NuStats
Research Solutions

Greater Buffalo-Niagara Regional Transportation Council On Board Study

Final Report

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1.0 Executive Summary

1.1 Background

In the fall of 2012, the Greater Buffalo-Niagara Regional Transportation Council (GBNRTC), with consultant support, conducted a regional on-board transit origin and destination (O/D) survey of all fixed route and rail services for the Niagara Frontier Transportation Authority (NFTA).

The purpose of conducting this study is for the calibration and validation of ridership models, demographic analysis of current customers, market share assessment, use of various fare media, and transfer activity. This information will allow an assessment of service area demographic shifts and trends in comparison to previous studies. The information collected and analyzed in this study will help shape the region's transit planning needs and assist in the transportation investment decision making process.

The last regional on-board transit study was conducted by NuStats in 2002. Since then, the region has experienced significant economic and transit system changes. The full-scale data collection for the 2012 survey was performed from September 26, 2012 through November 9, 2012. A total of 9,389 completed and usable questionnaires were collected. The study involved developing a sampling plan; designing the survey instruments; conducting a pilot test; collecting, processing, and geocoding the location-based data; weighting and expanding the data; analyzing the data; and reporting the results.

1.2 Survey Design and Administration

The survey design and administration was a collaborative effort between GBNRTC and NuStats leading up to the pilot study and the full-scale data collection. While the data collection was initially planned to include a pilot and full-scale survey occurring during the spring of 2012, major potential changes were planned for NFTA during March of 2012. This caused the pilot to be conducted during the spring of 2012 and the full-scale data collection to occur during the fall of 2012.

Using the Federal Transit Administration (FTA) protocols, a base 10 percent sample rate was determined for all NFTA bus routes using the ridership data available from spring 2012. A sample size of 4 percent was determined for the rail portion based on trip characteristics of the ridership such as trip purpose and trip time.

A pilot test was conducted to determine how well the data collection methodology (e.g., survey form, process for distribution and collection, response rates, etc.) worked prior to the full study. This was a full dress rehearsal intended to represent the full-scale data collection and processing effort. The pilot test took place during early February of 2012 and surveyed NFTA selected routes and the rail. A total of 1,266 samples were collected using two different paper self-administered survey instruments. The test results showed that the instrument with the boarding and alighting questions at the beginning of the survey produced the highest quality results.

Finally, using the pilot test results, NuStats developed the initial cleaning specifications to process the data. Once the pilot test data were submitted, GBNRTC scrutinized the data to fully understand the cleaning protocols and provided feedback based on the cleaning specifications and the processed dataset. After further iterations of comment regarding the data, the format was finalized and used as a template for the full-scale data collection processing efforts.

The initial survey questionnaire development was based on a fully tested on-board instrument which was used as a starting point for many previous studies. The survey instrument was designed using experience from other projects, current regional conditions, and GBNRTC modeling needs. Subsequently, the questionnaire was refined and finalized using findings from the pilot test.

1.3 Data Processing and Quality Control

Data processing and quality control were two critical tasks for this survey. The survey team spent extensive amounts of time on these two tasks to ensure a quality data set. Three major efforts were taken in this process: data check and verification, survey record aggregation and sample expansion.

After the data was collected, it was scanned and verified using specifically designed software. The results of the scanning and verification became the preliminary data file for processing. As noted, initial data processing occurred after the pilot test and the method was refined for the full-scale study. All location data was cleaned and geocoded, then scrutinized for direction, transfers made, and boarding and alighting locations. In order to create a representative final data file, weighting and expansion of the data collected was conducted. This involved creating trip level weights for each trip, response rates, and vehicle level weights to account for the trips not surveyed. The weights were then expanded to represent the average daily ridership by route using figures provided by NFTA.

1.4 Key Survey Findings

NuStats created sets of statistics at the service type and system wide levels. These statistics focused on transit user's demographics, travel patterns, trip purposes, and service quality.

The NFTA bus and rail system serves 97,683 boardings every day, with 73,390 average weekday boardings by local bus routes, 23,000 boardings by rail service, and 1,293 boardings by express services. The majority of riders (52 percent) reported not having to make any transfers to complete their trips, while 48 percent made at least one transfer.

The majority of transit riders in the Buffalo-Niagara region are transit dependent. Eighty-two percent of riders do not have access to a vehicle and 55 percent of riders in the region do not have a valid driver's license. Furthermore, 14 percent of riders surveyed in the region were unemployed. The NFTA transit system primarily serves people with lower incomes. While each service varies (express service, local service, and rail service) the survey found that on average 90 percent of riders were from households with an annual income of less than $50,000, and that 37 percent of riders were from households making less than $10,000 annually.

NFTA passengers are predominantly African American (42 percent), while Caucasians make up 33 percent of riders, and Hispanic riders only make up 8 percent of passengers. Nearly half (47 percent) of NFTA's passengers are between the ages of 19 to 34 years of age and 41 percent of passengers have only one person in their household that is employed even though 79 percent of households have more than one person.

Travel habits and trip characteristics of NFTA passengers show that four out of ten (40 percent) rider's origin or destination was home while one quarter (25 percent) of origins and destinations are work. Ninety-four percent of passengers walk to and from their first and last bus/rail stops due to the fact that 84 percent of riders do not have automobiles available to make their trip. When it comes to fare payment, 32 percent of passengers purchase monthly passes for their fare. The majority of fare purchases are at other places other than on the bus, where only 37 percent of fare purchase occurs. Full fare purchases total 89 percent of

purchases due to the fact that only 3 percent of riders are over the age of 65 and only 16 percent of passengers report that their employers pay for all or part of their fare.

Based off of survey results, NFTA riders are satisfied with the service that NFTA provides with 84% of passengers either reporting “somewhat satisfied” or “very satisfied”. This shows that customers still appreciate the value of the transit system even after service changes occurred in the spring of 2011.

1.5 Summary and Recommendations

Two areas of improvement are recommended for future on-board surveys. If resources allow, the first recommendation is a system-wide boarding/alighting (B/A) count survey prior to the next on-board survey. Understanding transit on-to-off flows would allow for a strategic sampling effort at the vehicle stop level to ensure all transit corridors are accurately represented during the on-board study. In addition, a weighting scheme could be derived from this B/A count survey and ridership could be educated on the upcoming on-board study to elicit participation. The collection effort should cover all routes by stop, direction, and time of day.

In recent years, FTA has emphasized using more accurate weighting and expansion methodologies so that the results of origin-destination transit surveys more accurately represent actual transit characteristics both spatially and temporally. A stop-level count survey is one such solution promoted by FTA. For the purpose of this survey, spring 2012 weekday daily ridership figures were used and only counts at the trip level were conducted. , The second recommendation relates to the way that on-board survey data is collected, given the known issues and biases with self-administered questionnaires. While this type of survey has been the industry standard for the past two decades, the trend, based on FTA direction and client/consultant data needs, is the ability to validate the data in real-time. This requires a personal interview conducted in an intercept method using tablet technology or through a telephone interview. In each scenario illogical data can be corrected during the interview. Thus, requiring fewer samples to be collected which leads to a cost savings for the transit agency. In summary, the GBNRTC on-board transit survey provides valuable information for transit planning, policy decision making, and resource allocation. The survey team developed various innovative methods in survey design, sample expansion, and data quality control, all leading to a more robust and statistically significant dataset, both spatially and temporally.

2.0 Introduction

Accurate and valid transit usage forecasts grounded on regional travel demand models are extremely important for local planning and investment, and are required for the increasingly stringent funding process of the Federal Transit Administration (FTA). To support the demand models' data requirements, up-to-date on-board transit surveys that are fully compliant with FTA guidelines are needed. Therefore, the Greater Buffalo-Niagara Regional Transportation Council (GBNRTC) contracted with transit research consultant NuStats to conduct the regional on-board survey for the riders on line-haul fixed bus routes and the rail system operated by the Niagara Frontier Transportation Authority (NFTA).

Since the last survey conducted in 2002, service changes and significant economic changes have occurred in the region. In addition, as the region looks to potentially increase investments to expand rail services, the need for more up-to-date information is even more critical. The purpose for conducting this large study is to update the Travel Demand Forecast Model (TDFM) and to enhance the transit and mode choice component. Meanwhile, the data collected should provide rich information on the current transit rider travel pattern, demographic information and transit service characteristics. The information is extremely valuable to the region's transit planning and transportation investment decision making process.

GBNRTC defined a set of criteria for a successful survey that includes the following:

- Proper coverage and representativeness across the full universe of transit users of the transit provider;
- Sampling plan and data collection methodology focusing on trip purposes and transit access/egress mode;
- Completeness of detail in the trip origin and destination records collected, including accurate geocoding;
- Establishing baseline information for boarding/alighting and transfer rates; and
- Comprehensive and transparent documentation of all methods, procedures, and outcomes in the survey.

The Origin/Destination (O/D) survey was conducted among riders of fixed route services for the entire NFTA system using self-administered questionnaires. Data collection was conducted on weekdays (Monday through Friday) from September 26 through November 9, 2012. A total of 9,389 usable questionnaires, as included in the final data files, were collected for the O/D study out of a total of 40,474 eligible boardings. Eligible boardings were defined as all passengers, aged 16 and older, on all surveyed trips where a completed questionnaire was collected (eligible boardings age 16 and older were determined by visual estimation), resulting in a response rate of 23.2 percent.

This report summarizes the survey methods and findings. Section 3.0 provides a description of the sampling approach, pilot test background, survey instrument and procedures, as well as the weighting and expansion methodology. Section 4.0 provides detailed information for the variables collected during the O/D study and summarizes the data by local route, express route, rail, and system-wide. Section 5.0 provides trending analysis in comparison to the 2002 On-board study. Appendix A contains the GBNRTC survey instrument distributed on bus routes and Appendix B contains the GBNRTC instrument distributed on the rail service. Appendix C contains the Spanish survey instrument distributed on bus routes and Appendix D contains the Spanish instrument

distributed on the rail service. Appendix E shows the assignment sheet format and details and Appendix F is the power point presentation conducted during surveyor training.

3.0 Survey Methods

3.1 Sampling Plan

The Greater Buffalo-Niagara Regional Transportation Council (GBNRTC) On-Board Survey sampling design is based on a standard two-stage sampling approach that consists of sampling bus trips and then passengers on those trips. Every passenger over the age of 16 (determined by visual estimation) who boards the sampled bus trips receives a questionnaire. The sampling plan, prior to the start of data collection, was to yield approximately 8,463 complete and usable questionnaires among all routes in the frame. Broken down by service type, completed questionnaires will be collected from 7,463 (88%) NFTA fixed bus route passengers and 1,000 (12%) from NFTA rail service passengers.

In developing the sample plan, three factors were taken into consideration. First, we wanted to ensure that the sample adequately meets data needs at the global level (i.e., system-wide). Second, the plan should ensure the collection of adequate samples at the various day-parts (i.e., AM Peak, Mid-day, PM Peak, and Off-Peak). Third, we want to ensure that every route is sampled in each direction (Inbound and Outbound). Routes having weekday average daily ridership higher than 400 daily boardings will have at least two trips sampled per stratum in order to calculate a standard deviation. Any express route will only need to be sampled heading Inbound as prescribed by GBNRTC.

The plan assumes that samples will be collected to simulate average weekday boarding distributions by time period. The time of day definitions are as follows: AM Peak (7:01 a.m.–10:00 a.m.), Mid-day (10:01 p.m. – 1:59 p.m.), PM Peak (2:00 p.m. – 6:00 p.m.), and Off-Peak (4:00 a.m. - 7:00 a.m. & after 6:01 p.m.). The actual number of surveys collected may or may not mirror these distributions, depending on the actual ridership by time period and/or the actual number of trips by time period as observed during data collection. However, sampled trips by time-of-day and direction were closely monitored by field staff.

Sample goals were developed for each route based on estimated proportional passenger volumes, which are based on NFTA average weekday ridership figures collected from April and May 2012. The goals set based on these figures held through the data collection effort. In addition, NFTA has added enhanced express routes subsequent to this time whose ridership is approximated for the sample plan.

For a questionnaire to be considered complete and usable for the purposes of this study, specific survey questions must be answered. To meet the definition of a completed survey, the required data elements are the origin address, destination address, mode of access, mode of egress, trip purpose and boarding and alighting information.

NuStats proposed a 10% sample proportional to population ridership for all bus routes in the system, the FTA de facto sample rate for bus service. However, due to the high ridership of the rail route and project fund limitations, a sample size of 1,000 samples, 4percent, was collected. As shown in Table 3.0, the sample plan

allows for a total of 8,463 sample pieces to be collected. NuStats exceeded the overall goal of the sample plan by completing the data collection task with a total of 9,389 completed surveys.

Table 3.0: Route Level Average Weekday Ridership and Sample Allocation

Route	Average Weekday Ridership	Sample Size	Sample Goal
1-William	1,551	10%	156
2-Clinton	1,550	10%	150
3-Grant	5,060	10%	506
4-Broadway	2,511	10%	252
5-Niagara/Kenmore	6,110	10%	611
6-Sycamore	2,524	10%	253
7-Baynes/Richmond	303	10%	31
8-Main	1,670	10%	167
11-Colvin	907	10%	91
12-Utica	5,841	10%	585
13-Kensington	3,583	10%	359
14-Abbott	1,461	10%	147
15-Seneca	1,789	10%	179
16-South Park	1,996	10%	200
18-Jefferson	782	10%	79
19-Bailey	4,336	10%	434
20-Elmwood	4,400	10%	440
22-Porter/Best	1,185	10%	119
23-Filmore/Hertel	5,410	10%	541
24-Genesee	3,082	10%	309
25—Delaware	2,715	10%	272
26-Delevan	3,335	10%	334
27-Erie County Home	85	10%	9
29-Wohlers	188	10%	19
32-Amherst	2,615	10%	262
34-Niagara Falls Blvd	1,207	10%	121
35-Sheridan	604	10%	61
36-Hamburg	736	10%	74
40-Grand Island	1,024	10%	103
42-Lackawamna	39	10%	4
44-Lockport	766	10%	77
46-Lancaster	162	10%	17
47-Youngs Rd	411	10%	42

Route	Average Weekday Ridership	Sample Size	Sample Goal
48-Williamsville	885	10%	89
49-Millard Suburban	153	10%	16
50-Main/Niagara	523	10%	53
52-Hyde Park	285	10%	29
54-Military	106	10%	11
55-Pine Ave	1,117	10%	112
57-Tonawandas	102	10%	11
*60-Niagara Falls Express	139	10%	14
61-North Tonawanda Express	51	10%	6
*64-Lockport Express	73	10%	8
66-Williamsville Express	106	10%	11
67-Cleveland Hill Express	80	10%	8
68-George Urban Express	31	10%	4
*69-Alden Express	69	10%	7
70-East Aurora Express	81	10%	9
*72-Orchard Park Express	54	10%	6
74-Hamburg Express	124	10%	13
75-West Seneca Express	66	10%	7
76-Lotus Bay Express	146	10%	15
79-Tonawanda Express	22	14%	3
81-Eastside Express	64	10%	7
201-Lockport	65	10%	7
*204-Airport/Downtown Express	187	10%	19
206-Buffalo State Circulator	28	10%	3
211-ECC Circulator	188	10%	19
45-Rail	23,000	4%	1,000
Total	97,633	8.6%	8,491

* New enhanced express trips without approximated ridership figures from April-May 2012

3.2 Pilot Test

3.2.1 Pilot Test Background

A pilot test was conducted prior to the full-scale data collection. The pilot test was a full dress rehearsal of the data collection processes for the O/D study that tested two different questionnaires to determine which version would be utilized for the full study. The pilot test included the following activities: questionnaire design, assignment generation, conducting of assignments, data processing, and final data file submittal and scrutiny to prepare for the upcoming full-scale data collection.

NuStats conducted a pilot survey from February 6, 2012 to February 9, 2012. The purpose of the pilot was to gain insight on potential issues that could arise during the full-scale data collection and limit these occurrences. The pilot test was designed to detect limitations of the methodology and the survey instrument. For those items that do not work well, the pilot data and anecdotal information were used to make improvements upon the methods to be employed for the full-scale data collection. In addition, the pilot allowed staff the opportunity to work with the transit provider to ensure that the full-scale data collection logistical issues were minimized and to familiarize staff with transit facilities, operators, and transit schedules.

3.2.2 Pilot Test Results

Overall, 1,266 questionnaires were returned from both the rail and bus during the pilot. Three-hundred and sixty of those returned questionnaires were deemed usable. NuStats received 132 questionnaires returned by mail, of which 38 percent were deemed completes. There were 17 Spanish-language questionnaires returned; out of those, only one was considered a complete.

The bus data collection did not perform as well as expected but performed better than the rail collection. The bus routes which were surveyed provided a large number of returned questionnaires yet the majority of these returns failed post-processing. Two survey Instruments where used in conducting the pilot test. The key difference in instrument versions is the placement of the questions concerning boarding and alighting.

Version A's instrument questions number one and two were questions concerning fare. In version B, the first two questions pertained to boarding and alighting. Version B fare questions were moved to numbers six and seven while version A boarding and alighting questions were moved to numbers six and eight.

Question number five was varying in both instruments as well. In the two versions question five was switched for 5b (What is the exact street address?) and 5c (What is the name of the place you are coming from?). This done for the destination question as well which in version A is number seven and version B is number eight. The two versions of the instrument were on card stock 8.5" x 14" and double sided. Version A questionnaires were odd numbered while version B questionnaires were even numbered. Questionnaires were bundled in stacks of 25 with every other card being a different version.

The pilot used field editors to assist with the completion of location based information and ensuring all coded responses were marked properly. NuStats continued the use of editors in the full study as a means to minimize processing time during the geocoding and verification tasks. Field editors are chosen from survey staff for their familiarity with the region and the transit system. A field editor's major function is to go through all returned

surveys and to use their expertise of the region and transit system to turn incompletes into completed surveys. Another key function of the field editor role is to perform callbacks on all surveys that do not pass the field screening. Implementing this practice during the full study increased the completion percentage.

3.3 Survey Instrument

The survey instrument design was a multiple-stage process comprising a pilot and full-scale questionnaire design phase. Taking into consideration the feedback from the pilot test, modifications were made to the instrument regarding the wording of individual questions and the placement of questions that resonated with the Buffalo regional area ridership.

The final survey instrument was designed as a self-completion questionnaire with 20 self-coded questions. The set of data items is presented in Table 2.2. Prior to data collection, returned questionnaires were defined as "complete" and "usable" if the following questions were answered: origin address, destination address, mode of access, mode of egress, trip purposes, and trip path.

Questionnaires were designed in a two-sided double letter-size format and printed on heavy card stock for easy distribution and completion. Each questionnaire contained a business reply mail permit for off-bus/rail completion and mail-back free of charge. The form was pre-printed with a unique serial number and barcode, which linked each questionnaire to a specific trip and bus stop boarding location. Text on the questionnaire invited passengers to register to win a monetary prize, one of 10 $100 prizes, by providing their name and telephone number. The questionnaire was designed to obtain information in three major categories: O/D travel patterns, access and egress modes, and rider demographics.

The questionnaire was available in English and Spanish. Appendix A contains the survey instrument used for bus data collection and appendix B contains the instrument used for the rail collection. Table 3.1 lists the data elements captured from the questionnaire and additional sources such as the control file which linked completed surveys to the surveyed route, direction, and time of day.

Table 3.1: Data Elements and Capture Method

Data Elements	Capture Method
Surveyed Route	Control File
Surveyed Route Direction	Control File
Surveyed Time of Day	Control File
Boarding Location	Questionnaire
Boarding Location Imputation	Imputed using other information : Trip path, origin location, access mode
Alighting Location	Questionnaire
Alighting Location Imputation	Imputed using other information : Trip path, destination location, egress mode
Total Buses and Trains	Questionnaire
Trip Path	Questionnaire

Data Elements	Capture Method
Origin Trip Purpose	Questionnaire
Origin Location	Questionnaire
Access Mode	Questionnaire
Fare Payment	Questionnaire
Fare Type	Questionnaire
Destination Trip Purpose	Questionnaire
Destination Location	Questionnaire
Egress Mode	Questionnaire
Fare Subsidy	Questionnaire
Place Fare was Purchased	Questionnaire
Trip Frequency	Questionnaire
Valid Driver's License	Questionnaire
Auto Availability	Questionnaire
Age	Questionnaire
Worker/Student Status	Questionnaire
Ethnicity	Questionnaire
Household Size	Questionnaire
Household Employment	Questionnaire
Household Vehicles	Questionnaire
Household Income	Questionnaire
Overall Satisfaction with NFTA Service	Questionnaire

3.4 Survey Administration

3.4.1 Labor Recruitment and Training

NuStats subcontracted the survey staff to Key Resource Group, a local Disadvantaged Business Enterprise (DBE) staffing agency in the Buffalo area. Employment criteria included the demonstration of: current or past residence in the service area, strong work ethic, effective communication skills, professionalism, maturity, possession of reliable personal transportation, and attentive to details.

Training was conducted on September 25, 2012. A total of 24 surveyors where trained for the bus system collection. Rail collection began on September 27, 2012 with training on September 26. Rather than using surveyors as the primary labor force, a total of six NFTA checkers where trained for Rail surveying. The training included a background of the survey project, an overview of the transit system, safety and security training, and survey instruction, including one hour of role-playing and intensive tutoring. Surveyors received specific training in reading and comprehension of surveyor assignment sheets, basic survey procedures and etiquette, and survey subject approach techniques.

3.4.2 Survey Administration

The full-scale survey was managed by an in-field survey team comprised of a NuStats field manager to oversee the entire field team and surveyor assistants to help manage the surveyor's day-to-day activities. The on-board data collection was conducted by individual surveyors and in some cases, high ridership lines, two surveyors were used on one vehicle. The surveyor handed out questionnaires, persuaded passengers to complete the questionnaires, assisted with questions, collected questionnaires, counted passengers who refused the survey, counted boardings under the age of 16 years old, and scrutinized the returned questionnaires. Daily surveyor assignments were distributed by the field manager or by the assistants.

As assignments were handed out, information was updated in the field management system. An example of the assignment sheet distributed to staff is provided in Appendix C. When surveyors returned from an assignment, the field manager or assistant checked the assignment results (i.e., quickly reviewed the questionnaires to spot any glaring performance issues) and verified the passenger counts. Feedback and additional training were provided when errors were found in the data. If certain errors persisted, staff was relieved of their services. The field manager updated the assignment status in the field management system and then handed out the next assignment. Once the completed assignments were reviewed, the questionnaires went through the in-field editing process for inspection and coding prior to being sent to Austin, the location of NuStats' headquarters, for scanning and verification.

Surveying was conducted out of all three bus divisions starting with Frontier Station, then Cold Springs Station, and finally with Babcock Station. Goals were set at the route level and once all goals were met for all routes at a bus division, the surveying effort moved to the next bus division.

There where between two and four NFTA checkers used per survey assignment for rail collection. After four weeks of rail collection, led by NFTA staff and supported by NuStats surveyors, rail collection was temporarily suspended in order to process mail backs (surveys returned by mail) and in-field call backs (respondents who provided their phone name and phone number and did not complete the survey were called back by in-field

editing staff in order to complete the survey). An additional day of surveying on the rail was conducted November 5, 2012 by NuStats survey staff, achieving the overall goal for the Rail.

Following the completion of the initial assignments, NuStats required the surveyors to return to the survey command center located at the Station which surveying was being conducted. Supervisors verified the accuracy of each surveyors work. Survey command center staff provided coaching and additional training when deemed necessary. Staff then distributed survey assignments for the next day.

3.4.3 Surveyor Assignments

NuStats developed surveyor assignments by uploading the trip selection requirements to a field management system based on ridership. Survey assignments where created by using NFTA scheduling information which was compiled into an Excel spreadsheet. The Field manager created surveyor assignments on an individual block basis (a unique collection of trips assigned to a vehicle for a day), uploaded the assignments into the management system, printed the surveyor assignment sheets from the management system for the surveyors and included the assignment start and end locations. Surveyors distributed survey instruments to all boarding passengers over the age of 16, and recorded the number of passengers refusing the survey. The assignment sheets contained open ended areas for surveyors to mark survey ranges distributed per trip, capture the number of refusals per trip, and document under age boardings per trip.

3.4.4 In-Field Survey Instrument Editing and Scanning

Following the surveyor check-in, completed questionnaires were presented to on-site data editors for editing and correction. Data editors were local residents who were familiar with the geography of the transit service area. Data editors reviewed each completed questionnaire and used geographic resources to complete or correct address information. Because the origin and destination questions are the most difficult to collect, using these geographic resources to “clean” addresses provided a means to “salvage” as many questionnaires as possible, thus increasing the response rate. After each questionnaire passed the in-field quality control procedures, the barcodes were scanned on the questionnaire using a procedure that identified the questionnaire as a “complete.”

This information was uploaded to the field management system as one data input for the status reports. “Complete” questionnaires were sent to Austin for scanning and verification. Data editors were also employed to call back riders who turned in questionnaires that were less than complete, but provided contact information for the prize drawing. The phone number came from the questionnaire and allowed partially filled out questionnaires to be converted into completes

3.4.5 Status Reporting

The field management system allowed the field manager to review surveyor assignments, provide progress reports and data summary tables, and monitor field staff performance. The field manager prepared status reports from the field management system. This automated application also allowed the field manager to conduct consistency checks, flag problem records, and clean and purge flagged records. The field manager reviewed the information for accuracy in the status, response, and performance reports to the field management system.

3.5 Data Quality Assurance and Processing

3.5.1 Data Verification

For the questionnaires returned and deemed initially complete, NuStats used ScanTron scanning technology to assist in data entry and minimize human error resulting from manual data entry methods. The scanning process involved electronically scanning batches of approximately 20 survey instruments to produce an image file of the documents. After scanning, the data results derived from the image files were individually reviewed and verified by comparing the scanned image to the data contained in the data file. Text data (primarily location information) were reviewed for the purpose of correcting misspellings and verifying that the scanner correctly read numeric data. The raw data file output from scanned documents was maintained unaltered for comparison purposes, if necessary.

A data items matrix and data dictionary were developed based on the survey instruments and scanning programs using the following process:

- The data items matrix identified variable names, variable descriptions, data types, field widths, code sets, skips, and exact question wording as it appeared in the survey instruments.
- The data dictionary was based on variables listed in the data items matrix. The data dictionary consisted of variable names, data types, field widths, variable labels, and response labels. The labels were abbreviated as necessary to accommodate database field width restrictions.
- The data dictionary was checked to ensure agreement with the hard-copy survey instrument.
- The data structure was checked to ensure consistency for all data files created for the study.

Following the duplication of the original database, the data contained in the database copy were checked for data integrity. Various edit routines were programmed to check the consistency of data and to identify reporting, scanning, or entry errors. Data in the control file were then matched against survey data to ensure that all information was consistent between the two files. Routine edit checks were conducted to examine survey instrument responses for reasonableness and consistency across items. Routine checks included:

- The total number of records in the data file was checked to determine if the amount was equal to the total number of scanned survey instruments.
- If duplicate records were identified, all duplicated data were checked against the original record. If all data were not identical, data were flagged for review. Otherwise, duplicates were corrected or removed (duplicate unique identifier).
- Records with multiple responses per question were reviewed for plausibility.
- Records with comments outside of the scanning area were either incorporated into the appropriate variable or into the open comments.
- Ten percent of data entries were re-verified.

Response Checks

- Checking for proper data skips and patterns of answering questions consistent with prior answers.
- Checking for realistic responses (e.g., number of household workers is equal to or less than the number of household members).

- Responses of home to home trips were researched for correct one-way location types.
- Checking for high frequency of item non-response (missing data).
- Non-required responses that were not entered were coded as “9”.

Range Checks

- All categorical values were verified within the expected range.
- Outliers in continuous variables (variables that represent a continuum of values and do not have a code set) were flagged and reviewed.

Open-Ends Preparation (non-categorical, text variables)

- Routes were converted from an open response into standard route codes.
- Text variables associated with an “other” type category were reviewed. Text responses that belonged to one of the categories in the response list/code set were flagged and re-coded.
- All text responses were corrected for any spelling or typographical errors.
- All responses not marked “other” and included an open response were reviewed.

3.5.2 Geocoding

After the questionnaire data was compiled, the location data were split out and geocoded. The geocoding task included reviewing, cleaning, and geocoding the location data collected in the survey instrument. The survey location data consisted of four location types: trip origin, boarding location, alighting location, and trip destination. The trip origin, destination, boarding, and alighting questions were explicitly asked on the survey instrument.

Trip Origin and Trip Destination

Geocoding of respondent-provided trip origin and trip destination addresses consisted of two stages. First, an automated batch run was first attempted to successfully geocode origin and destination addresses. The batch run attempted to match exact addresses or cross-streets obtained from respondents to a street coverage file provided by NFTA. Addresses or cross-streets matching the coverage file were assigned an latitudinal and longitudinal (X/Y) coordinates and a value of “M” for matched, and placed in the “AV_STATUS” field. Addresses or cross-streets not matched during the batch run were flagged with an “AV_STATUS” value of “U” for unmatched, and passed to the next stage of geocoding.

During the next stage, addresses were researched using a series of resources, including Google.com and other mapping software. Addresses that were matched to an exact address or cross-streets during this stage were assigned an X/Y coordinates and an “AV_STATUS” of “M” if matched through traditional mapping software, and an “AV_STATUS” of “G” if matched through Google street networks. Those remaining unmatched addresses were not assigned an X/Y coordinate and were given the “AV_STATUS” of “U”. Because origin and destination are required elements, unmatched records were removed from the final data file. Records that could not be matched in this stage, where further researched by using the respondents full trip information in order to locate the appropriate locations.

Boarding and Alighting Location

Geocoding of respondent-provided boarding and alighting locations were split into a separate file for geocoding. The reasoning behind geocoding these locations in a separate file were:

- Only place name and cross streets where asked and address was not asked since there are not addresses for bus stops
- Many respondents only gave one single cross street which cannot be geocoded without an intersecting road.
- Sorting of rider provided information allowed for a streamlined process in cleaning the partial records.
- The rail respondents selected their stations from a list instead of writing in the locations.

Geocoding Quality Control

Once geocoded, the records were subjected to a series of strict quality control checks. The quality control checks included:

- Running the unmatched locations through the geocoding process for a final geocoding attempt.
- Randomly selecting five percent of the geocoded address file to review in detail to ensure proper placement of the overall latitude/longitude points. The review process entailed mapping the geocoded points in ArcView and comparing the points with street file.
- All cross-street points were queried and analyzed to ensure proper placement of the points (since a cross-street geocode does not reference a zone for zip code or city in ArcView; and the default placement of a geocoded cross-street in ArcView places the point in the southeast quadrant of that intersection.)
- A visual quality control check was first performed on each route. This check reviewed the geocoding and verified the accuracy of the location by route, and additionally analyzed the boarding and alighting locations relative to the each route. The visual check was conducted by querying boarding/alighting points according to each route. For example, all of the boarding/alighting matches for Route 5 were selected and displayed in the map view in ArcView. A visual check was conducted to make sure that most of these points were displayed on or within proximity of the route. Points that were not displayed on or near the route were flagged for review.
- A visual quality control check was then performed by city. The geocoding was verified by querying the geocoded matches related to each city. These points were then displayed in the map view in ArcView and visually confirmed, and outlying locations were selected and confirmed to be correct.
- Records with the same origin and destination location were researched or possibly removed from the database if irresolvable.

Boarding and Alighting Imputation

All records were required to have both a boarding and an alighting location before being considered complete. The boarding and alighting locations were prompted in the questionnaire. However, not all responses given in the questionnaire could be matched to logical stop locations on the surveyed trip. At times, the locations would be for stops on other routes or for streets that had several stops on them. This required imputation logic to translate the responses to the actual stop locations on the transit trip.

For records with geocoded boarding and alighting locations, the geocoded X/Y coordinates from these were snapped to the physical stops on the surveyed trips if they were within a .5 mile threshold of the route. For records that had one or more stops that either could not be geocoded or was not near the surveyed route, they were imputed by either the proximity of the origin/destination location to the surveyed route or by transfer locations if applicable. If it was determined that a previous/future transfer occurred, the following logic was applied to determine the boarding/alighting transfer location:

- The set of possible stop locations that the passenger could transfer to/from based on the reported sequence of routes and the current route were identified in order to determine the transfer location.
- The transfer location was then selected using a half-mile buffer, which included the stops closest to the origin/destination where the two routes cross.

3.5.3 Route Sequence and Locations Verification

At times, survey respondents were confused about the one-way nature of the questionnaire, and recorded duplicated locations or routes resulting in roundtrips, alternate routes, reversed locations, or routes used for a different trip. If left uncorrected, this could result in illogical transfer rates for a trip or inaccurate travel patterns. The geocoded locations and sequence of routes along the trip were reviewed for plausibility through the TrueRoute program. The heart of TrueRoute is the "Put Passenger Surveys" module of VISUM (Put stands for Public Transport). This is an add-on to VISUM that has the capability to calculate plausibility scores for on-board survey records.

These scores are based on the records' O/D locations and the captured sequence of routes. As part of its processing, TrueRoute uses the NFTA provided input data to identify line routes (directional routes) and vehicle journeys (trips) in the VISUM network that match the provided inputs as closely as possible, and that allow the passenger to complete the trip between the provided origin and destination locations.

Plausibility scores were computed for the surveyed leg, the preceding leg (if reported), and the succeeding leg (if reported), and then for the overall path based on a .5-mile walk tolerance and 30-minute wait time tolerance. All records with an implausible leg were reviewed visually for possible errors in either the locations or the route sequence. For records with long walking distances, a list of possible route sequences was generated to fill in missing transfers. Likewise, some records had transfers that were implausible given their O/D trip. A similar list of possible route sequences was generated to determine if the route sequence was reported and interpreted correctly. Although not all public transit riders follow a logical path, this verified that the origin and destination locations were in the correct order given the surveyed route and that only routes that could have been used in the one-way O/D trip were recorded in the data set.

3.6 Survey Weighting and Expansion

From a finite population sampling theory perspective, analytic weights are needed to develop estimates of population parameters and, more generally, to draw inferences about the population that was sampled. Without the use of analytic weights, population estimates are subject to biases of unknown (possibly large) magnitude.

In on-board surveys, the universe of trips operated by transit routes cannot be sampled. At the same time, all the riders who board the sampled routes cannot be surveyed due to non-response. All these factors lead to

biases in the survey data. Consequently, sample weighting and expansion is critical to account and correct for these biases. In particular, sample weighting adjusts for non-response at the bus trip level and accounts for sampling trips at the route level. Sample expansion, on the other hand, expands the weighted sample to reflect the population ridership at the system-wide level. The next section describes the sample weighting procedure followed by the sample expansion procedure, calculation of the final analytic weights, and calculation of linked trip factor that translates boardings (i.e., unlinked trips) to linked trips.

Sample Weighting

Sample weighting is a critical consideration to account and correct for biases in the survey data. As a simple example, one route may have 1,000 passengers per day, and another, 100 passengers. If 50 surveys were collected on each route, the percentage collected would be 5 and 50%, respectively. Without weighting, the data collected on the route with 100 passengers would be over-represented in the results. Thus, weighting balances these differences and aligns the weighted sample to the known distribution of population ridership.

The sample weighting process includes calculation of two weights: (1) Response factor that corrects for non-response at the bus trip level, and (2) Vehicle factor that corrects for sampling trips at the route, time of day, and direction level. The Boarding factor, or final weight, is the product of the response factor and vehicle factor. Each of these factors is discussed below in detail.

Response Factor

Response factor adjusts for non-response associated with boarding passengers that do not return usable surveys1 for each trip. In order to capture all the non-responding boarding passengers, the Response factor is calculated at the bus trip level.

Response Factor = Total Adult Boardings[2] by Trip / Usable Surveys by Bus Trip

Vehicle Factor

Vehicle factor accounts for the non-surveyed trips at the route, time of day and direction level, or cell. The total one-way trips and total sampled trips will be calculated for each cell based on the population run cut file. For example, Route *x* inbound in the AM Peak has a total of 5 trips, and 4 had completed questionnaires. This cell would have a Vehicle Factor of 1.25 (5 divided by 4). In the event that no trips in a cell had completed questionnaires, similar cells will be grouped together in the following manner:

1. Grouping type 1:
    a. AM Peak trips are grouped with PM Peak trips going in the opposite direction.
    b. Off-peak trips in one direction are grouped with off-peak trips in the same direction.
2. Grouping type 2:
    a. All AM Peak trips are grouped with PM Peak trips if one time period had no completed records.
    b. All Mid-day trips are grouped with Evening/Early AM trips if one time period had no completed records.
3. If further grouping is necessary, vehicle factor is calculated at a route level.

[1] Each record in the database represents a usable survey (i.e., one that has passed all quality assurance procedures).

[2] Adult Boardings are defined as boardings made by individuals 16 or over 16 years of age that qualify them for taking the survey.

Vehicle Factor = Total Trips per Cell / Sampled Trips per Cell[3]

Boarding Factor

Following the calculation of the two weighting factors, the Boarding factor is calculated by multiplying the Response and Vehicle factors. Excessively large weights are capped at 8 times the average weight per route.

Boarding Factor = Response Factor * Vehicle Factor

Sample Expansion

Sample expansion factors increase the weighted sample to the total boardings at the system-wide level. In particular, the survey data is expanded to represent fall 2012 average daily ridership at the route level. This information was provided by NFTA. The calculation of the Expansion factor is described below.

Expansion Factor

The Expansion factor is calculated at the route level using the formula below. As an example, the weighted sample ridership for Route *x* is 411.5 and the population average daily weekday ridership for this route is 344. This produces an Expansion factor of 0.836 (344 divided by 411.5).

Expansion Factor = Population Average Daily Ridership by Route / Ridership Weighted by Boarding Factors

Expansion Weight

The final sample "weighing and expansion" weight is referred to as the Expansion weight. In particular, the Expansion weight is calculated by multiplying the Boarding factor (i.e., weighting factor) by the Expansion factor. Following the application of the Expansion weight, the weighted data represents the population boardings (i.e., unlinked trips).

Expansion Weight = Boarding Factor * Expansion Factor

Linked Trip Factor

Linked Trip factor translates boardings (i.e., unlinked trips) to linked trips. This factor accounts for the rider's transfer before or after the surveyed bus. A rider who did not transfer during the completion of a one-way transit trip would carry a Linked Trip factor of 1.0. A rider who transferred from another route before boarding the surveyed bus, but did not intend to transfer again, would have a weight of 0.5, as would a rider who did not transfer before boarding the surveyed bus, but who intended to transfer in order to get to the ultimate destination. A rider who transferred to and from the surveyed bus would have a weight of 0.333. The Linked Trip factor is calculated for every rider who completed the survey. This weight will be provided as a stand-alone weight. Following the application of this factor to the weighted data (i.e., data weighted by the Expansion weight), the information can be expressed as "linked" trips instead of individual boardings.

[3] A cell is defined as the scheduled trips grouped by route, time of day and direction. For cases where there are no usable records in the cell, it will be grouped with trips with similar trip characteristics.

4.0 Survey Results

Overall, 40,474 total passenger boardings were observed during the survey which yielded 9,389 completed questionnaires for an overall response rate of 23 percent. Response rates varied by route, with a minimum of 16.3 percent on route 60 and a maximum of 72.2 percent on route 74. The rail collection yielded a response rate of 23.3 percent. Table 4.0 shows each routes complete records collected, eligible boardings (passengers over the age of 16 years old), and response rate.

Table 4.0: Response Rates by Route

Route	Completed Records	Eligible Boardings	Response Rate
1-William	147	732	20.1%
2-Clinton	195	815	23.9%
3-Grant	499	2,285	21.8%
4-Broadway	250	1,479	16.9%
5-Niagara/Kenmore	606	2,583	23.5%
6-Sycamore	256	1,328	19.3%
7-Baynes/Richmond	47	165	28.5%
8-Main	208	761	27.3%
11-Colvin	168	428	39.3%
12-Utica	645	2,951	21.9%
13-Kensington	361	1,416	25.5%
14-Abbott	193	679	28.4%
15-Seneca	190	835	22.8%
16-South Park	202	987	20.5%
18-Jefferson	84	463	18.1%
19-Bailey	458	1,957	23.4%
20-Elmwood	535	1,964	27.2%
22-Porter/Best	119	502	23.7%
23-Filmore/Hertel	560	2,949	19.0%
24-Genesee	332	1,616	20.5%
25—Delaware	293	1,263	23.2%
26-Delevan	353	1,527	23.1%
27-Erie County Home	8	30	26.7%
29-Wohlers	27	93	29.0%
32-Amherst	301	1,303	23.1%
34-Niagara Falls Blvd	176	985	17.9%
35-Sheridan	73	268	27.2%

Route	Completed Records	Eligible Boardings	Response Rate
36-Hamburg	112	392	28.6%
40-Grand Island	108	485	22.3%
42-Lackawamna	7	31	22.6%
44-Lockport	93	391	23.8%
46-Lancaster	41	193	21.2%
47-Youngs Rd	40	123	32.5%
48-Williamsville	89	285	31.2%
49-Millard Suburban	41	94	43.6%
50-Main/Niagara	71	193	36.8%
52-Hyde Park	51	165	30.9%
54-Military	21	72	29.2%
55-Pine Ave	111	383	29.0%
57-Tonawandas	13	31	41.9%
*60-Niagara Falls Express	15	92	16.3%
61-North Tonawanda Express	17	47	36.2%
*64-Lockport Express	15	35	42.9%
66-Williamsville Express	14	22	63.6%
67-Cleveland Hill Express	19	34	55.9%
68-George Urban Express	6	13	46.2%
*69-Alden Express	12	20	60.0%
70-East Aurora Express	10	23	43.5%
*72-Orchard Park Express	9	25	36.0%
74-Hamburg Express	13	18	72.2%
75-West Seneca Express	9	28	32.1%
76-Lotus Bay Express	21	92	22.8%
79-Tonawanda Express	7	17	41.2%
81-Eastside Express	9	38	23.7%
201-Lockport	8	17	47.1%
*204-Airport/Downtown Express	17	26	65.4%
206-Buffalo State Circulator	13	31	41.9%
211-ECC Circulator	19	87	21.8%
45-Rail	1072	4,607	23.3%
Total	9,389	40,474	23.2%

* New enhanced express trips without approximated ridership figures from April-May 2012

NuStats surveyed routes by four different time of day periods as described in the sampling plan. Trips were surveyed with an even distribution of time of day periods in order to capture a true representation of riders by time period. Express route service provided the highest number of completed surveys for the a.m. peak period with 40 percent of completed surveys. This is due to typical express route passenger's morning commute to work. Local routes and rail service provided an almost even representation of passengers spread throughout all time of day periods.

The NFTA system as a whole provided an adequate coverage of surveys by time of day with mid-day providing the lowest amount of responses (16 percent) and a.m. peak providing the highest amount of responses 30 percent. Table 4.1 shows completed surveys by time of day, by service type and system wide.

Table 4.1: Survey Results by Time of Day

Survey Results by Time of Day	Service Type			
	Express	Local	Rail	System Total
AM PEAK	40.3%	26.5%	22.2%	29.7%
MID DAY	N/A	23.1%	24.3%	15.8%
PM PEAK	27.0%	24.1%	24.6%	25.2%
OFF PEAK	35.1%	20.0%	23.6%	26.2%

4.1 Data Summary and Analysis

The fully weighted and expanded GBNRTC data were used to create the following analysis, displayed by express service, local service, rail service, and system wide. All data are weighted by the final expansion weight, unless otherwise noted.

Twenty-eight percent of express passengers used a total of two or more vehicles to complete their one-way-trip while the majority of express passengers (72 percent) used only one bus. Half of local service riders used only one bus to make their trip and 60 percent of rail passengers used more than one vehicle for their one-way-trip. System wide, 52 percent of passengers made at least one or more transfers during their trip. Table 4.2 illustrates the relationship between the service type surveyed, and the total number of vehicles needed to complete a respondents' one-way trip.

Table 4.2: Total Buses Used to Make One-Way Trip

Total Buses Used to Make One-Way Trip	Service Type			
	Express	Local	Rail	System Total
One	71.8%	49.9%	40.2%	48.1%
Two	24.1%	37.3%	46.9%	39.2%
Three	3.8%	10.9%	11.2%	10.9%
Four	0.4%	1.8%	1.6%	1.7%
Five	0.0%	0.1%	0.2%	0.1%
Total	100.0%	100.0%	100.0%	100.0%

Express service had the highest number of home based origins (51 percent) which correlates with the surveys by time of day with respondents begging their commute from home. System wide, 48 percent of respondent's trip started from home while 10 percent of passengers started their trip from universities, middle schools, or high schools. Table 4.3 shows the origin trip purpose for passengers by service type.

Table 4.3: Origin Purpose

Origin Purpose	Service Type			
	Express	Local	Rail	System Total
Home	50.5%	48.5%	47.6%	48.3%
University/College (Student Only)	1.6%	7.4%	11.3%	8.2%
Shopping	5.7%	6.1%	4.2%	5.7%
Dining, Recreational, Entertainment, Sporting Event, Religious or Personal Business	9.9%	11.3%	10.7%	11.1%
Work or Work-Related	31.8%	21.3%	18.2%	20.8%
High School/Middle School (Student Only)	0.0%	2.2%	2.2%	2.2%
Medical Services	0.4%	3.0%	4.7%	3.3%
Other – Specify	0.0%	0.3%	1.1%	0.4%
Total	100.0%	100.0%	100.0%	100.0%

System wide, 92 percent of passengers walked from their origin location to their first stop while less than one percent of passengers biked to their first stop. Express riders had the highest percentage of auto travel to their first stop with 24 percent. Table 4.4 shows the mode of access to the passenger's first stop from their origin location.

Table 4.4: Access Mode from Origin Location

Access Mode from Origin Location	Service Type			
	Express	Local	Rail	System Total
Walked/WheelChair	76.3%	94.6%	83.2%	91.9%
Dropped Off	8.8%	4.5%	7.7%	5.2%
Drive Alone	14.2%	0.4%	7.9%	2.1%
Carpooled	0.7%	0.1%	0.8%	0.3%
Bicycle	0.0%	0.2%	0.4%	0.3%
Taxi	0.0%	0.2%	0.0%	0.2%
Total	100.0%	100.0%	100.0%	100.0%

Forty-seven percent of express passengers used a monthly pass to pay for their trip and 32 percent of all NFTA passengers used a monthly pass for fare payment. Three percent of NFTA passengers are still using tokens for fare payment while one percent of NFTA passengers reported riding for free. Table 4.5 depicts how passengers paid for their fare.

Table 4.5: Fare Payment

Fare Payment	Service Type			
	Express	Local	Rail	System Total
Token	3.6%	3.3%	3.4%	3.3%
Cash (One Ride)	31.2%	21.6%	16.4%	20.6%
Day pass	12.4%	26.5%	22.2%	25.5%
Weekly Pass	1.8%	1.4%	1.2%	1.4%
Monthly Pass	46.6%	31.9%	30.0%	31.7%
Round Trip Rail Ticket	0.0%	0.2%	3.2%	0.8%
Student Pass	2.6%	10.2%	14.6%	11.0%
University Pass	0.7%	4.5%	3.9%	4.3%
Free Ride	1.0%	0.4%	5.2%	1.4%
Total	100.0%	100.0%	100.0%	100.0%

Ninety percent of express passengers pay full fare while 11 percent of local service passengers pay senior or disable fares. Table 4.6 describes the type of fare used on a passenger's one-way trip.

Table 4.6: Fare Type

Fare Type	Service Type			
	Express	Local	Rail	System Total
Full Fare	90.4%	88.6%	89.9%	88.9%
Senior/Disable	9.6%	11.4%	10.1%	11.1%
Total	100.0%	100.0%	100.0%	100.0%

Fifty-one percent of express service passengers commute was to work. Nine percent of local service riders were traveling to shop while 33 percent of local service riders were going home. Sixteen percent of rail service passengers were traveling to their university, middle school, or high school. System wide, the majority of respondents were traveling home with 32 percent of riders reporting home for their destination location. Table 4.7 shows all passengers destination purpose for their one way trip.

Table 4.7: Destination Purpose

Destination Purpose	Service Type			
	Express	Local	Rail	System Total
Home	29.0%	33.0%	27.4%	31.7%
University/College (Student Only)	2.6%	7.4%	11.0%	8.1%
Shopping	4.1%	8.9%	5.2%	8.0%
Dining, Recreational, Entertainment, Sporting Event, Religious or Personal Business	10.1%	14.6%	14.8%	14.6%
Work or Work-Related	51.2%	29.3%	30.7%	29.8%
High School/Middle School (Student Only)	0.6%	2.0%	4.6%	2.6%
Medical Services	1.0%	4.8%	6.2%	5.1%
Other – Specify	1.4%	0.0%	0.0%	0.0%
Total	100.0%	100.0%	100.0%	100.0%

Nearly all (95 percent) passengers system wide walked from their last stop to their final destination. Fifteen percent of express service passengers used automobile for their egress mode while 4 percent of all passengers system wide used automobile for their egress mode. Table 4.8 shows the mode passengers took from their last bus or train to their final destination.

Table 4.8: Egress Mode to Destination Location

Egress Mode to Destination Location	Service Type			
	Express	Local	Rail	System Total
Walked/WheelChair	84.8%	96.6%	90.3%	95.1%
Dropped Off	6.2%	2.5%	4.8%	3.0%
Drive Alone	8.3%	0.4%	4.1%	1.2%
Carpooled	0.0%	0.1%	0.6%	0.2%
Bicycle	0.0%	0.2%	0.3%	0.3%
Taxi	0.7%	0.1%	0.0%	0.1%
Total	100.0%	100.0%	100.0%	100.0%

Rail service had the highest percentage of subsidized fare with 15 percent of rail passenger's employers paying for all or part of their fare. The majority of passengers system wide (84 percent) did not have employers paying for any part of their bus or rail fare. Table 4.9 shows fare subsidy used which is when an employer pays for their employees fare or part of their fare in order to use transit to get to and from work.

Table 4.9: Fare Subsidy

Fare Subsidy	Service Type			
	Express	Local	Rail	System Total
Yes, Entire Fare	11.4%	12.9%	17.1%	13.8%
Yes, Some of Fare	4.1%	2.1%	2.4%	2.2%
No	84.5%	85.0%	80.5%	84.0%
Total	100.0%	100.0%	100.0%	100.0%

Thirty-one percent of express riders choose to purchase their fare at store outlets. The majority of local service passengers (49 percent) purchased their fare on the bus. Fourteen percent of rail passengers purchase their fares through their university. System wide, online fare purchase was chosen the least with less than one percent of passengers choosing to make online fare purchases. Table 4.10 shows the place that passengers purchased their bus or rail fare.

Table 4.10: Location of Fare Purchase

Place Fare was Purchased	Service Type			
	Express	Local	Rail	System Total
On the Bus	41.7%	48.7%	21.7%	37.0%
Ticket Vending Machine	2.1%	7.1%	35.8%	11.0%
Online Purchase	1.1%	0.6%	0.2%	0.5%
Store Outlet	30.9%	15.9%	11.8%	13.1%
Employer/Metro Advantage	15.3%	3.9%	4.6%	3.6%
Social Services	3.3%	6.7%	5.0%	5.4%
NFTA Cash Office	2.5%	3.4%	2.7%	2.8%
University Pass	3.9%	11.8%	13.6%	10.4%
High School/Middle School	0.0%	3.1%	5.1%	3.0%
Total	100.0%	100.0%	100.0%	100.0%

Over three quarters (80 percent) of express passengers use transit five days a week or less which is typical due to express services running only on weekdays meaning that 5 percent of express riders use local services and/or rail on weekends. Seventy-eight percent of local bus passengers use transit more than three days a week while 74 percent of rail riders use transit more than three days a week. System wide, five percent of riders use transit service less than once a month. Table 4.11 shows the trip frequency of the passengers which is the amount of days that passengers ride bus or train.

Table 4.11: Trip Frequency

Trip Frequency	Service Type			
	Express	Local	Rail	System Total
6-7 Days per Week	5.2%	27.1%	26.3%	26.7%
3-5 Days per Week	79.6%	50.7%	47.9%	50.5%
1-2 Days per Week	9.0%	11.2%	11.7%	11.3%
1-3 Days per Month	4.9%	6.4%	6.7%	6.5%
Less than once per Month	1.4%	4.5%	7.3%	5.1%
Total	100.0%	100.0%	100.0%	100.0%

Nearly three quarters of express service users have a valid driver's license. Fifty-eight percent of local route passengers do not possess a valid driver's license. System wide, more than half (55 percent) of all riders do not possess a valid driver's license. Table 4.12 shows the driver's license status of passengers.

Table 4.12: Valid Driver's License

Valid Driver's License	Service Type			
	Express	Local	Rail	System Total
Yes	72.4%	41.7%	54.9%	44.8%
No	27.6%	58.3%	45.1%	55.2%
Total	100.0%	100.0%	100.0%	100.0%

The question of auto availability in combination with valid driver's license status helps to understand the reason why riders choose transit. More express riders have personal automobiles available for use (45 percent) in comparison to local service and rail service which combine for 42 percent of riders with automobiles available for use. System wide, 82 percent of passengers do not have personal automobiles they can use for making their trip. Table 4.13 shows the availability of personal automobile.

Table 4.13: Auto Availability

Auto Availability	Service Type			
	Express	Local	Rail	System Total
Yes	45.4%	14.6%	27.3%	17.6%
No	54.6%	85.4%	72.7%	82.4%
Total	100.0%	100.0%	100.0%	100.0%

Forty-nine percent of express users are 50 years of age or over. Sixty eight percent of local service and rail passengers are between 19 and 49 years of age. Only eight percent of passengers system wide is under 19 years of age. Table 4.14 shows the age ranges of passengers.

Table 4.14: Age

Age	Service Type			
	Express	Local	Rail	System Total
Under 19	1.0%	7.7%	10.2%	8.2%
19-24	10.5%	23.7%	25.5%	24.0%
25-34	15.7%	23.5%	23.2%	23.3%
35-49	23.4%	23.2%	17.6%	22.0%
50-64	45.1%	19.3%	21.5%	20.0%
65+ Years of Age	4.3%	2.5%	2.0%	2.5%
Total	100.0%	100.0%	100.0%	100.0%

Ninety percent of express passengers are employed either full or part time. Sixty-eight percent of local service riders are employed full or part time while 30 percent of all rail passengers are students. Eighty percent of all transit users either work or attend school. Table 4.15 shows the employment and student status of riders.

Table 4.15: Worker/Student Status

Worker/Student Status	Service Type			
	Express	Local	Rail	System Total
Full-time Worker	81.0%	44.9%	44.0%	39.4%
Part-time Worker	9.8%	23.2%	19.4%	19.4%
Homemaker	5.6%	5.7%	6.0%	5.0%
University/College Student	5.2%	18.5%	25.8%	17.3%
Middle/High School Student	0.0%	3.9%	4.5%	3.5%
Retired	1.5%	4.3%	3.6%	3.6%
Unemployed/Looking for a Job	2.6%	11.7%	11.4%	10.1%
Unemployed/ Not Looking for a Job	0.6%	4.6%	5.5%	4.2%
Total	100.0%	100.0%	100.0%	100.0%

Seventy-one percent of express passengers are Caucasian/White while African Americans make up for 49 percent of local service riders. Fifteen percent of riders are other ethnicities than Caucasian and African American. Table 4.16 shows the ethnicity of passengers.

Table 4.16: Ethnicity

Ethnicity	Service Type			
	Express	Local	Rail	System Total
Asian	2.1%	1.7%	2.4%	1.6%
Black/African American	19.9%	49.3%	47.1%	42.0%
Caucasian/White	71.1%	37.1%	41.9%	33.3%
Hispanic	2.8%	10.0%	6.9%	8.0%
Native American	0.9%	3.1%	1.8%	2.4%
Other – Specify	3.3%	4.1%	3.1%	3.3%
Total	100.0%	100.0%	100.0%	100.0%

Fifty-four percent of express passengers have less than three persons living in their household. Fifty-two percent of local service riders have three or more people living with them while 17 percent of rail users have five or more persons in their household. Table 4.17 displays the Household size of riders.

Table 4.17: Household Size

Household Size	Service Type			
	Express	Local	Rail	System Total
One	19.5%	21.3%	21.2%	21.3%
Two	34.5%	26.5%	28.2%	26.9%
Three	29.3%	22.3%	20.8%	22.1%
Four	11.6%	14.8%	12.9%	14.4%
5 or More	5.2%	15.0%	16.9%	15.3%
Total	100.0%	100.0%	100.0%	100.0%

Ninety percent of express passengers belong to households were at least one person is employed. Nearly a quarter (24 percent) of local bus service passengers has zero persons employed in their household. Thirteen percent of rail riders have three or more employed persons living in their household. Table 4.18 summarizes the number of full-time or part-time workers by household.

Table 4.18: Household Employment

Household Employment	Service Type			
	Express	Local	Rail	System Total
None	10.7%	24.1%	22.9%	23.7%
One	45.8%	41.2%	40.5%	41.1%
Two	31.6%	24.9%	23.0%	24.6%
Three	7.7%	6.6%	10.4%	7.4%
4 or More	4.2%	3.2%	3.2%	3.2%
Total	100.0%	100.0%	100.0%	100.0%

Thirty-three percent of all express passengers have two or more vehicles in their household while 64 percent of local service passengers do not have any household vehicles. Half (50 percent) of rail users have at least one vehicle in their household. Table 4.19 shows the total number of vehicles owned by household.

Table 4.19: Household Vehicles

Household Vehicles	Service Type			
	Express	Local	Rail	System Total
None	33.8%	64.1%	50.4%	60.9%
One	33.6%	25.5%	26.8%	25.8%
Two	25.8%	7.9%	15.7%	9.7%
Three	5.4%	1.9%	4.9%	2.6%
4 or More	1.4%	0.7%	2.2%	1.0%
Total	100.0%	100.0%	100.0%	100.0%

Forty percent of express user's household income exceeds $50,000 annually. Thirty-one percent of local service user's household income is less than $10,000 annually while 23 percent of rail user's annual household income is less than $5,000. System wide, 82 percent of transit users have a household income of less than $35,000 a year. Table 4.20 shows the annual household income of transit riders.

Table 4.20: Household Income

Household Income	Service Type			
	Express	Local	Rail	System Total
Less than $5,000	3.2%	22.3%	23.1%	22.2%
$5,000 - $9,999	6.6%	16.1%	11.8%	15.2%
$10,000 - $14,999	7.2%	13.4%	8.5%	12.3%
$15,000 - $24,999	17.9%	20.1%	17.1%	19.5%
$25,000 - $34,999	11.9%	12.8%	10.5%	12.4%
$35,000 - $49,999	13.6%	7.4%	12.7%	8.5%
$50,000 - $74,999	15.3%	4.9%	8.7%	5.8%
$75,000 - $99,999	14.9%	1.8%	4.3%	2.4%
$100,000 or More	9.3%	1.2%	3.1%	1.7%
Total	100.0%	100.0%	100.0%	100.0%

On all service types, overall satisfaction with NFTA services was fairly even. Eighty-five percent of rail users where at least somewhat satisfied with NFTA services. Only 16 percent of transit riders were dissatisfied with services provided by NFTA. Table 4.21 shows customers overall satisfaction of services which NFTA provides.

Table 4.21: Overall Satisfaction with NFTA Services

Overall Satisfaction with NFTA Services	Service Type			
	Express	Local	Rail	System Total
Very Satisfied	38.5%	34.8%	36.8%	35.3%
Somewhat Satisfied	45.2%	49.1%	48.2%	48.9%
Somewhat Dissatisfied	11.7%	11.9%	10.4%	11.5%
Very Dissatisfied	4.6%	4.2%	4.6%	4.3%
Total	100.0%	100.0%	100.0%	100.0%

Table 4.22 shows the distribution of origin trip purpose by destination trip purpose for express, local, and rail passengers.

Table 4.22: Distribution of Trip Purpose (Origin Purpose by Destination Purpose)

		Destination Place Type								
	Origin Place Type	Home	University*	Shopping	Personal Business**	Work***	School****	Medical Service	Other, Specify	Total
Express	Home	0.0%	1.6%	0.0%	6.7%	41.8%	0.0%	0.4%	0.0%	50.5%
	University*	1.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%
	Shopping	0.5%	0.0%	0.0%	0.2%	4.3%	0.0%	0.0%	0.7%	5.7%
	Personal Business**	2.4%	0.6%	0.5%	0.5%	3.9%	0.6%	0.5%	0.7%	9.9%
	Work***	24.4%	0.0%	3.6%	2.6%	1.3%	0.0%	0.0%	0.0%	31.9%
	Medical Services	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
	Total	29.1%	2.5%	4.1%	10.1%	51.3%	0.6%	0.9%	1.4%	100.0%
		Destination Place Type								
	Origin Place Type	Home	University*	Shopping	Personal Business**	Work***	School****	Medical Service	Other, Specify	Total
Local	Home	4.8%	0.4%	0.7%	0.6%	0.7%	0.0%	0.1%	0.0%	7.4%
	University*	3.7%	0.4%	0.7%	0.6%	0.5%	0.0%	0.1%	0.0%	6.1%
	Shopping	5.4%	0.6%	1.0%	2.0%	1.7%	0.2%	0.3%	0.0%	11.3%
	Personal Business**	15.4%	0.6%	1.0%	1.7%	2.1%	0.0%	0.4%	0.0%	21.3%
	Work***	4.8%	0.4%	0.7%	0.6%	0.7%	0.0%	0.1%	0.0%	7.4%
	School****	1.7%	0.0%	0.1%	0.2%	0.1%	0.1%	0.0%	0.0%	2.2%
	Medical Services	1.8%	0.1%	0.3%	0.3%	0.2%	0.0%	0.2%	0.0%	3.0%
	Other - Specify	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.3%
	Total	33.0%	7.4%	8.9%	14.6%	29.3%	2.0%	4.8%	0.0%	100.0%
Rail		Destination Place Type								

	Origin Place Type	Home	University*	Shopping	Personal Business**	Work***	School****	Medical Service	Other, Specify	Total
	Home	0.0%	7.1%	3.4%	6.8%	22.7%	3.7%	3.9%	0.0%	47.6%
	University*	6.8%	0.6%	0.4%	1.4%	1.7%	0.0%	0.4%	0.0%	11.3%
	Shopping	2.1%	0.1%	0.2%	0.7%	0.6%	0.1%	0.3%	0.0%	4.2%
	Personal Business**	4.1%	0.7%	0.3%	2.5%	2.3%	0.3%	0.3%	0.0%	10.7%
	Work***	10.7%	1.8%	0.5%	2.6%	1.8%	0.1%	0.8%	0.0%	18.2%
	School****	1.1%	0.3%	0.0%	0.4%	0.2%	0.3%	0.0%	0.0%	2.2%
	Medical Services	2.2%	0.2%	0.4%	0.2%	1.1%	0.0%	0.5%	0.0%	4.7%
	Other – Specify	0.4%	0.2%	0.0%	0.2%	0.2%	0.0%	0.1%	0.0%	1.1%
	Total	27.4%	11.0%	5.2%	14.8%	30.7%	4.6%	6.2%	0.0%	100.0%

*University/College (Student Only)

**Dining, Recreation, Entertainment, Sporting Event, Religious, or Personal Business

***Work or Work-Related

****High School / Middle School (Student Only)

Table 4.23 examines the relationship of passengers' access and egress modes for their one-way trip.

Table 4.23: Distribution of Access Mode by Egress Mode

		Egress Mode						
	Access Mode	Walked / WheelChair	Picked Up	Drove Alone	Carpooled	Bicycle	Taxi	Total
Express	Walked / WheelChair	64.7%	4.2%	6.6%	0.0%	0.0%	0.7%	76.3%
	Dropped Off	6.9%	1.9%	0.0%	0.0%	0.0%	0.0%	8.8%
	Drove Alone	12.6%	0.0%	1.6%	0.0%	0.0%	0.0%	14.2%
	Carpooled	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%
	Total	84.9%	6.1%	8.3%	0.0%	0.0%	0.7%	100.0%
		Egress Mode						
	Access Mode	**Walked / WheelChair**	**Picked Up**	**Drove Alone**	**Carpooled**	**Bicycle**	**Taxi**	**Total**
Local	Walked / WheelChair	92.5%	1.6%	0.2%	0.1%	0.1%	0.1%	94.6%
	Dropped Off	3.6%	0.8%	0.0%	0.0%	0.0%	0.0%	4.5%
	Drove Alone	0.3%	0.0%	0.1%	0.0%	0.0%	0.0%	0.4%
	Carpooled	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
	Bicycle	0.1%	0.0%	0.0%	0.0%	0.2%	0.0%	0.2%
	Taxi	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%
	Total	96.6%	2.5%	0.4%	0.1%	0.2%	0.1%	100.0%
		Egress Mode						
	Access Mode	**Walked / WheelChair**	**Picked Up**	**Drove Alone**	**Carpooled**	**Bicycle**	**Taxi**	**Total**
Rail	Walked / WheelChair	77.2%	3.0%	2.5%	0.5%	0.0%	0.0%	83.2%
	Dropped Off	6.2%	1.4%	0.0%	0.1%	0.0%	0.0%	7.7%
	Drove Alone	6.0%	0.3%	1.6%	0.0%	0.0%	0.0%	7.9%
	Carpooled	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%
	Bicycle	0.0%	0.1%	0.0%	0.0%	0.3%	0.0%	0.4%
	Total	90.3%	4.8%	4.1%	0.6%	0.3%	0.0%	100.0%

Sixty-six percent of express passengers made Home-based Work trips while 42 percent of local service riders went somewhere else other than work from home. Table 4.24 shows the distribution of trip types.

Table 4.24: Distribution of Trip Types

Distribution of Trip Types	Service Type			
	Express	Local	Rail	System Total
Home-based Non-Work	13.3%	42.2%	41.6%	41.7%
Home-based Work	66.2%	39.2%	33.4%	38.3%
Non-Home Non-Work	4.8%	9.3%	11.2%	9.7%
Non-Home-Based Work	15.6%	9.2%	13.8%	10.3%
Total	100.0%	100.0%	100.0%	100.0%

Passengers which access mode was walk walked an average of 0.27 miles from their origin location to their first bus or rail stop. Table 4.25 shows the average distance walked for riders from their origin to their first bus/rail stop in miles.

Table 4.25: Access Walk Distance

Access Walk Distance	Service Type			
	Express (Mean)	Local (Mean)	Rail (Mean)	System Total (Mean)
Access Distance	0.31	0.27	0.27	0.27

On average, express passengers walked more than a half a mile to their destination from their last bus stop when their egress mode was walk. Table 4.26 shows the average distance walked from passenger's last bus/rail stop to their final destination by miles.

Table 4.26: Egress Walk Distance

Egress Walk Distance	Service Type			
	Express (Mean)	Local (Mean)	Rail (Mean)	System Total (Mean)
Egress Distance	0.65	0.41	0.34	0.39

The average distance of miles driven using automobile for mode of access is 1.24 miles. Table 4.27 shows the average distance driven from origin to first bus/rail by miles.

Table 4.27: Access Drive Distance

Access Drive Distance	Service Type			
	Express (Mean)	Local (Mean)	Rail (Mean)	System Total (Mean)
Access Distance	1.81	.91	1.57	1.24

Express passengers, who used automobile for their egress mode, drove an average of 2.6 miles to their destination while local service riders drove an average of 1 mile from their last stop to their final destination. Table 4.28 shows the average distance driven from passenger's last stop to their final destination in miles.

Table 4.28: Egress Drive Distance

Egress Drive Distance	Service Type			
	Express (Mean)	Local (Mean)	Rail (Mean)	System Total (Mean)
Egress Distance	2.62	1.00	1.14	1.12

Seventy percent of passengers did not have to transfer prior to the route they were surveyed on. Forty-one percent of rail passengers had to make at least one transfer before they used the rail in order to reach their destination. Table 4.29 shows the number of vehicles used prior to the vehicle they were surveyed on.

Table 4.29: Transfers to Bus (Access)

Transfers to Bus (Access)	Service Type			
	Express	Local	Rail	System Total
0	84.0%	72.8%	59.1%	70.0%
1	15.3%	23.1%	38.2%	26.3%
2	0.7%	3.8%	2.6%	3.5%
3	0.0%	0.2%	0.1%	0.2%
Total	100.0%	100.0%	100.0%	100.0%

Seventy-two percent of passengers did not have to make a transfer after the route they were surveyed on. Eighty-seven percent of express riders did not transfer after being surveyed on the express bus they were on. Table 4.30 shows the number of vehicles used after the vehicle they were surveyed on.

Table 4.30: Transfers after Bus (Egress)

Transfers to Bus (Egress)	Service Type			
	Express	Local	Rail	System Total
0	86.7%	72.0%	71.4%	72.0%
1	10.7%	23.1%	27.0%	23.8%
2	2.6%	4.4%	1.1%	3.7%
3	0.0%	0.5%	0.5%	0.5%
Total	100.0%	100.0%	100.0%	100.0%

When transfers needed to be made, they were typically between two local routes. The table below shows the percent of transfer types out of linked trips (cases weighted by the expansion weight divided by the number of buses on the trip). On the rail, 5.8 percent of passengers transferred to a local bus, and 8.7 percent of passengers transferred from a local bus. There was also a small number of passengers who used both a local route and an express route (<1% each). Table 4.31 shows transfers to and from service types.

Table 4.31: Transfers Matrix*

Transfer from Route Type	Transfer to Route Type		
	Express	Local	Rail
Express	0.0%	0.3%	0.1%
Local	0.2%	18.9%	8.7%
Rail	0.0%	5.8%	0.0%

* Percent of linked trips. Data weighted by expansion weight divided by number of vehicles.

4.2 Origin and Destinations

The figures below provide origin locations and destination locations by Traffic Analysis Zone (TAZ). Provided are origin and destinations for Express service, Local service, and rail service.

Figure 4.0: Express Service Origin Locations

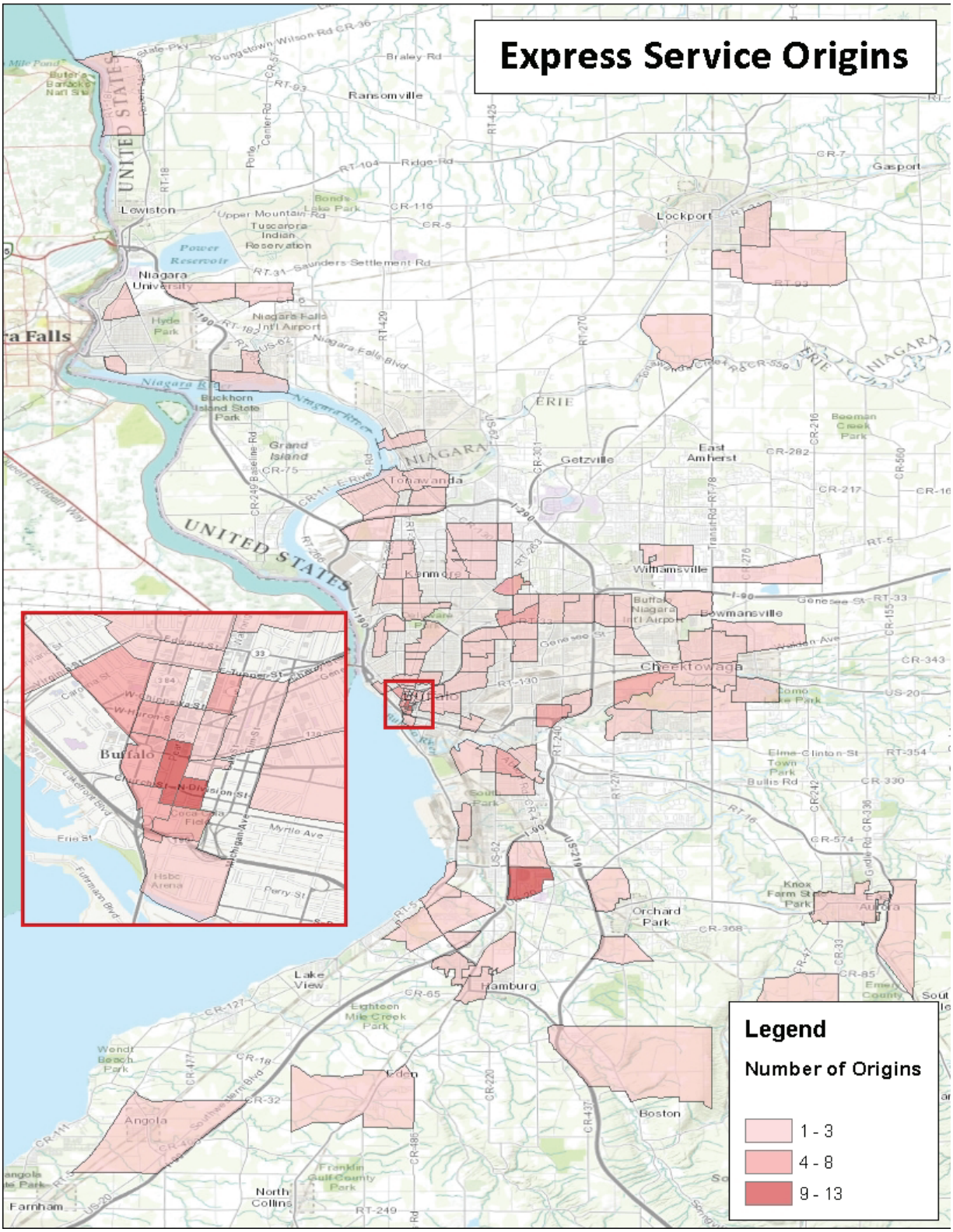


Figure 4.1: Express Service Destination Locations

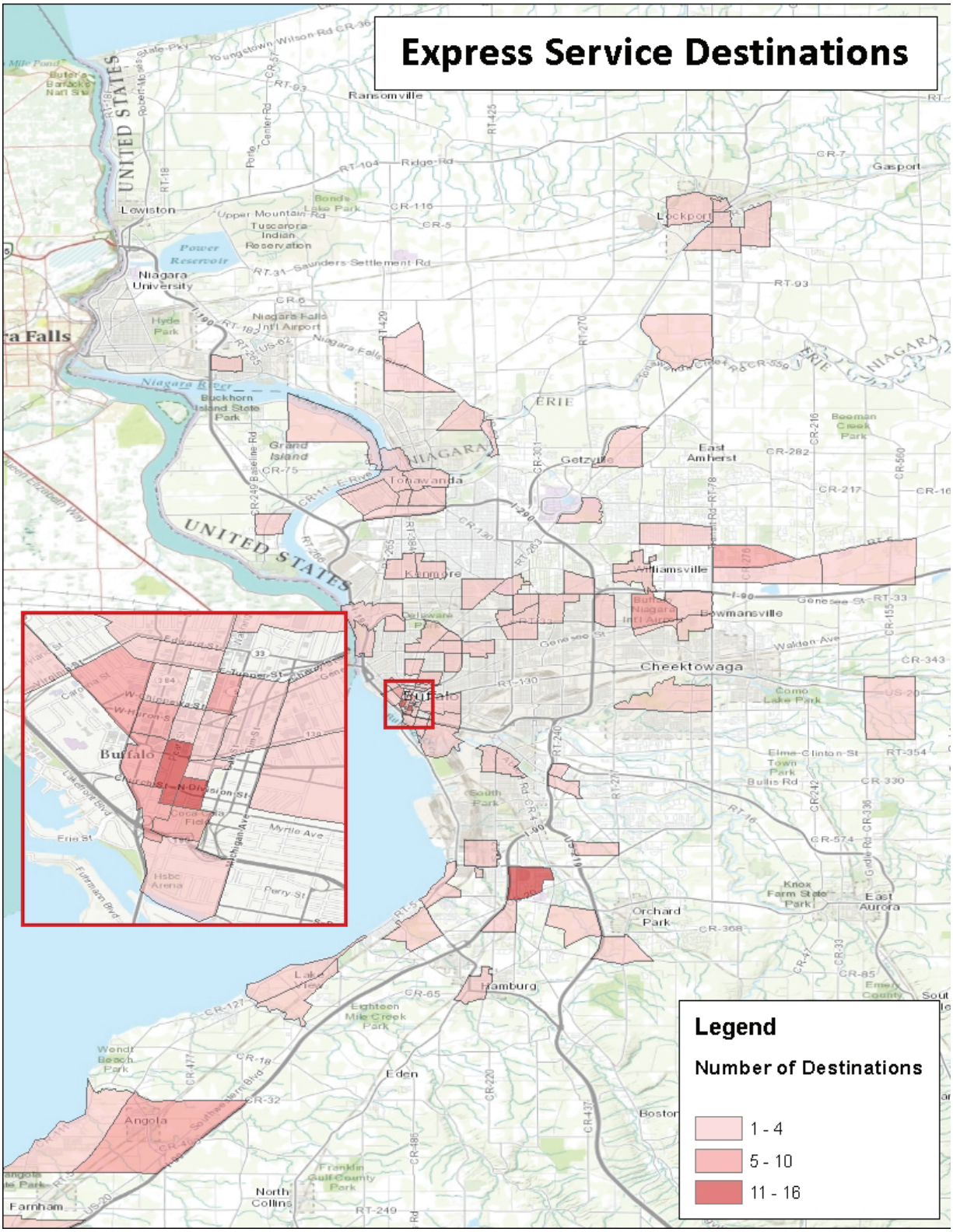


Figure 4.2: Local Service Origin Locations

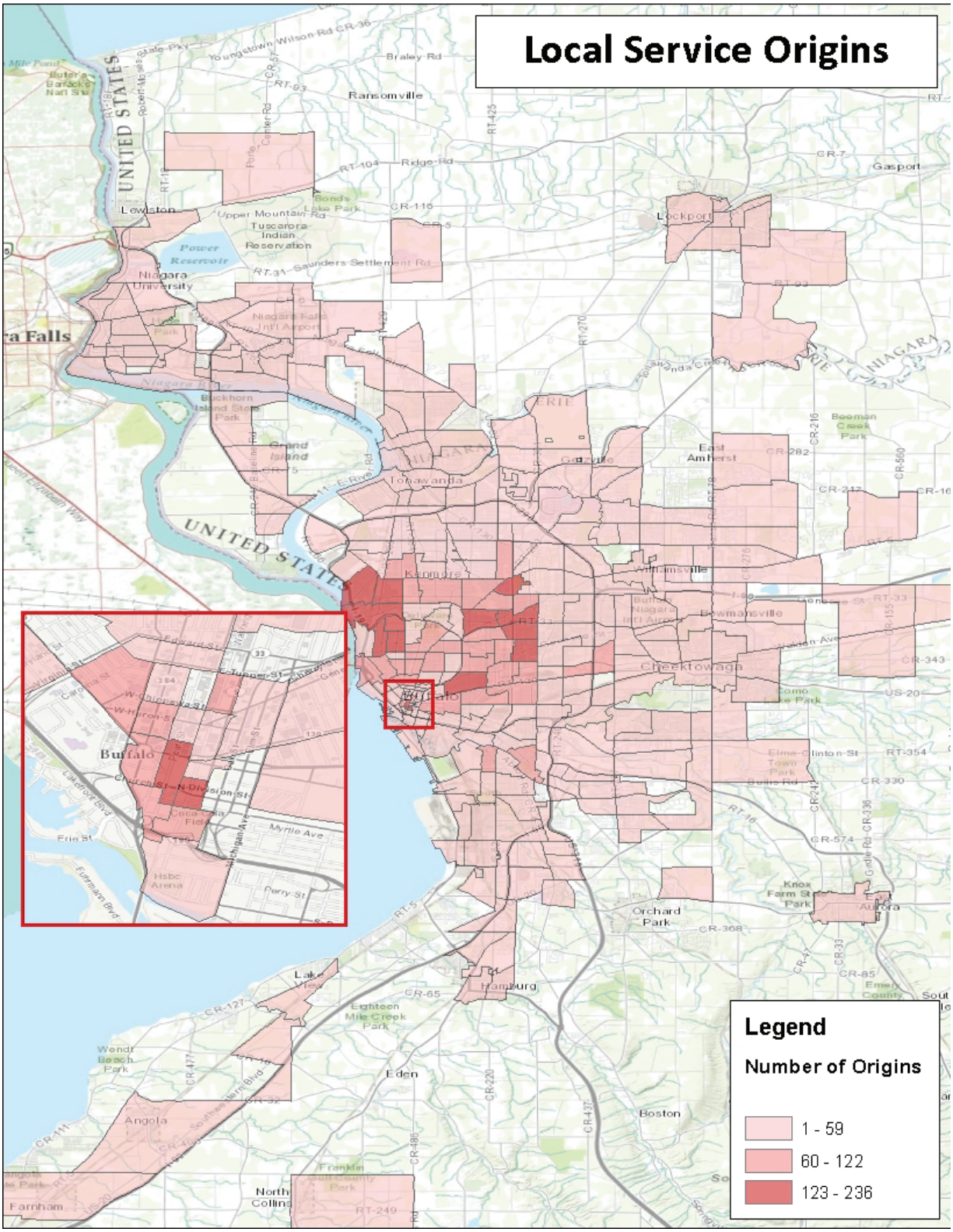


Figure 4.3: Local Service Destination Locations

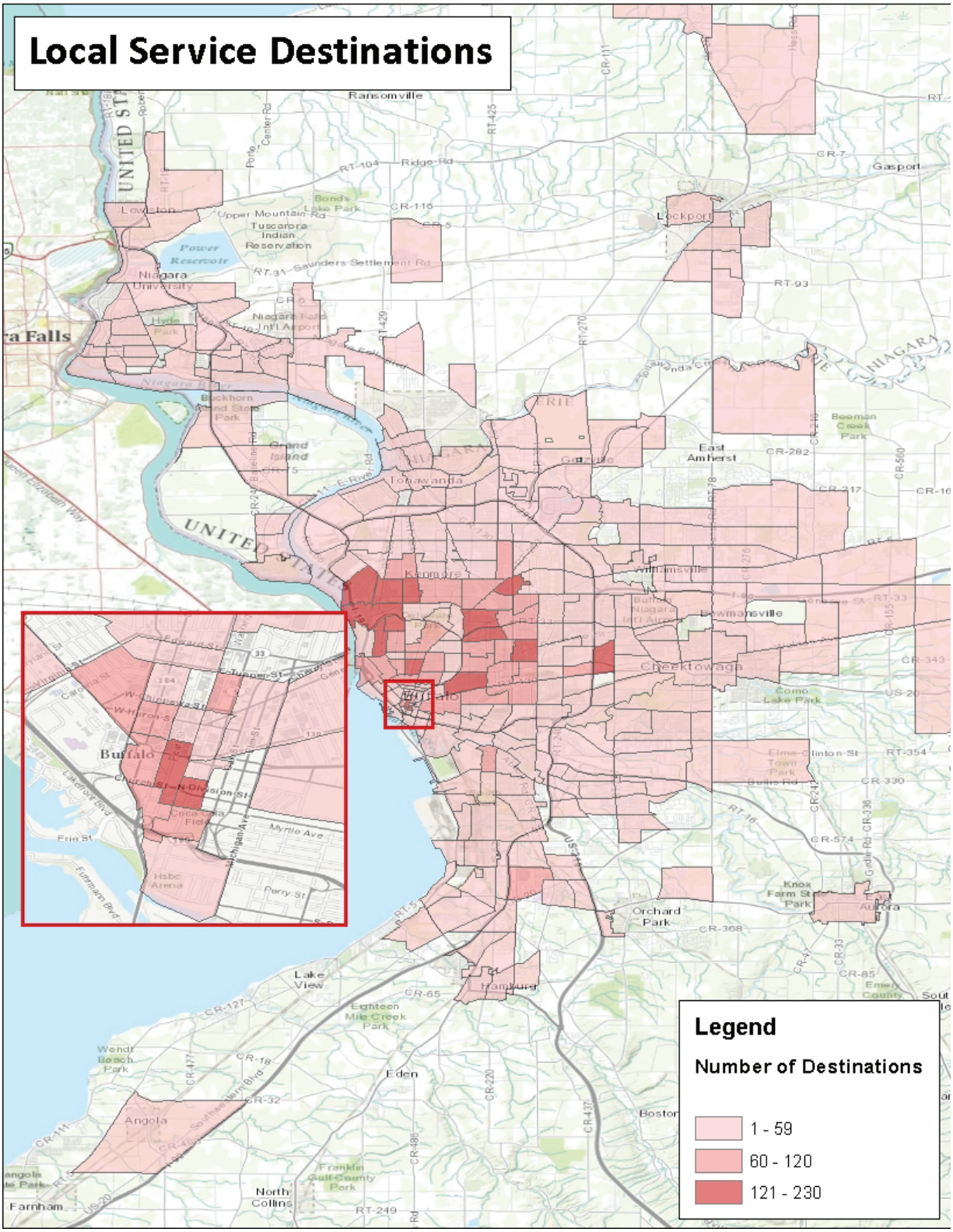


Figure 4.4: Rail Service Origin Locations

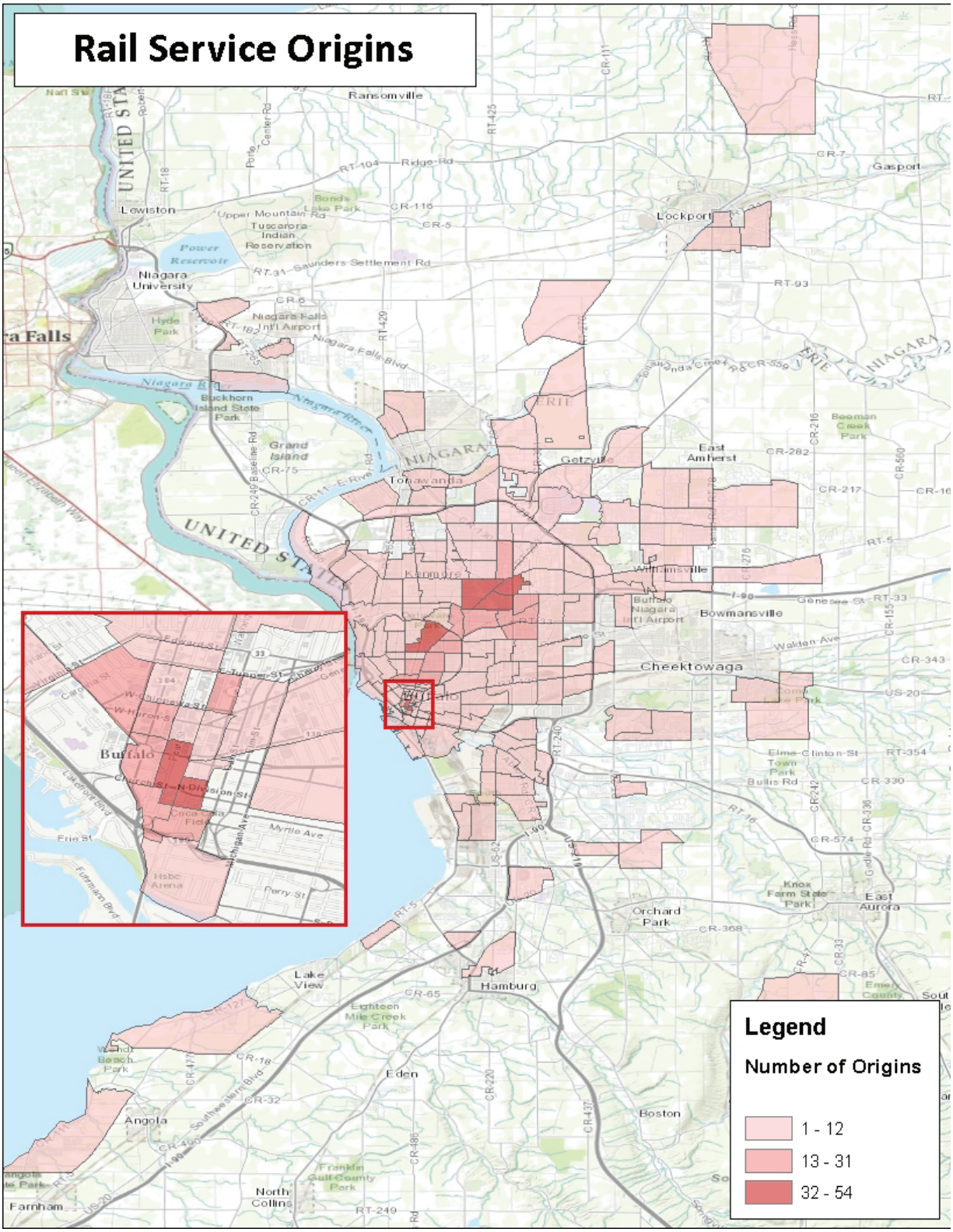
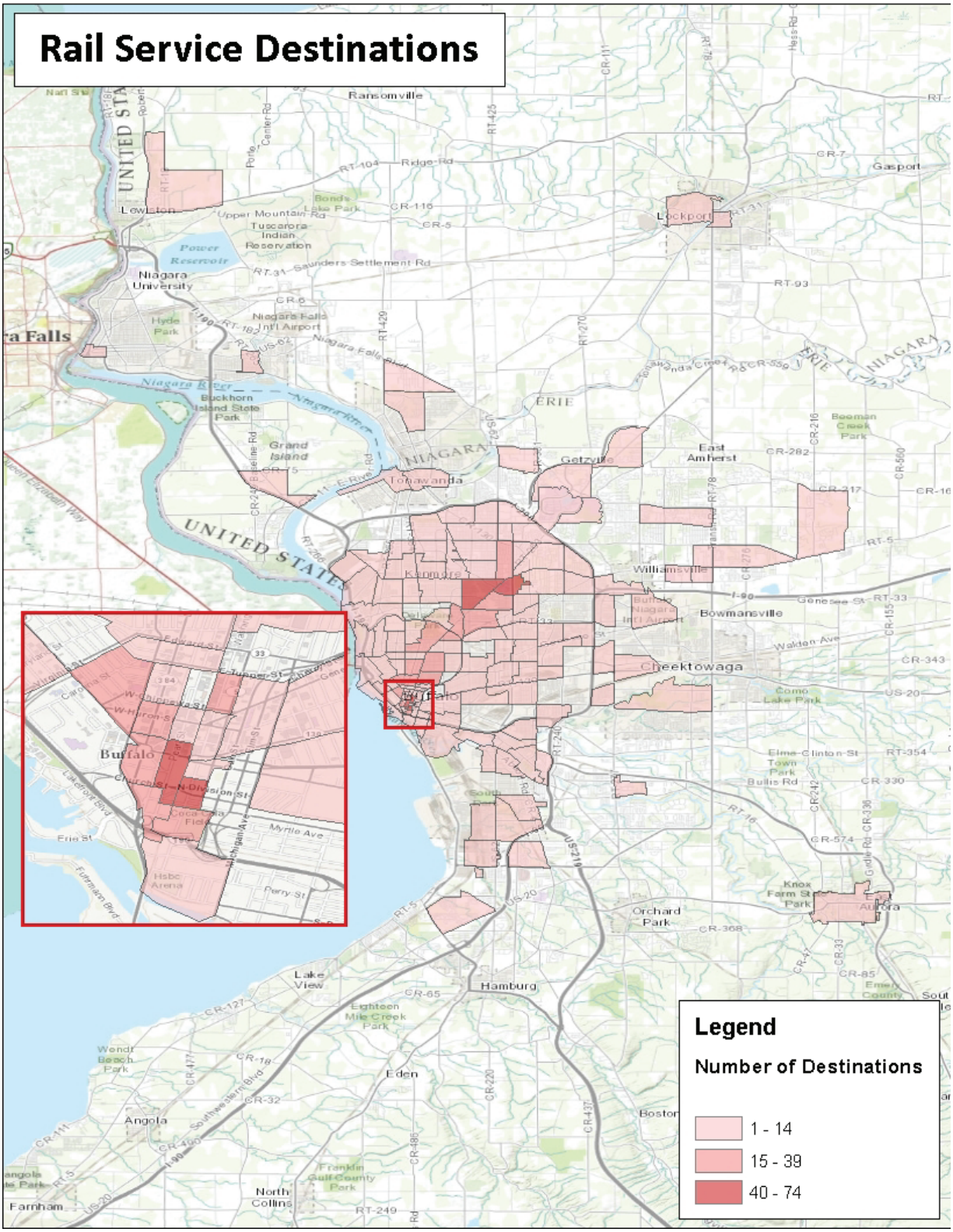


Figure 4.5: Rail Service Destination Locations



5.0 Summary of Trends

The Niagara Frontier Transportation Authority (NFTA) is the primary public transit operator for Erie county and Niagara region. The last On-Board study on NFTA bus and rail was conducted in 2002 by NuStats. Since the 2002 On-Board study, various changes have occurred with the economy and changes in the transit system itself. This chapter provides comparative analysis and details passenger trends since the 2002 study.

In 2002, fewer riders had to make transfers in order to get from their origins to their destinations. More riders had to make at least one transfer during their one way trip which is an increase of 11 percent. Table 5.1 shows the total number of vehicles used to make a one way trip in comparison to 2002 and shows the variance of trends.

Table 5.1: Total Buses Used to Make One-Way Trip (Trends)

Total Buses Used to Make One-Way Trip	2002	2012	Difference
One	59%	48%	-11%
Two or More	41%	52%	+11%

Within the last ten years, there has been a two percent increase in riders paying full fare. Senior and disable fares have decreased by two percent since 2002. Table 5.2 provides percentages showing the minor changes in fare type from 2002 and 2012.

Table 5.2: Fare Type (Trends)

Fare Type	2002	2012	Difference
Full Fare	87%	89%	+2%
Senior/Disable	13%	11%	-2%

Riders that use NFTA services are using less transit services weekly than they did in 2002. There is a six percent decrease in passengers that use the bus or rail more than three days a week. However there is a slight increase (3 percent) in riders using weekend service and using transit more than five days per week. Table 5.3 shows comparisons in how often riders utilize NFTA services.

Table 5.3: Trip Frequency (Trends)

Trip Frequency	2002	2012	Difference
6-7 Days per Week	24%	27%	+3%
3-5 Days per Week	60%	51%	-9%
1-2 Days per Week	8%	11%	+3%
1-3 Days per Month	4.0%	6%	+2%
Less than once per Month	4.0%	5%	+1%

There has been a six percent decrease in the last ten years in riders possessing valid driver's license. Table 5.4 shows that over half (51 percent) of NFTA riders in 2002 had a valid driver's license and over half (55 percent) of NFTA riders in 2012 do not have driver's licenses.

Table 5.4: Valid Driver's License (Trends)

Valid Driver's License	2002	2012	Difference
Yes	51%	45%	-6%
No	49%	55%	+6%

There has been an increase of transit dependent users since 2002 due to fewer passengers possessing driver's licenses and an 11 percent decrease in riders having automobiles available to them. Table 5.5 shows the trends from 2002 to 2012 for riders that have automobiles available for personal use.

Table 5.5: Auto Availability (Trends)

Auto Availability	2002	2012	Difference
Yes	29%	18%	-11%
No	71%	82%	+11%

Riders over the age of 35 years of age use less transit than in 2002. There has been a six percent decrease in passengers over 35 and a 14 percent increase in riders between the ages of 19 to 34 years old. Table 5.6 shows the trends of ridership age from 2002 to 2012.

Table 5.6: Age (Trends)

Age	2002	2012	Difference
Under 19	17%	8%	-9%
19-24	16%	24%	+8%
25-34	17%	23%	+6%
35-49	33%	22%	-11%
50-64	15%	20%	+5%
65+ Years of Age	2%	3%	+1%

The economy has changed drastically since 2002 and figures show that there has been a 16 percent decrease in riders that are employed either full or part time. Besides the drastic changes in employment status statistics, all other categories remain nearly the same. Table 5.7 shows worker and student status trends that have occurred in the last ten years with NFTA's customer base.

Table 5.7: Worker/Student Status (Trends)

Worker/Student Status	2002	2012	Difference
Full-time Worker	53%	39%	-14%
Part-time Worker	21%	19%	-2%
Homemaker	4%	5%	+1%
Student	22%	21%	-1%
Retired	4%	4%	0%
Unemployed/Looking for a Job	10%	10%	0%
Unemployed/ Not Looking for a Job	3%	4%	+1%

There has been a decrease in both African American and Caucasian passengers by 14 percent while a small increase (2 percent) of Hispanic riders was reported. This may be due to passengers being multi-racial in ethnicity. Table 5.8 shows the ethnicity trends from 2002 to 2012.

Table 5.8: Ethnicity (Trends)

Ethnicity	2002	2012	Difference
Asian	2%	2%	0%
Black/African American	50%	42%	-8%
Caucasian/White	39%	33%	-6%
Hispanic	6%	8%	+2%
Native American	2%	2%	0%
Other – Specify	3%	3%	0%

A decrease in the number of household vehicles by 13 percent is shown in table 5.9 below. More passengers tend to report having zero vehicles in their household.

Table 5.9: Household Vehicles (Trends)

Household Vehicles	2002	2012	Difference
None	48%	61%	+13%
One	29%	26%	-3%
Two	17%	10%	-7%
Three	5%	3%	-2%
4 or More	2%	1%	-1%

An eight percent drop in rider's households with more than $15,000.00 and the difference in employment show the economic changes since 2002. Table 5.10 shows riders annual household income trends.

Table 5.10: Household Income (Trends)

Household Income	2002	2012	Difference
Less than $5,000	22%	22%	0%
$5,000 - $14,999	21%	27%	+6%
$15,000 - $24,999	26%	20%	-6%
$25,000 - $$74,999	28%	27%	-1%
$75,000 or More	5%	4%	-1%