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# **GO BUS IMPACT ANALYSIS**

## **FINAL REPORT**

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Submitted by  
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# 1. INTRODUCTION

New Jersey Transit (NJ TRANSIT) has launched GO Bus service in order to provide an enhanced Bus Rapid Transit (BRT)-like bus service to customers in the Springfield Avenue and Bloomfield Avenue corridors. The GO Bus Route 25, introduced on April 7<sup>th</sup>, 2008, serves a 4.8-mile corridor between Irvington Bus Terminal and Newark Penn Station. The GO Bus Route 28, inaugurated in October 2009, connects Bloomfield, Downtown Newark, and Newark Liberty International Airport. The total length of this corridor is 12.1 miles. GO 25, GO 28, and local parallel routes in the study area are demonstrated in Figures 1 and 2.

As an enhanced but not full BRT service, GO Bus features include improved bus stops with redesigned shelters, limited stop services to reduce running time, traffic signal priority, branding for visibility, and other features that provide a convenient commuting experience and efficient connections for corridor residents and commuters. Figure 3 demonstrates a few key attributes of GO Bus features.

The initial responses from local communities and riders were very positive. As documented in *Bloomfield Life* (Frankel, 2009), a local publication, many non-bus riders have started riding GO Bus as it is more like “Light Rail” service with the state of art signal prioritization, new buses, and improved shelters. Airport employees use the GO Bus as the preferred mode since it eliminates the hassle of parking and driving altogether (*Star Ledger Staff*, 2009). Even students from the surrounding universities gave great reviews of GO Bus (NJIT, 2009). The GO 28 service route was changed in September 2012 and no longer includes the University branch. Additionally, headways were lengthened for this route. Table 1 provides an overview of GO Bus Routes and parallel local bus routes examined in this study.

NJ TRANSIT is interested in the shift in travel patterns that have occurred as a result of the GO Bus. This includes auto diversions and induced ridership. It is also important to understand the riders’ perceptions of BRT-like elements and their impact on ridership and customer satisfaction.

The New Jersey Institute of Technology (NJIT) research team was hired to accomplish the following objectives:

1. Conduct and analyze an onboard survey on GO 25, GO 28, as well as parallel local routes along the GO Bus corridors.
2. Design and perform focus groups and a stated preference survey to assess the impact of GO Bus on the daily lives of riders, potential riders, and other stakeholders.

3. Identify and understand travel pattern shifts, including auto diversions, induced ridership, and time saving benefits derived from the introduction of GO Bus services.
4. Analyze both on-board and stated preference survey to highlight the impact of various transit attributes on ridership and customer satisfaction.
5. Provide data to support GO Bus business planning activities and marketing programs.

A. Go 25



B. Local Route 25

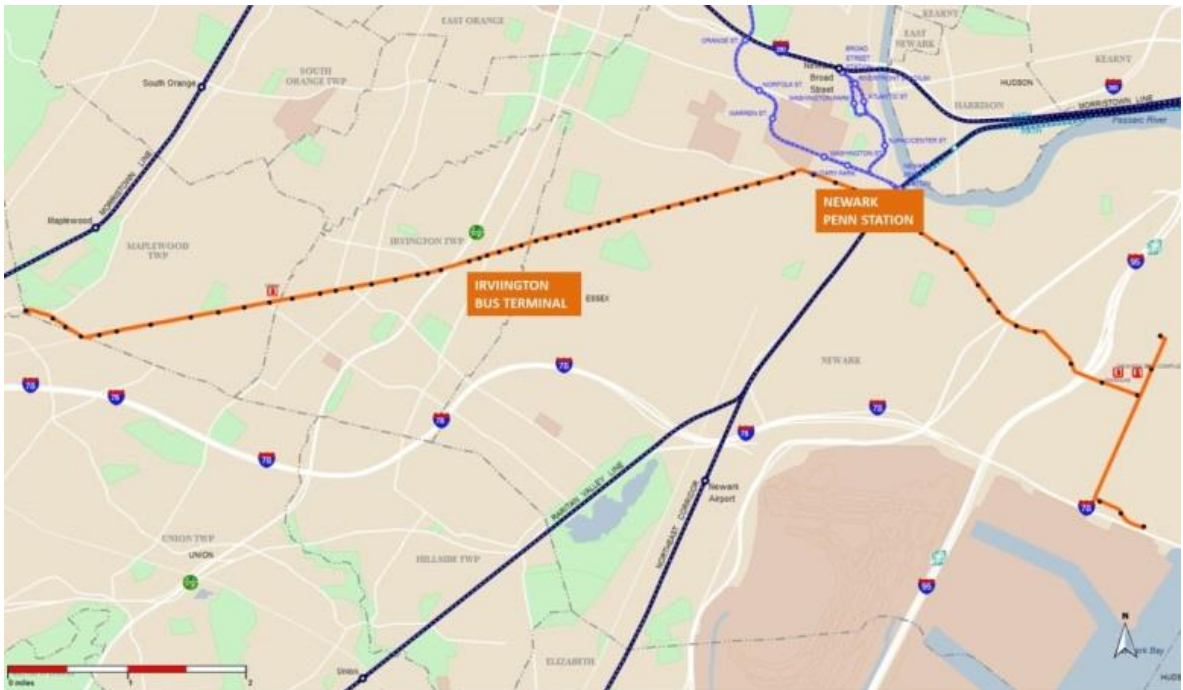
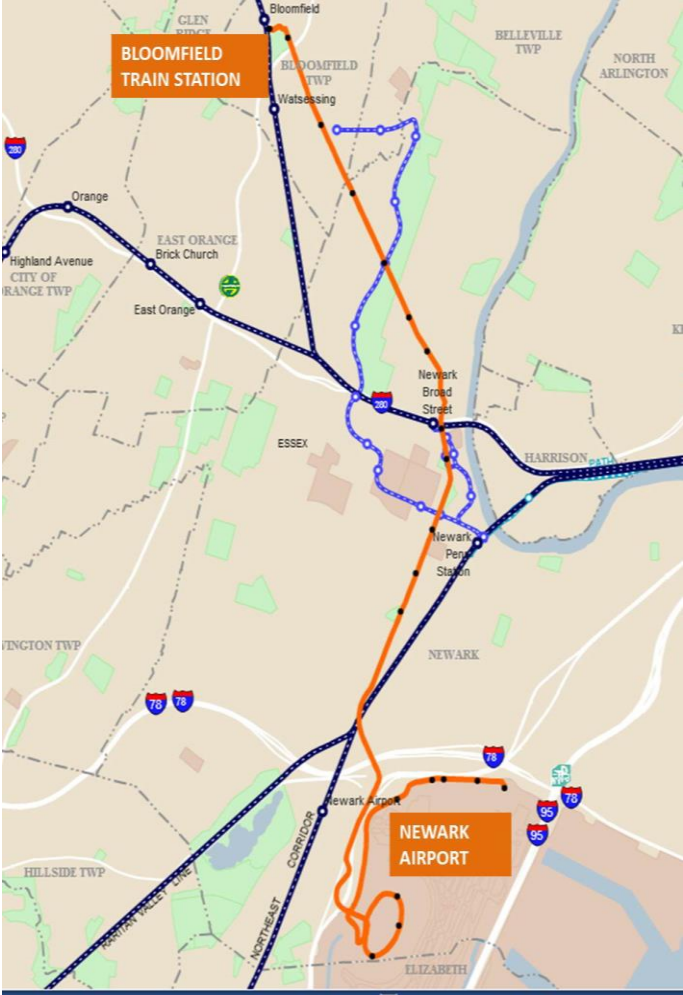


Figure 1. Route maps for Go and local route 25

A. Go 28



B. Local Route 11, 28, and 72

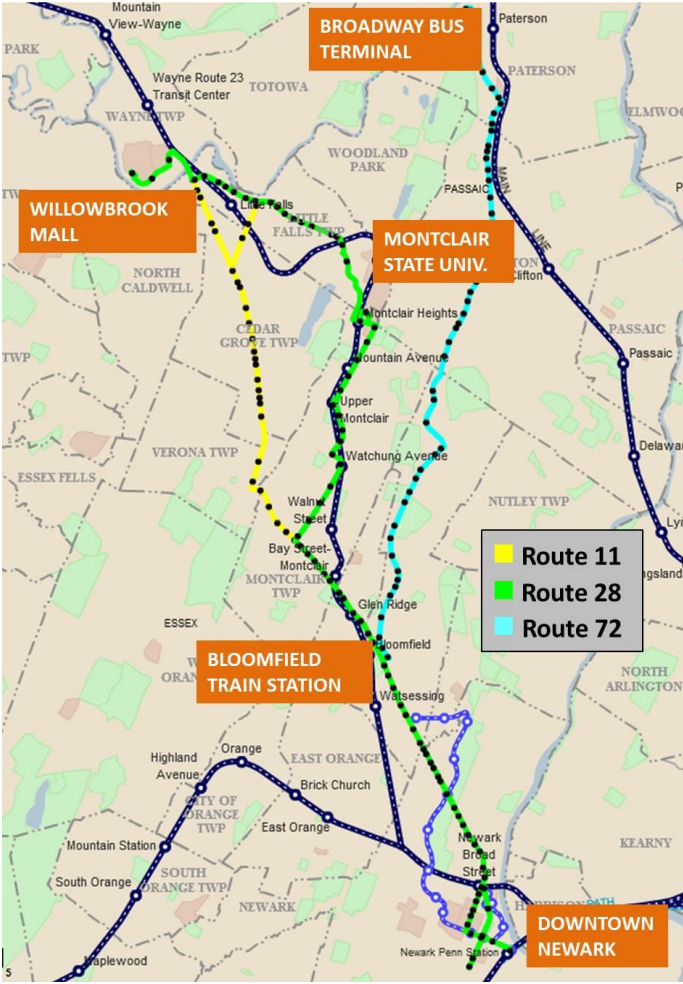


Figure 2. Route maps for Go 28 and local routes 11, 28, and 72



**Figure 3. Key features of GO Bus**

Table 1. 2012 Bus service patterns in study corridor

Route	Average Weekday Ridership (9AM-3PM)	Number of Stops	Headways			Locations Served
			AM/PM Peak	Midday Service	Evening Service	
GO 25	460	11	15 min	No service	No service	Newark, Irvington, Maplewood
25	7194	67	3-15 min	5-10 min	15-30 min	
GO 28*	1763	25	15-20 min	15-20 min	15-20 min	Bloomfield, Newark
11	1862	73	10-30 min	20-40 min	20-60 min	Wayne, Little Falls, Cedar Grove, Verona, Montclair, Glen Ridge, Bloomfield, Newark
28	1666	55	20-30 min	30-50 min	50-80 min	
72	2501	82	20-30 min	20-30 min	60-120 min	Paterson, Clifton, Bloomfield, Newark

\*GO 28 service changed in September 2012. The University Branch was eliminated, reducing the number of stops to 20. Headways are now 30 minutes all day.

## **2. LITERATURE REVIEW**

In our first task to assist the New Jersey Department of Transportation (NJDOT) and NJ TRANSIT understand the impact of Go Bus Services, the NJIT research team conducted a thorough literature review. The research team found uneven coverage on the impact of transit services and important attributes that affect the ridership. Many publications focus on the impact of traditional bus services, and some recent literature paid close attention to Bus Rapid Transit (BRT).

The magnitudes of impact vary among service levels, locations, and sometimes users. The following section presents a brief summary of literature to demonstrate the diversity of the existing research, the multidimensional characteristics of transit impact, and the complexities of distinguishing individual factors from overall interaction effects.

### **2.1 Awareness of Transit Services**

Conventional wisdom typically assumes that if a transit option is available nearby, it is part of the traveler's mode choice set and has a probability of being used. In reality, the lack of awareness and familiarity with transit seems to be significant, though there is not yet abundant research on this topic.

According to Transit Cooperative Research Program (TCRP) Report 63 (2000), individuals in a variety of transit markets were asked their perception of transit availability; while all respondents contacted in this study lived in an area with readily available transit alternatives. Twenty-one percent did not know that transit was available. More than twice that number, 44%, reported being either "not very familiar" or "not at all familiar" with public transportation services in their area.

Similarly, Marchwinski, Spitz, and Adler (2003) have documented the importance of awareness of parking services adjacent to transit stations in North New Jersey. In the case of the Liberty State Park Park-and-Ride facility, it took more than two years, a seven-month free parking period, and great outreach effort by NJ TRANSIT to have the parking facility fully utilized.

Unfamiliarity with public transportation is also prominent in major transit markets. A study for the Regional Transportation Authority for Chicago (Northwest Research Group, Inc., 1999) found that 38% of randomly selected residents in the transit service area had not ridden transit in the past year. The TCRP H-37 Literature & Practice Review stated that 19% reported that they were "somewhat unfamiliar" with transit services and an additional 36% were "very unfamiliar" with transit.

While many individuals are unaware of transit in general, of particular importance to the research cited above is to determine the differences in awareness between premium and conventional services. Typically, those supporting a positive premium service bias cite the improved quality of non-traditional, more qualitative attributes like comfort and convenience. However, another possible reason for premium transit's perceived appeal is that premium transit services are more visible and therefore travelers are more aware of their existence.

## 2.2 Premium Bus Branding

The most obvious way to become aware of a transit service is to physically see it. Conventional bus service may seem visible because it is typically well established and geographically widespread; however, bus stops are often poorly marked, and the routes and schedules of the service can be difficult to determine. Premium bus services, on the other hand, typically include many improvements that increase the visibility of the service. Improvements in bus stops such as clear signage, seats, and shelters, or off-board ticket vending bring attention to the service, while branding on the bus exterior captures attention and distinguishes the bus from conventional services. Also, premium bus services occasionally operate in bus lanes or High Occupancy Vehicle (HOV) lanes, and marked or painted lanes can bring attention to the bus service and its potentially improved reliability and travel time.

For example, in New York City, a BRT service introduced in 2007 incorporates many of these visible service improvements and has shown a significant increase in ridership (Barr and Beaton, 2008). The new BRT alternative, branded *Select Bus Service* (SBS) by the New York City Metropolitan Transportation Authority (MTA), runs along Fordham Road in the Bronx. Bus lanes are painted a separate color from the regular street, with large signs declaring the lanes as bus lanes. New bus shelters have been constructed to offer better visibility and improve security. Ticket vending machines have been placed at bus stops eliminating on-board payment. The SBS buses, which use the same type of vehicle as conventional buses, are thoroughly rehabilitated and cleaned for the new service, and are equipped with signal priority and on-board cameras. The buses are also "wrapped" with a brand logo.

Patrick (2006) documented efficiency improvement provided by premium bus services. In large and congested metropolitan areas, carpools and express bus service may attract many more riders if premium bus services operate between residential areas and job centers. Several metropolitan planning organizations have proposed premium bus service/high-occupancy vehicle (HOV) lanes or high-occupancy toll lanes for buses and HOVs. The concept includes new express bus and carpool services that improve passenger collection and distribution at bus transfer stations. With free trial periods, web-based multimodal trip-planning programs, and individualized marketing of alternative modes at

employment centers and in residential areas, the newly proposed concept would certainly make the premium service more visible than that of their counterparts of conventional bus services. Being promoted by marketing strategies and preferable treatments of operations, the proposed premium service has a very good starting point to attract more transit users.

Outwater (2010) focused on improving the understanding of the determinants for mode choice behavior and offering practical solutions to represent and distinguish these characteristics in travel demand models. The principal findings included that the awareness of transit service is significantly different from the assumptions made in the conventional travel demand forecast models; i.e., there is no perfect or complete information on all modes or all the characteristics for various modes; the correlation to mode choice is not perfect either.

Loader (2009) studied Melbourne's bus services, which cover two-thirds of the city's populations. The study reviewed recent experiences based on service upgrades and evaluated the effectiveness of such upgrades. The study derived their conclusions based on the procedures/questions:

- Documentation of recent improvements to Melbourne's bus services
- Evaluation of bus patronage growth
- Gathering of patronage response to introduction of premium "Smart Bus" routes
- Gathering of feedback on extended operating hours
- Assessing "value for money".

The main conclusion reflects that improvements to transit services generally favor increased transit use, but only public transport routes with reasonable service levels will attract new patronage.

## **2.3 Important Transit Service Attributes**

Once the potential transit market is accurately specified, the attributes explaining mode choice must be identified and appropriately described in order to estimate each mode's market share. The existing literature on critical attributes that affect the mode choice and transit can be grouped into several categories as presented in Table 2. Monetary cost, journey time, comfort, and convenience are within the traditional categories that have been incorporated into mode choice models to different degrees depending on different models and agencies. Walk time and wait time are usually specified separately from in-vehicle travel time (IVTT) because time spent out of the vehicle has typically been found to be two to five times more onerous than IVTT (Liu; Pendyala; and Polzin, 1997).

Table 2. Important transit attributes

Monetary Cost	
	Cost of one-way ride/pass
	Parking cost
Journey Time	
	Access/Egress time
	Wait time
	In-vehicle time
	Reliability
	Right of way
	Bus goes to front of line at red light
	Bus gets priority at traffic light
Convenience	
Transfers	Number of transfers
	Transfer walk time
	Transfer wait time
	Transfer monetary cost
	Time to transfer before assessed second fare
	Quality of transfer (same vs different platform)
	Transfer information
Span/Frequency	Schedule/route coordination w/in b/w agencies
	Service frequency
	Service hours
	Geographic coverage
	Express service
Comfort	
Station/Stop	Shelter
	Seats/benches
	Cleanliness
	Vandalization
	Maintenance/repair
	Station design/layout
	Station building materials
	Station art
On-board	Layout/design
	Seat configuration
	Seat comfort
	Load factor
	Seat availability
	Heating/cooling/ventilation
	Smoothness
	Quietness
	Cleanliness/appearance interior/exterior
	Smell
	Space for luggage/belongings
Restrooms	
Accessibility	
	Pedestrian friendliness
	Parking
	Bicycle accommodation
	Distance from entrance to platform
	Elevators/escalators
	Wider passages and stairways
	Platform surface
	Low-floor/no steps
	Wide entry
	Availability of handrails
	Stopping position of bus/train
Productivity	
	Ability for activity
	Activity services - WiFi
	Entertainment
	Journey enjoyment
Information Services	
General	Understandability of schedules/routes
	Accuracy of information
	Ease of getting information by phone/online
	Effectiveness of customer service
	Availability of service change information
	Notification of service changes
	Availability of customized local information
Station/stop	Schedule/map availability
	Availability of real-time information
	Usefulness of digital displays
	Clear/timely announcements
	Visibility of signage
	Staff availability
	Station egress information
On-board	Visibility of route names/numbers on outside
	Schedule/map availability
	Clear/timely announcements on board (if any)
	Visibility of station name from inside train
	Driver knowledgeable of schedules/routes
	Driver explains reasons for delays
Fare Payment	
	Pass/fare card purchase location availability
	Ticket vending machine availability
	Ease of purchasing pass/fare card
	Ease of recharging fare card
	Ease of obtaining refund/replacement fare card
	Fare integration with other agencies
	Mandatory off-board payment
	Proof of purchase by fare inspectors
	Ease of paying fare on-board
Change availability	
Safety	
	Station/stop crime daylight
	Station/stop crime nighttime
	On-board crime daylight
	On-board crime nighttime
	Parking lot crime daylight
	Parking lot crime nighttime
	Presence of surveillance cameras
	Presence of emergency call buttons
	Presence of security personnel and/or police
	General visibility/open sightlines
	Lighting
	Accidents
	Availability of on-board emergency exits

Time spent walking and waiting during a transfer is also accounted for separately, but transfers are generally thought to impose additional costs through increased unreliability, additional mental effort, and by splitting IVTT into a greater number of stages, which breaks up time that could be more productive with fewer but longer journey stages (Li, 2003). These costs can be captured by adding a coefficient specifying the number of transfers and assessing a transfer penalty, estimated as an extra 5-15 minutes of IVTT (Liu, 1996 and Horowitz and Zlosel, 1981). The monetary cost of a transfer is captured in the cost coefficient along with the fare, parking cost, and any additional fees.

Service frequency can be included in models as a proxy for wait time; however, research has shown that improvements in headway provide greater benefits for high frequency services than low frequency ones, and can therefore be specified nonlinearly. In one study, a one-minute decrease in headway for a service departing every five minutes was equivalent to one minute of IVTT savings, while the same improvement for an hourly service provided roughly half that benefit (Litman, 2007).

Finally, pedestrian friendliness, while not necessarily a service attribute over which the transit agency has control, is occasionally included in models to account for variation in the quality of the accessibility between the station and activity locations.

Many other studies (Connecticut Association for Community Transportation 2010, Weyrich 2011) have confirmed the importance of various transit attributes listed in Table 2. For example, the Connecticut study has found several benefits of traditional bus services:

- Affordable transportation service
- Reduction of congestion and fuel consumption
- Support of smart development, livable communities, and a green economy.

The same study documented that public transportation in three urban areas in 2007 saved 1.06 million hours of travel time and \$21.6 million in travel costs for transit and auto users. Along one corridor of 20 miles, the bus is the ride of choice instead of driving alone for commuting trips. The overall reduction in the CO<sub>2</sub> emissions per year by riding transit may amount to 4,800 pounds. Similarly, the American Public Transportation Association (APTA) estimates that \$9,242 is the average annual savings for a person riding public transportation instead of driving a Single Occupancy Vehicle (SOV).

Besides the obvious lower fares, fewer transfers, and shorter headways documented in many other studies, Weyrich (2011) also highlighted that buses provide mobility to people who have no car or cannot drive. Compared to rail transit, the bus is more “flexible” because bus routes can be moved overnight

while train tracks are fixed in place. Bus service generally costs less to build and maintain as it usually shares the roadway with other vehicles, while track is exclusively for rail transit. With the recent development of BRT services, some corridors with dedicated rights-of-way, busways, or High Occupancy Vehicle (HOV) lanes may provide better transit service with less capital investment than light rails.

More specific to the importance of various factors that contribute to the transit services, Taylor and Fink (2008) have summarized a list of factors that affect transit ridership based on various studies conducted up to 2001. As documented in Table 3, a number of social and economic factors, such as regional or CBD employment, per capita income, and auto ownership all played a significant role in transit ridership. At the same time, transit service parameters, such as parking strategies, fare prices, and overall service quality also played an equal role in encouraging or decreasing transit ridership in various metropolitan areas.

## **2.4 Sample Applications of Premium Bus Services**

A recent literature review update shows that many more premium, select or enhanced bus services have been implemented by various transit agencies. For example, the Metropolitan Transit System in San Diego, CA (<http://www.sdmts.com/marketing/dumpthepump.asp>) has implemented I-15 Premium Express, which offers five bus routes that use the I-15 Express Lanes to transport riders from North County locations to their destinations in downtown San Diego and Sorrento Mesa.

Transit stations and Park & Ride lots are located along I-15 and are connected to the Express Lanes via direct access ramps. These direct access ramps allow the MTS Premium Express Bus and other Express Lanes users to bypass general purpose lanes and enter directly onto the Express Lanes. Express Bus riders, carpoolers, and vanpoolers can take advantage of additional parking within the transit stations at Sabre Springs/Peñasquitos, Rancho Bernardo, and Del Lago stations, with an additional transit station opening in 2014 at Hillary Drive in Mira Mesa.

Another transit agency, Utah Transit Authority (UTA) in Salt Lake City, UT (<http://www.rideuta.com/mc/?page=Projects-BusRapidTransit>) offers a limited number of Express Bus routes throughout its service area. These services typically travel at higher speeds and offer intra-county transportation. Due to their longer travel times, Express routes are usually available only during peak commuting hours on over-the-road coaches. These coaches offer reclining seats, overhead bins, individual reading lights and climate controls, and scenery-sized windows. In addition, free Wi-Fi is usually available to passengers on UTA's Express Bus routes. However, Express Bus requires a higher fare than for UTA's fixed-bus routes or TRAX system.

**Table 3. Factors influencing transit ridership**  
Source: Taylor, 2008

<b>External Factors</b>			
<b><i>Social Economic Factors</i></b>			
<b><u>Employment</u></b>			
Author	Year	Area	Research Interest
Liu	1993		regional employment
Kain and Liu	1995&1996		regional employment
Chung	1997	Chicago	employment and regional development
Gomez-Ibanez	1996	Boston	employment is more significant than per capita income
Hendrickson	1986	25 large U.S. metropolitan Area	CBD employment
<b><u>Income levels &amp; auto ownership</u></b>			
Liu	1993		per capita income
Kain and Liu	1995&1996		auto ownership
McLeod	1991	Honolulu, Hawaii	capita income, number of vehicles, the price of gasoline
Gomez-Ibanez	1996	Boston	Per capita income
Kitamura	1989	Netherland	auto ownership
Sale	1976		energy-crisis
<b><i>Spatial Factors</i></b>			
Bianco et al.	2000		parking strategy
Moral and Bolger	1996	Canadian and U.S. Cities	Parking
Chung	1997	Chicago	parking
Crane	2000		residential and employment densities
Cervero	1993		residential and employment densities
TCRP	1996		residential and employment densities
Spiller and Rutherford	1998		residential and employment densities
Hendrickson	1986	25 large U.S. metropolitan Area	residential and employment densities
<b><i>Public Finance</i></b>			
Sale	1976		Financial resources
Gomez-Ibanez	1996	Boston	budget crisis
Kain and Liu	1996		public or private of transit systems
<b>Internal Factors</b>			
<b><u>Pricing Factors</u></b>			
Sale	1976	Eugene, Madison, Minneapolis-St. Paul, Portland, Salt Lake City, San Diego, and Vancouver, B.C.	Fare price
Liu	1993		Fare price
Kain and Liu	1995	Portland, San Diego, and Houston	Fare price
Kohn	2000	85 Canadian urban transit agencies	Fare price
McLeod et al.	1991	Honolulu, Hawaii	Fare price
Brown, Hess, and Shoup	2001		Fare price
<b><u>Service Quantity Factors</u></b>			
Liu	1993		vehicle hours of service
Kohn	2000		vehicle hours of service
Kain and Liu	1995&1996		revenue and vehicle miles of service
Gomez-Ibanez	1996		revenue and vehicle miles of service
<b><u>Service Quality Factors</u></b>			
Kohn	2000		bus information, on-street service, station safety, customer service, reduced fare, cleanliness
Abdel-Aty and Jovanis	1995		Service quality

Moreover, the Chicago Transit Authority (CTA), the Toronto City Council, and the Washington Metropolitan Area Transit Authority (WMATA) are among many entities that are contemplating enhanced bus services.

On the other hand, not all the enhanced or premium bus services are successful. For example, Jackson (1979) described the performance of three luxury express coach services offering travel to and from the centers of cities to commuters living in outlying towns or suburbs. The services were offered at premium prices and catered for journeys between 7 and 15 miles in length. They aimed to attract managerial and professional workers from their cars. The author concluded that none of the services was successful. Average loadings varied between 7 and 20. The proportion of allocated costs recovered was at best 39 percent and at worst 23 percent.

Reasons for this lack of success are believed to be fares which were high in relation to the perceived costs of motoring, the inflexible service timings, the problem of attracting sufficient patronage from limited catchment areas containing a low density of potential users and, in one case, the method of fare collection which required payment for unmade journeys.

### **3. ON BOARD BUS SURVEY**

To measure the impact of the GO Bus on travel behavior and customer satisfaction, the research team explored the comprehensive impact of the premium GO Bus services and highlighted the specific impact on travel behavior, such as mode shift and ridership retention. The first step of the study was accomplished via an on-board survey along the two GO Bus service corridors, which include local route 25 and GO 25 along the Springfield Ave corridor, and local routes 11, 28, 72 and GO 28 in the Bloomfield Ave corridor.

#### **3.1 Development of the Survey Instrument**

The research team started the survey questionnaire design by using a previously tested bus survey instrument by NJ TRANSIT. Based on the specific characteristics of GO Bus services, the research team updated the survey instrument and included probing questions related to the BRT-like features. Due to significant differences between regular local bus and GO Bus services, the research team designed two separate survey instruments, one for GO Bus and another for the local bus as included in Appendix 1 and Appendix 2, respectively.

The questionnaires contain 27 questions for local bus and 29 for GO Bus. The questions focused on four main aspects: awareness and use of GO Bus; travel patterns; satisfaction with the bus service; and socio-economic and demographic information. As shown in Appendices 1 and 2, the first part of the survey instruments include mostly travel pattern questions like “On what route did you receive this survey?” “How did you get to this bus?” and “Where did you get on this bus?” The customer satisfaction section asked respondents to rate the following attributes of service on a scale of 0 to 10, with “0” being unacceptable, “5” being acceptable and “10” being excellent: condition of the shelter, weekday peak frequency, weekday off-peak frequency, information about the bus, trip time, on-time performance, and overall satisfaction. In the final section of the survey, respondents were asked to provide demographic information like age, gender, occupation, and income.

The research team conducted an onboard pretest of the survey instrument after the survey design and methodology were approved by NJDOT and NJ TRANSIT. Approximately 50 questionnaires were distributed by NJ TRANSIT staff and NJIT students on a selected number of bus routes. The pretest ensured that the questionnaires were free of error; the business reply permit was valid; customers would not encounter any problems when answering the survey; and survey interviewers could handle the task with minimum supervision.

Once all corrections were made, the team proceeded to the following steps toward administering the survey in full scale. In particular, this includes the following steps:

- Obtaining information on NJ TRANSIT business reply permit,
- Printing and bundling the survey forms,
- Assigning a unique ID for each questionnaire,
- Providing a drawing of two monthly passes as incentives.

### **3.2 Administration of the Survey**

The typical approach for an on-board survey is to have surveyors hand out and collect self-administered questionnaires (hand-back) or to encourage the respondents to mail questionnaires back (mail-back). Typical response rates for a mail-back survey are around 20% (Meyer and Miller, 2001; Richardson et al., 1995); the response rate via the former approach (hand-back) may be slightly higher.

Given the service patterns of regular and GO Bus services, it is convenient and productive to have surveyors distribute questionnaires on the bus in both directions. This arrangement captured passengers boarding/alighting from both directions so one peak period and one off-peak period were enough to capture the majority of the daily riders.

The research team surveyed both GO Bus corridors and their parallel local bus routes during the three-day survey period. Corridor 25 included GO 25 and Local Route 25 and Corridor 28 included GO 28, Local Routes 11, 28, and 72. The survey period spanned from 6 AM to 3 PM on April 16, 17 and 18, 2012. The survey was designed as a census to capture inbound and outbound customers on all scheduled bus trips during the 6 AM to 3 PM time period. The approximate ridership obtained from farebox data for these routes during this time period was 15,400.

The surveyors were largely NJIT graduate students, who received training prior to being sent to the field. NJ TRANSIT provided staff to supplement the survey collection effort to increase coverage and response rates. A field recording form was given to each surveyor, as demonstrated in Appendix 3. The surveyors were asked to hand out the questionnaires following the sequence numbers printed on the envelopes and to write down the first and last sequence number after each trip. If someone refused to take the survey, the questionnaire was handed out to the next passenger.

Overall the survey was well organized and executed. However, there were a few issues that may have an impact on the survey:

- A portion of the passengers spoke Spanish only and refused the English survey citing that they could not read or respond to the survey in English;

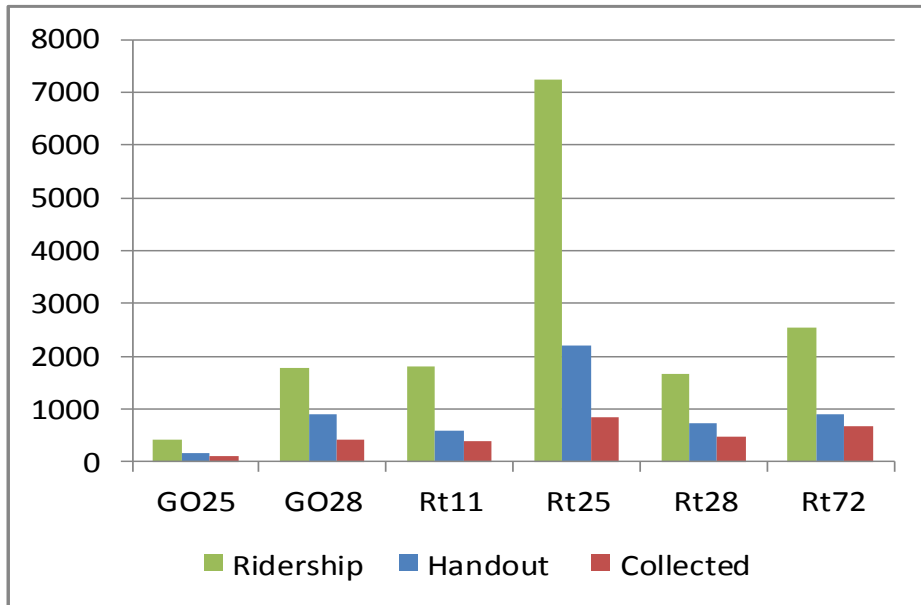
- Some passengers refused the survey because they had already responded to the survey on a parallel route;
- 10% of scheduled trips were missed, resulting in approximately 1,800 passengers not having the opportunity to complete a survey. Roughly half of these were local Route 25 passengers.

### 3.3 Processing the Survey Results

The research team prepared a record layout and a third party contractor keyed the data. The research team conducted consistency and logic checks on all data items in the database. NJ TRANSIT developed the weighting factors.

Of the 15,428 total riders during the survey period, 5,438 questionnaires were distributed and 2,925 surveys were returned. This results in a response rate of 19%, which is in line with response rates reported in literature.

As shown in Figure 4, the total ridership for each route varies, ranging from a few hundred for Go 25 to more than 7,000 for route 25. Response rates for each route can be found below in Table 4.



**Figure 4. Questionnaires distributed and collected by route**

**Table 4. Response rates by route**

Route	Completed Surveys	Ridership	Response Rate
GO 25	117	416	28%
25	847	7235	12%
GO 28	430	1759	24%
11	394	1817	22%
28	476	1655	29%
72	661	2546	26%
Overall	2925	15428	19%

NJ TRANSIT staff developed weighting factors based on the response rate, which were used to project the survey results. The data from the returned surveys was weighted for each route by time period and direction to reflect the total ridership during the survey period. Weights were determined by dividing the ridership totals per time period and direction by the total completed surveys per time period and direction. Using GO 25 as an example, for every 3.94 riders traveling in the inbound direction during the AM Peak, one useable survey was returned. Table 5 exhibits the specific weights for the inbound direction of each route. A similar approach was applied to the outbound direction for both peak and off peak periods. The full table of weights is available in Appendix 4.

**Table 5. Weighting approach**

Route	Inbound Peak (6AM-10AM)			Inbound Off Peak (10AM-3PM)		
	Completed Surveys	Ridership	Weight	Completed Surveys	Ridership	Weight
GO 25	82	323	3.94	n/a*	n/a*	n/a*
25	297	2068	6.96	222	1954	8.80
GO 28	110	492	4.47	146	499	3.42
11	91	372	4.09	72	427	5.93
28	90	258	2.87	69	445	6.45
72	155	701	4.52	140	699	4.99

**\*Note: GO 25 only operates during peak periods.**

## 4. STATED PREFERENCE SURVEY

To further understand customer preferences for various attributes of the GO Bus service, the research team hired Resource Systems Group (RSG), Inc. as a subcontractor to conduct focus groups and administer a Maximum Difference Scaling (MaxDiff) survey.

MaxDiff is a conjoint technique that allows researchers to quantitatively determine the magnitude by which certain attributes are valued in comparison to others by forcing respondents to make trade-offs between attributes. As shown in Figure 5, respondents are shown a list of four attributes at a time and required to select which is the most important and which is the least important. Each subsequent “experiment” includes a different mix of attributes to be ranked. For this study, a total of 24 attributes of service were evaluated.

In this section, you will see 12 pages, each with a list of 4 features that could be made available for your commute.

On the left, please indicate which one of the features would be **most important to you**.

Then on the right, please indicate which one of the features would be **least important to you**.

Most Important (pick one)		Least Important (pick one)
<input type="radio"/>	Using GO Bus takes 10 minutes less travel time than the local bus	<input type="radio"/>
<input type="radio"/>	GO Bus gets preferential priority signal when coming to a traffic light	<input type="radio"/>
<input type="radio"/>	Using GO Bus takes 5 minutes less travel time than the local bus	<input type="radio"/>
<input type="radio"/>	GO Bus stops have nicer shelters than regular bus routes	<input type="radio"/>

(10 of 12)


Next Question 

Figure 5. Examples of MaxDiff Tradeoffs

## **4.1 Design of Survey Instrument**

Working with NJ TRANSIT staff, the research team developed a list of attributes based on the findings of the primary onboard data collection effort, the results of previous NJ TRANSIT BRT studies, and other relevant public outreach conducted by NJ TRANSIT. The attributes were then programmed into the quantitative questionnaire, included in Appendix 5. In addition to the MaxDiff experiments, the questionnaire also includes questions about the respondent's current travel patterns.

## **4.2 Administration of Focus Group/ Stated Preference Survey**

Upon analysis of the onboard survey data, NJ TRANSIT identified the following market segments:

- GO Bus customers who shifted from driving alone or carpooling
- GO Bus customers who shifted from rail modes (commuter rail or light rail, including bus to rail)
- GO Bus customers who started making the trip because of GO Bus
- GO Bus customers who use GO Bus for 1/3-2/3 of their total weekly bus trips
- GO Bus customers who use GO Bus for at least 75% of their trips and at least 3-4 days per week
- GO Bus customers whose origin/destination was one of the stops eliminated from the GO 28 route
- Local bus customers who do not use GO Bus but travel within the GO Bus service area

NJ TRANSIT staff contacted all respondents recruited during the onboard survey who were willing to participate in future research. NJ TRANSIT staff also contacted additional customers who either use a GO Bus or regularly travel within a GO Bus service area. The expanded recruiting effort increased the sample size and reliability of the survey results, allowing for segmentation of the MaxDiff results. Due to recruitment and logistical challenges, the research team decided to collapse the market segments listed above into two groups: (1) Customers who primarily use GO Bus, and (2) Customers who primarily use local bus 11, 28, 25, or 72 and travel within a GO Bus service area.

Seven focus groups were held on February 27<sup>th</sup> and 28<sup>th</sup>, 2013 at NJ TRANSIT headquarters in Newark, NJ. More than 70 people signed up and agreed to participate in the focus groups and Stated Preference (SP) survey, and 66 showed up, completed the survey, and produced usable data. Roughly 48% of participants primarily used GO 25 or GO 28, while the remaining 52% primarily used a parallel local route.

After the focus group discussions, an online MaxDiff survey was administered, which was used to conduct the conjoint analysis. This online approach saves time and effort on data entry, improves data quality, and provides a better experience for the respondents. A number of workstations with internet access were used when the respondents were ready for the short survey.

### **4.3 Analysis of Stated Preference Survey Results**

The results from the MaxDiff “experiments” are used to estimate the coefficients of a multinomial logit choice model. These results allowed NJ TRANSIT to understand which BRT service elements are most preferred and the magnitude of the preference in relation to the other service elements tested.

RSG processed and analyzed the SP survey data. The full report is attached in Appendix 6 and some of the findings are discussed in the remainder of the report.

## 5. STUDY FINDINGS

The objectives of this task are to identify shifts in travel patterns, ridership, and customer satisfaction levels among Go Bus customers by analyzing results of surveys. After initial cleaning of the survey data, the team examined current distributions among various modes including main, access, and egress modes, origin-destination (OD) matrices and boarding volume by stops, directions, and time of day.

### 5.1 Awareness of GO Bus

Customers who received a survey while riding a local bus route were asked whether they were aware of GO Bus, and if so, how they found out about the service. As shown in Figure 6, about 77% of local bus riders were aware of GO Bus. Of these, more than three-quarters became aware of the service after seeing the branded bus shelters and GO buses running. This was also true for 55% of GO Bus customers, demonstrating the significant role of branding attributes in drawing attention to the service.

Customers who participated in focus group sessions also mentioned the importance of branding in helping them to determine which bus to catch and where to wait for it. As shown earlier in the report, most GO Bus stops feature brightly-colored covered shelters that are much easier to identify than a traditional bus stop, many of which only feature a small sign. Customers also mentioned that the unique GO Bus colors allow them to identify the bus from farther away, and will let a local bus pass if they can see the GO Bus down the road.

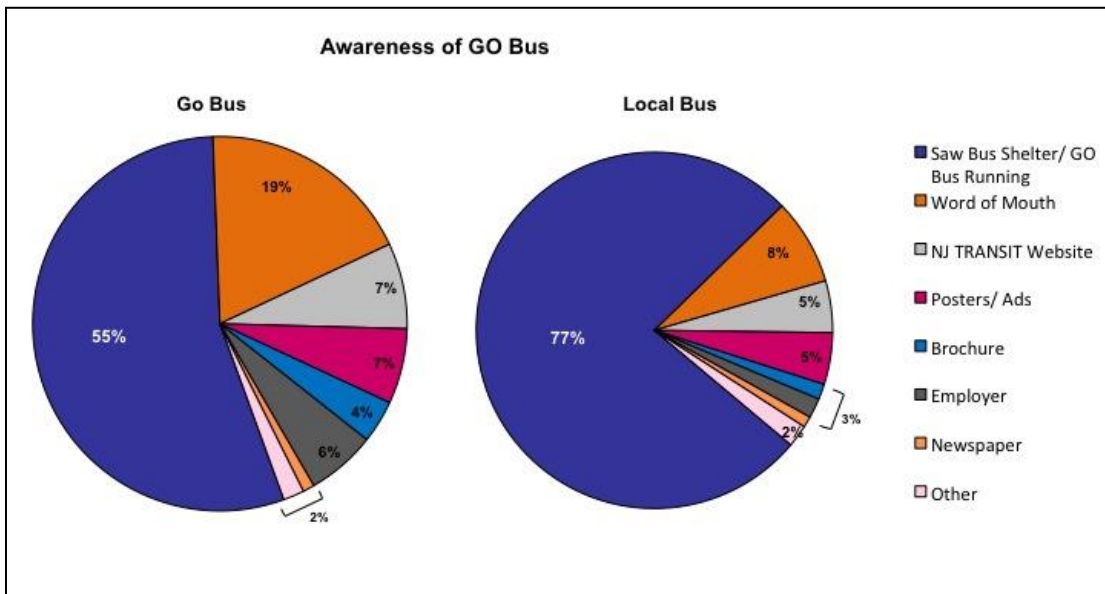
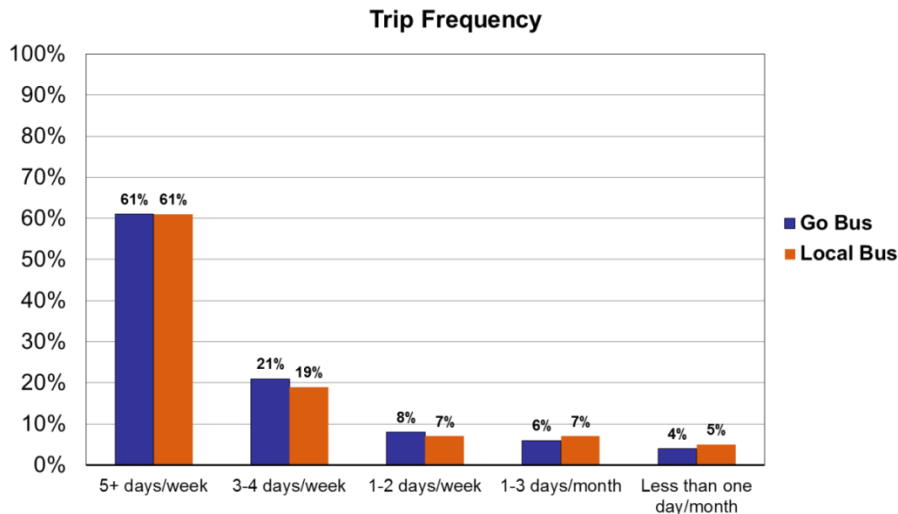


Figure 6. Awareness of GO Bus

## 5.2 Travel Characteristics

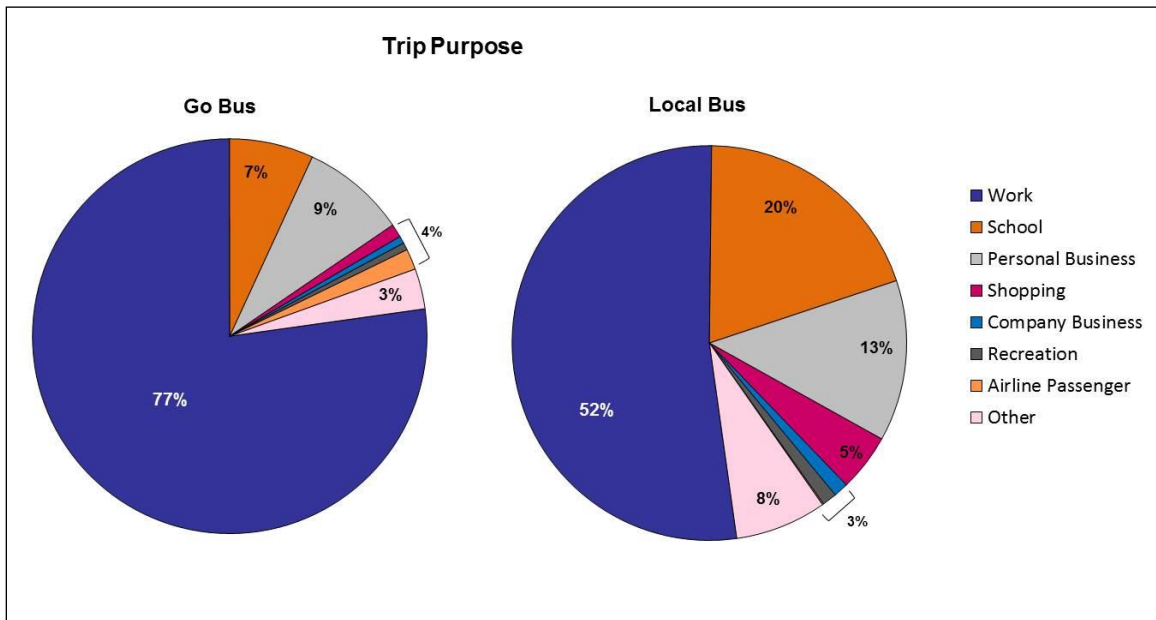
The primary trip purpose and trip frequencies reflected typical commuting trips by most bus riders. As shown in Figure 7, the percentage distribution is similar for both GO Bus and local bus service - about 60 percent of participants use the bus service five or more days a week. Another 20 percent of riders use the bus 3-4 days a week, followed by those who take the bus 1-2 days per week, 1-3 days per month, and less than one day per month.



**Figure 7. Weekly trip frequencies**

Most GO Bus riders do not use GO Bus exclusively. An additional question on the survey asked GO Bus riders how often they ride another route, and nearly half (47%) ride another bus route 5 or more days per week. The observation was qualitatively confirmed by the focus group discussions: often riders decide which route they take based on which bus they saw coming.

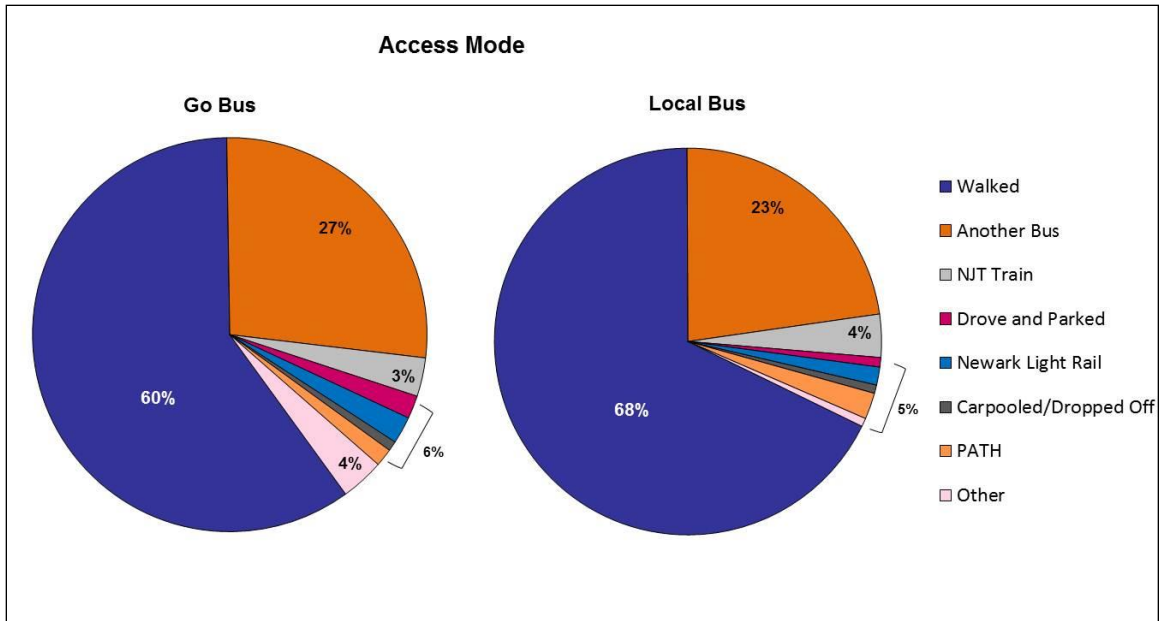
The trip purposes of all survey participants are shown in Figure 8. Among all bus customers, work was the most common trip purpose. For GO Bus customers (GO 25 and GO 28), nearly 80% reported using the bus for work. For the parallel local routes, just over half of trips were for work, followed by 20% for school. The high share of work and school trips reflects the share of customers who use the bus at least 3 days per week, as seen in the previous chart. For the rest of GO Bus customers, nine percent used the GO Bus for personal business, seven percent for school, and the remaining seven percent for airline travel, company business, shopping, or other. While the survey did not explicitly ask customers whether they work at the airport, an analysis of origins, destinations, and trip purposes reveals that a significant portion of GO 28 customers, approximately 64%, were traveling to or from the airport for work.



**Figure 8. Trip purpose**

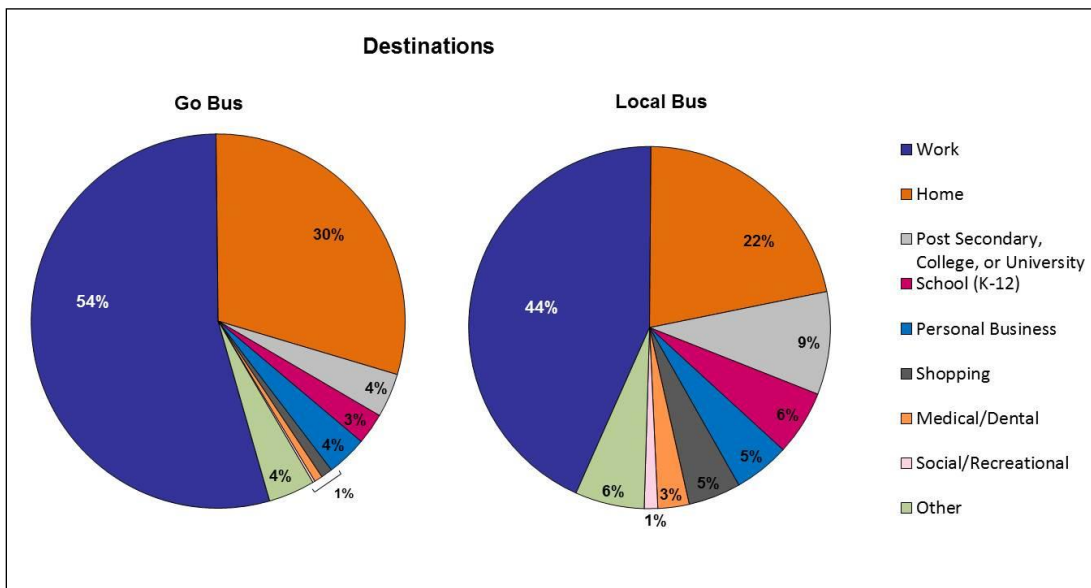
For the parallel local bus customers, thirteen percent used the bus for personal business, followed by five percent for shopping, and eleven percent for airline travel, company business, recreation, or other. A quick scan of other purposes revealed that they may include job search, jury duty, or dropping someone off.

Figure 9 reflects the access mode choice by GO Bus and local bus riders. The largest share of access mode is walking for both bus services, 60% and 68% respectively. The slightly higher walking access mode for local bus riders may reflect the dense spacing of local bus routes as more people have closer access to local bus stops. The second largest access mode is another bus, 27% and 23%, for GO Bus and local bus riders, respectively. Five percent of GO Bus and local bus riders use NJ TRANSIT fixed guideway transit, such as commuter train or light rail. About two percent of both GO Bus and local bus riders use PATH, which provides connections to the New Jersey waterfront and New York City. Three percent of the GO Bus riders and two percent of regular bus riders drove to the bus stop. They either parked, carpoled, or were dropped off by others. Other access modes include taxi or non-motorized modes such as mopeds or bikes.



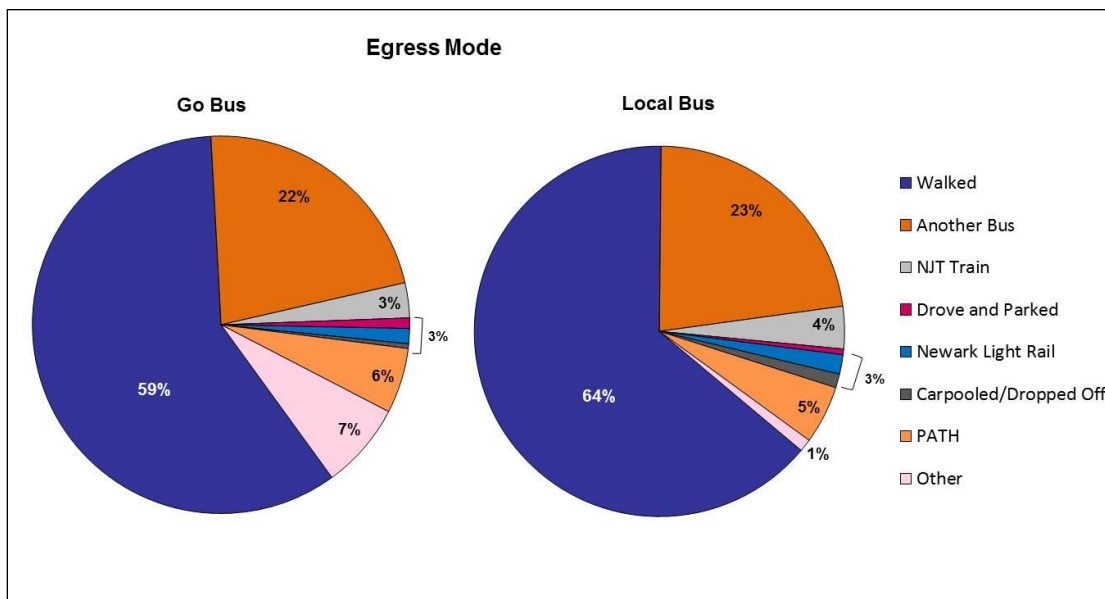
**Figure 9. Access mode distribution**

About half of all riders surveyed listed their work places as their destination. As shown in Figure 10, the second largest portion, thirty percent of GO Bus riders and about twenty percent of regular bus riders were taking the bus home, while smaller percentages traveled to school, business, medical/dental appointments, shopping or recreation places. The origin-destination (O-D) pair patterns are largely dictated by the survey period, from 6 AM to 3 PM, which captures the morning peak period but not the afternoon peak. A balanced O-D pair pattern would be more likely if the survey period captured the entire service day.



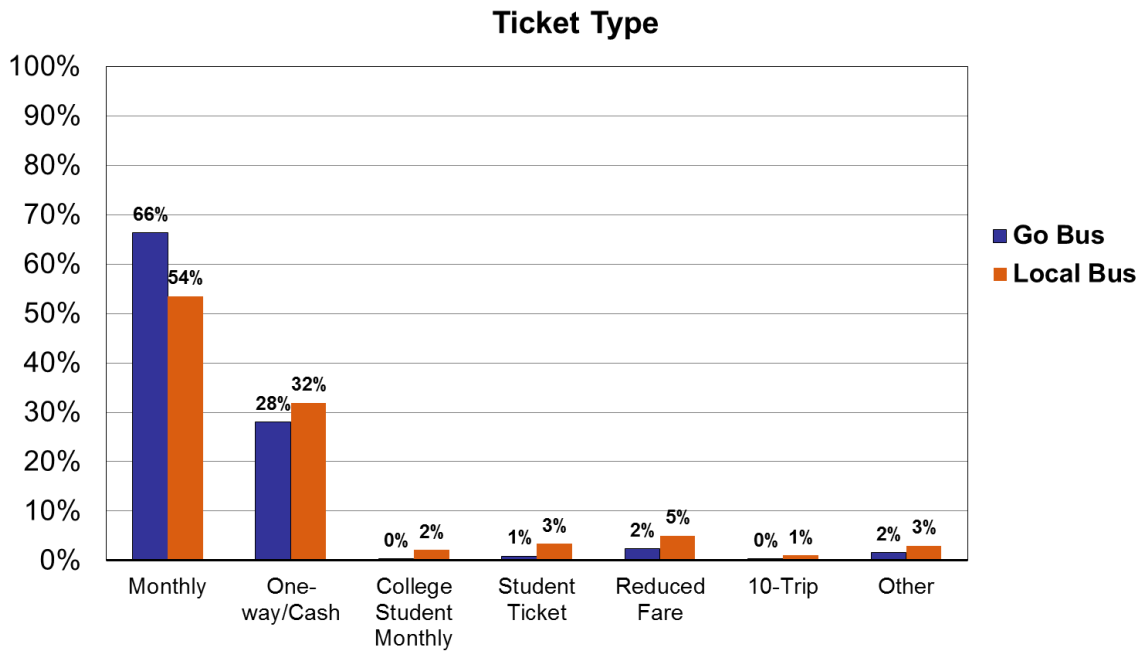
**Figure 10. Destination types**

Similar to the access mode for boarding the bus, the egress mode from the bus stop to final destinations is an important segment of bus travel. As shown in Figure 11, the predominant egress mode is walking, with 59% of GO Bus and 64% of local bus customers walking to their final destination. Another 22% of GO Bus customers and 23% of local bus customers transfer to another bus to complete their trip. The remaining customers transfer to a NJ TRANSIT train, light rail, or PATH to reach their final destination, with a small percentage driving, carpooling, or being picked up. Seven percent of GO Bus customers chose “Other” as their primary egress mode. PATH usage among GO 25 users is especially high compared to other routes, with 25% reporting PATH as an egress mode at Newark Penn Station.



**Figure 11. Egress mode distribution**

With most customers using buses daily, a monthly pass is the most economical and convenient. As shown in Figure 12, two-thirds of GO Bus riders and more than half of regular bus riders use monthly passes. This is likely due to a higher income profile among GO Bus customers enabling them to afford to purchase monthly bus passes. About 30% of all riders use either a one-way ticket or cash to purchase the fare on the bus. Both the reduced and student fare shares are higher for local bus riders than the GO Bus riders, which may reflect that the local routes service additional universities, including Montclair State University (11), Bloomfield College (11, 28, 72), Passaic County Community College (72), and others. Both local and GO Buses service New Jersey Institute of Technology, Rutgers-Newark, and Essex County Community College. Unfortunately, the GO 28 branch that served New Jersey Institute of Technology and Rutgers-Newark was eliminated shortly after the survey was conducted due to budget constraints and low ridership.

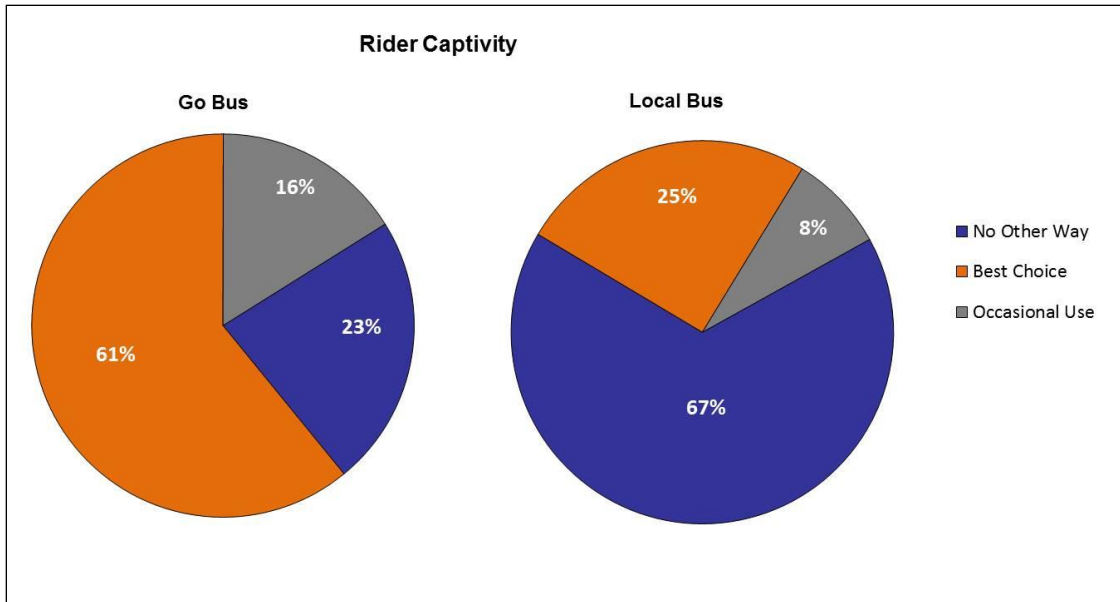


**Figure 12. Ticket types**

In order to measure transit dependency, also known as “captivity,” respondents were asked to select which of the following three statements applied to them:

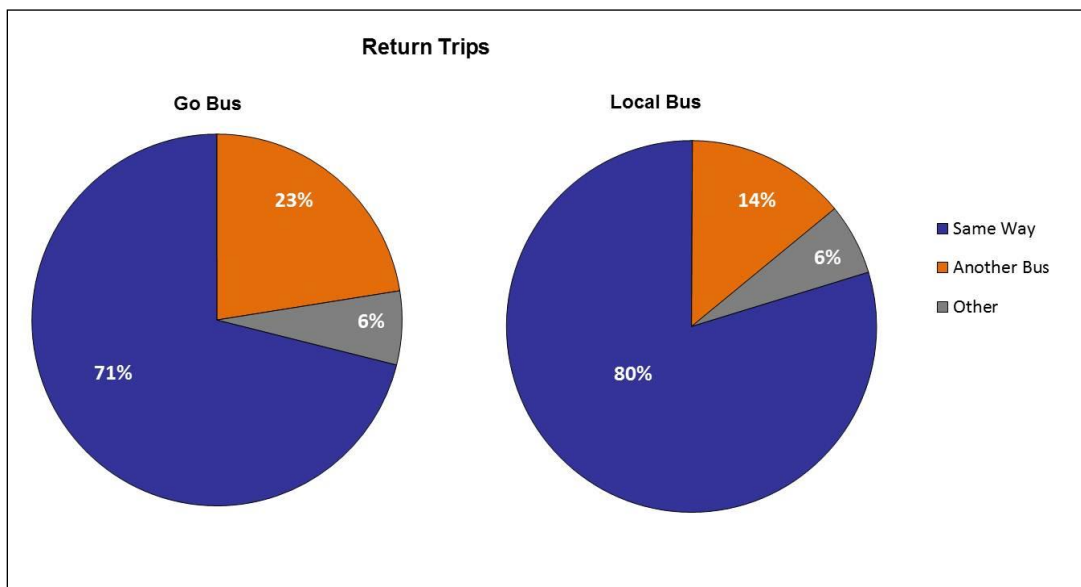
- “I have no other way to travel, so I use the (GO) bus.”
- “I use the (GO) bus because it is the best choice for me, even though there are other ways I could travel.”
- “I usually use another type of transportation, but I occasionally take the (GO) bus.”

As can be seen in Figure 13, the results for this question varied significantly when comparing the responses of GO Bus customers to local bus customers. Local bus customers are much more likely to be captive riders, with 67% having no other way to travel. In contrast, only 23% of GO Bus customers had no other way to travel, while 61% took the GO Bus because it was the best choice for them and 16% use another type of transportation more frequently. These results indicate that premium bus services can attract a broader spectrum of riders than traditional bus service.



**Figure 13. Rider captivity**

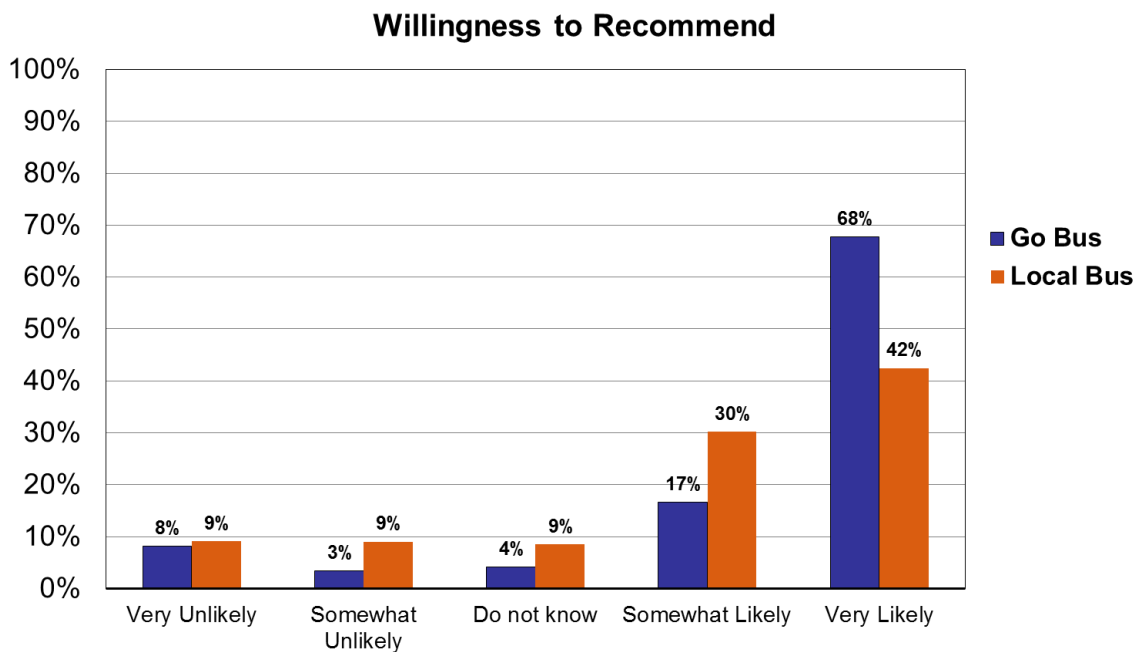
Over 70% of GO Bus riders take the same mode in the opposite direction, as shown in Figure 14. The portion of regular bus riders using the same bus service for their returning trips is even larger, about 80%. More than 20% of GO Bus riders and 13% of regular bus riders take another bus. And about 6% of both GO Bus and local bus riders choose others like PATH, NJ TRANSIT trains or private automobiles.



**Figure 14. Return trips**

### 5.3 Customer Satisfaction

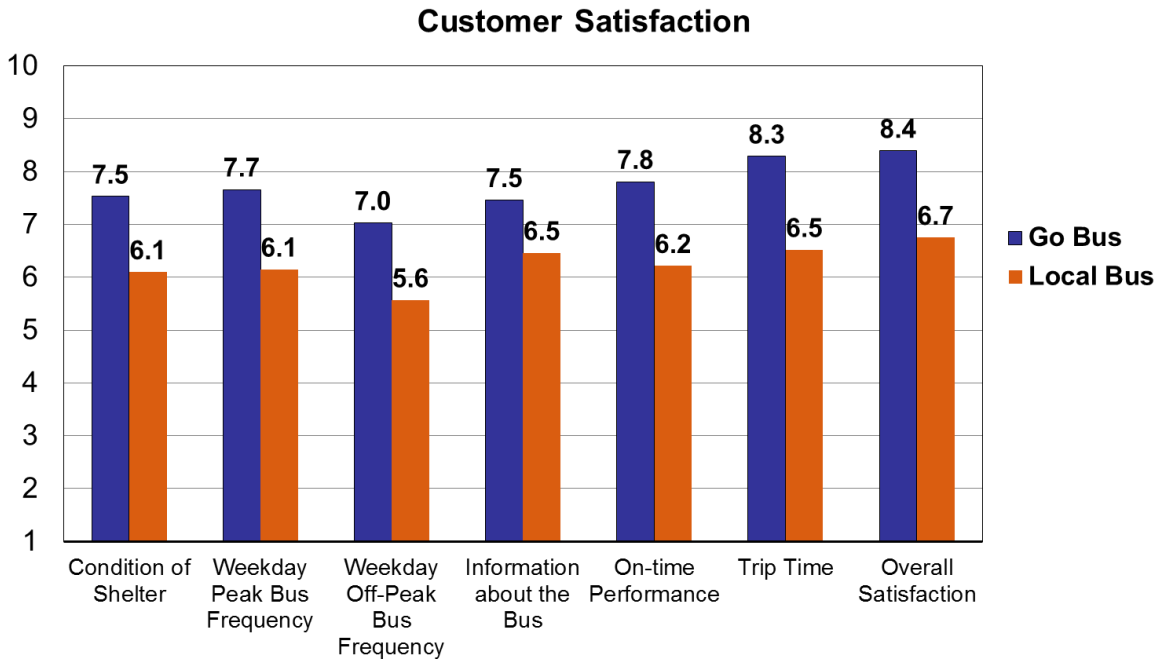
Customers were asked to rank their likelihood to recommend NJ TRANSIT service to a friend or relative on a scale ranging from “very unlikely” to “very likely”. In general, both GO Bus and local bus customers are satisfied with service, with 85% of GO Bus and 72% of local Bus customers expressing willingness to recommend NJ TRANSIT. However, GO Bus customers express much stronger positive sentiments. As demonstrated in Figure 15, a large portion of GO Bus riders, 68%, and less than half of local bus riders, 42%, chose “very likely” to recommend their respective service to others. This 26 percentage point difference demonstrates the strong preference GO Bus customers have for the enhanced bus service.



**Figure 15. Willingness to recommend**

The survey also asked the participants to evaluate various attributes of service on a scale of 0 to 10, with “0” being unacceptable, “5” being acceptable and “10” being excellent.

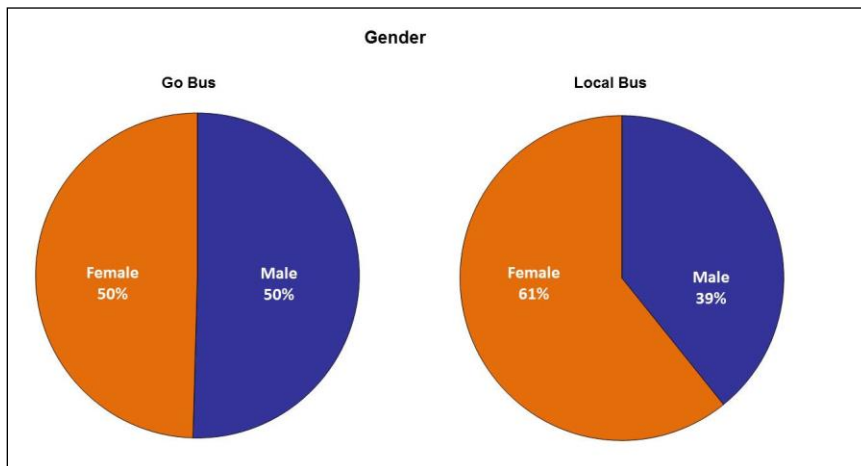
Again, GO Bus customers show higher levels of satisfaction across all rated attributes of service, including overall satisfaction. As documented in Figure 16, the mean overall satisfaction score for GO Bus customers is 8.4, a full 1.7 points higher than the mean score among local bus customers. The feature rated most highly by GO Bus customers is “Trip Time” (8.3), while “Information About the Bus and Trip Time” receive the highest ratings among local bus customers (both 6.5). Both GO Bus and local bus customers gave “Weekday Off-Peak Frequency” the lowest ratings.



**Figure 16. Satisfaction ratings**

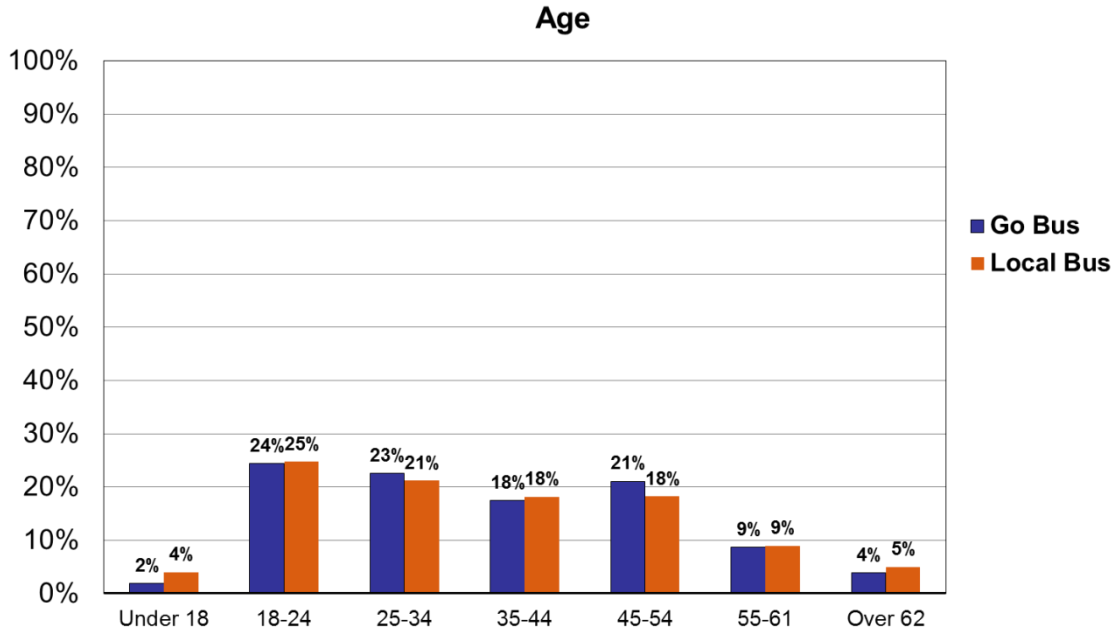
## 5.4 Demographic, Social, and Economic Status

As shown in Figure 17, the split between male and female among GO Bus riders is rather equal but more female riders than male took a local bus. Upon analysis of the results at the route level, GO 25 actually has the largest proportion of female riders among all routes at 68%, while GO 28 is the only route with fewer female (45%) than male (55%) riders.



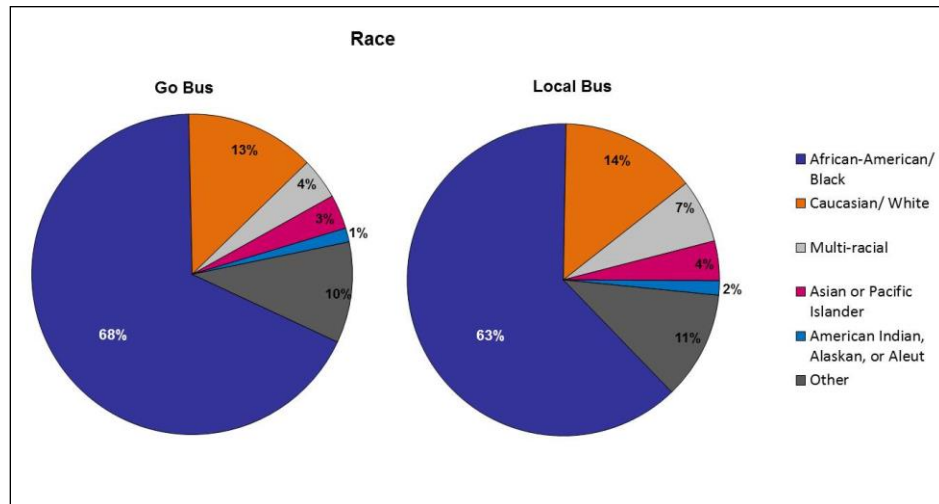
**Figure 17. Gender distributions**

As depicted in Figure 18, the age distribution for GO Bus and local bus riders is similar. Customers for both Go Bus and local routes have a mean age of 37 years old. The 18-24 year old age cohort is the largest, with a share of 24% and 25% of GO Bus and local bus riders, respectively.



**Figure 18. Age distributions**

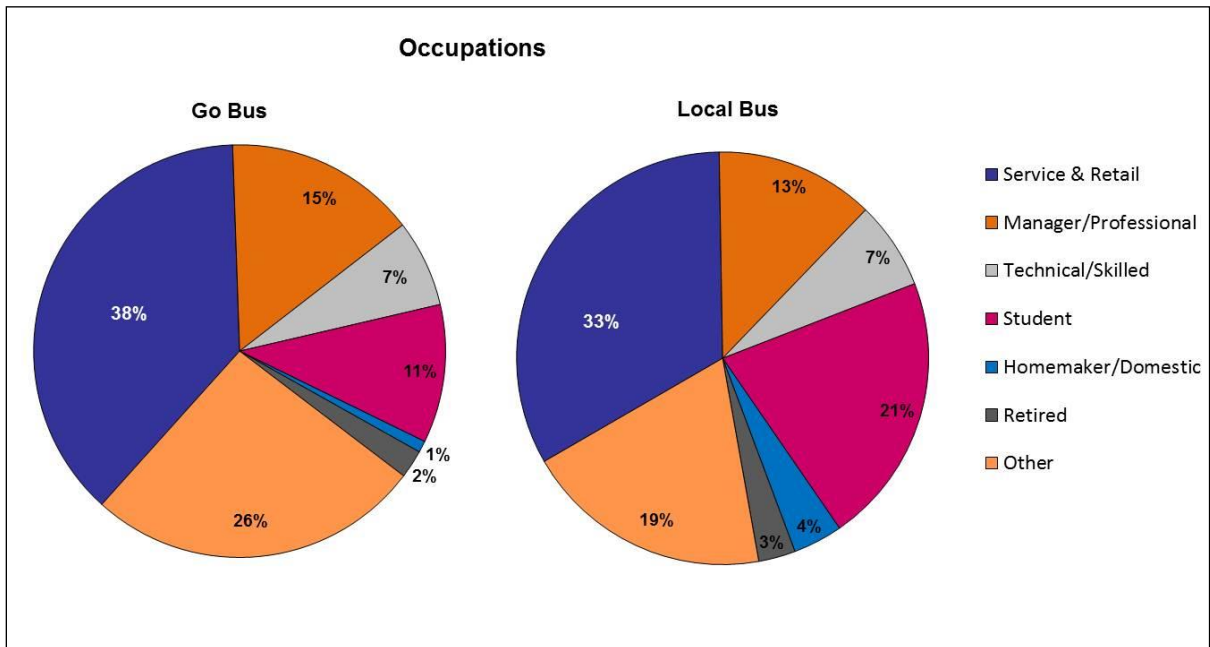
As shown in Figure 19, most bus customers identify as African-American/Black, followed by Caucasian/White. 68% of GO Bus and 63% of local bus customers are African-American/Black.



**Figure 19. Racial distributions**

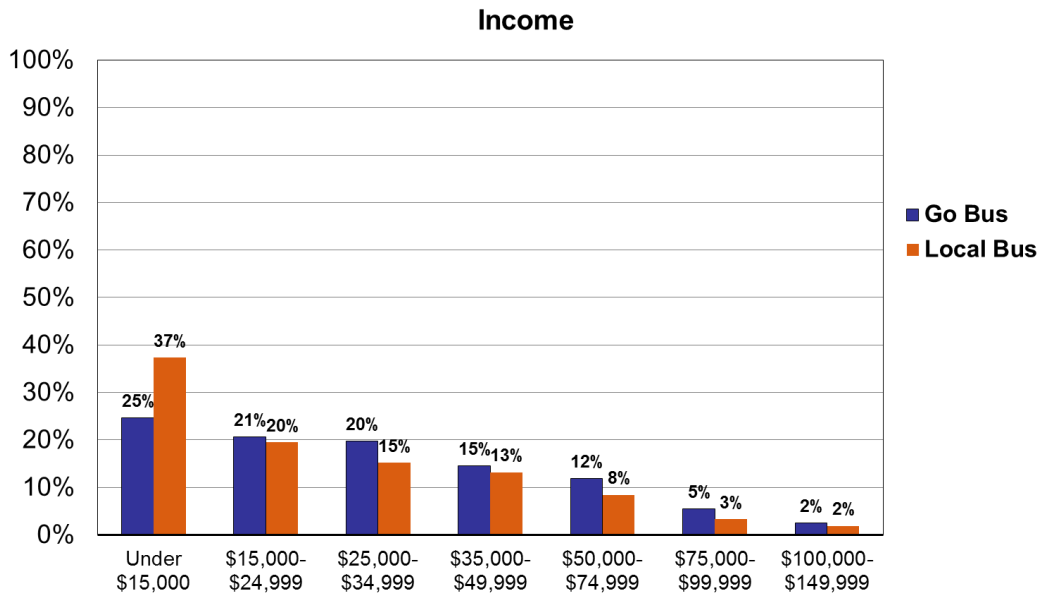
A separate question asked customers whether they are of Hispanic origin. Overall, 22% of customers identified as Hispanic, with the highest percentages of Hispanic customers concentrated along the Bloomfield Ave corridor (GO 28 and Route 11, 28, and 72). The percentage of Hispanic customers using these routes ranged from 28% to 39%. In contrast, only 11% of GO 25 and 12% of 25 customers are of Hispanic origin. The actual percentages of Hispanic customers is likely higher, as surveys were only provided in English.

As shown in Figure 20, the largest percentage of respondents work in service and retail, 38% for GO Bus and 33% for local bus. The higher share of service and retail occupations among GO Bus riders may reflect the airport as a major employment hub. Just over one fifth of local bus respondents were students compared to just 11% of GO Bus riders. As mentioned earlier, this likely reflects the additional schools serviced by the local routes. The smallest occupational groups among survey participants is retired or homemaker/domestic. A fairly substantial number of respondents, 19% of local bus riders and 26% of GO Bus riders, selected the “other” occupational category, which represents diversified occupations/classifications, such as actor or musician, which may not fit into any of the occupational categories listed above.



**Figure 20. Occupation distributions**

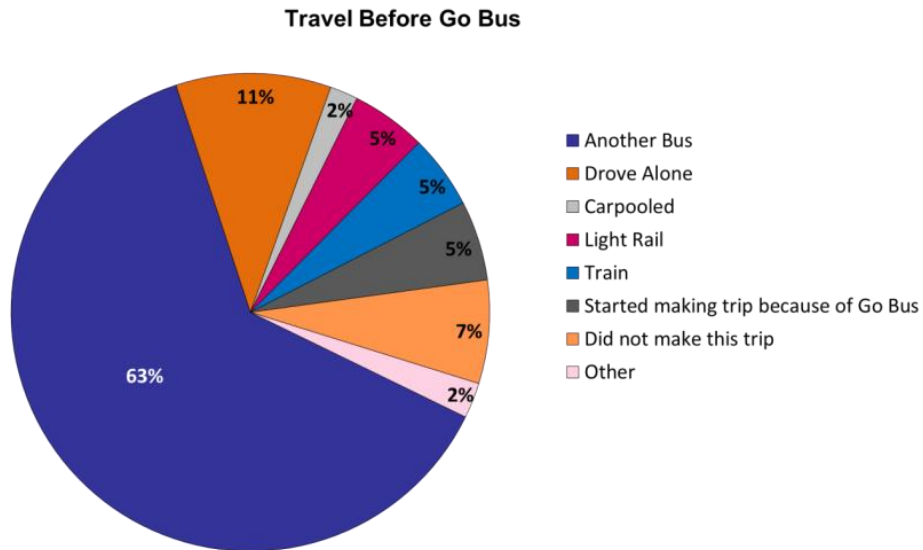
Dramatically different from the typical pattern of income distribution in most areas in the U.S., the annual household income distribution for the bus survey participants is skewed toward the lower income categories. As shown in Figure 21, the largest group is “Under \$15,000”, with 25% of GO Bus and 37% of local bus customers falling under this category. The portion of each group gets smaller as the income of the category increases. When comparing the incomes of GO Bus and local bus riders, GO Bus riders have slightly higher incomes, with a mean household income of \$35,700 compared to \$31,200 among local bus customers. GO 25 customers had the highest average household income at \$42,900. This may be explained by the large percentage of GO 25 customers transferring to PATH (25%) to reach employment destinations in New York City.



**Figure 21. Income distributions**

## 6. GO BUS IMPACT ANALYSIS

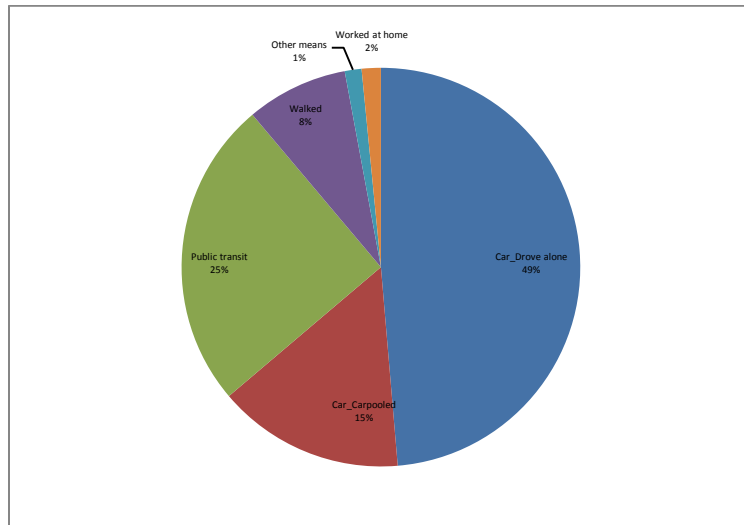
In order to evaluate the GO Bus impact, the research team focused on the riders' mode shifts and reasons behind such shifts. As demonstrated in Figure 22, over 60% of the GO Bus riders came from another NJ TRANSIT Bus, showing the attractiveness of the enhanced GO Bus service over local bus service. This was also confirmed by the focus group discussions.



**Figure 22. Modes used before GO Bus**

The second largest mode shift came from automobile users – about 11% of all GO Bus riders switched from driving alone and another two percent switched from carpools. This finding shows that high-quality bus services can compete with cars, helping to reduce traffic congestion and reduce the environmental impact of local travel. As seen in Figure 23, which shows the share of commuting by all travel modes within the study area, the percentage of commuters using the bus is already high at 25%. Even in a market that has already achieved high ridership, premium bus service has the potential to expand the market.

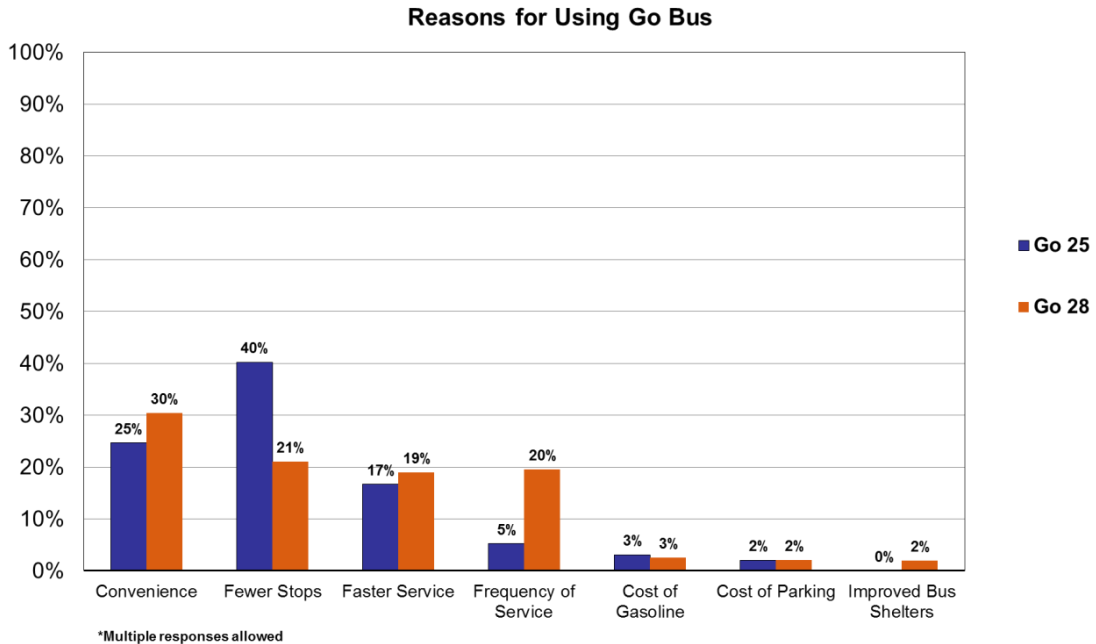
Another significant behavior change are the newly generated trips by GO Bus. About five percent of GO Bus riders started making the trip because the GO Bus service was available. Given the large share of commuting trips made by GO Bus riders, it is reasonable to speculate that some people may have gained their access to work or the airport via GO Bus, which is confirmed by the focus group discussions. Another seven percent did not make the trip at all before the GO Bus became available. Further research is needed to determine whether these customers may have chosen their work or home location due to the proximity of a GO Bus stop.



**Figure 23. Mode shares in the study area**  
Source: Census 2010

Customers who switched from another travel mode to the GO Bus were asked to select the primary reasons they switched. Among all GO Bus customers, “convenience” emerged as the top reason, with 40% of responses. “Fewer stops,” a distinguishing feature of the GO Bus service, garnered 33% of responses, followed by “faster service” and “frequency of service.” These findings were confirmed by the MaxDiff results, which found that travel time and frequency attributes were valued twice as high as branding attributes. The cost of parking, cost of gasoline, improved bus shelters, and other reasons played comparatively smaller roles in motivating travelers to use the GO Bus.

When analyzing GO 25 and GO 28 separately, the primary reasons for using GO Bus vary. As shown in Figure 24, “fewer stops” was much more important to GO 25 customers, while “frequency of service” was more important to GO 28 customers. The subtle differences actually reflected the services quite accurately. GO 25 makes 11 stops, while the local 25 makes 33 stops along the same corridor. Due to the short route length between Irvington Terminal and Newark Penn Station in comparison to the route length of GO 28, the reduction in stops is more perceptible. GO 28 customers selected “convenience” as the primary reason for switching, which may reflect the convenience of having the southern terminal at Newark Liberty International airport. As many GO 28 riders travel to the airport for work or travel, GO 28 eliminates the costs and hassle associated with driving or the extra time associated with transferring to another bus to reach the airport. During the focus groups, customers who work at the airport explained that due to the lack of direct service to the airport from the Bloomfield Avenue corridor, they previously had to transfer to the 62 bus, which made numerous local stops and had poor on-time performance.



**Figure 24. Reasons for using Go Bus**

GO 25 only operates during the AM and PM Peak, which may help to explain its relative low ranking of “frequency of service.” In contrast, GO 28 riders were four times as likely to select “frequency of service,” perhaps due to its predictable schedule that includes late night, early morning and weekend service. It should be noted that at the time of the survey, GO 28 headways ranged from 15 minutes during peak periods to 40 minutes during off-peak periods on the University Branch. After the service change in September, GO 28 now runs every 30 minutes on weekdays, weekends, and holidays. In the focus groups, which were held after the service change, customers expressed some discontent with the new schedule.

Overall, 60% of responses included a time saving aspect of GO Bus service (i.e. fewer stops, faster service, and frequency of service). This is reflected in customers’ perceived time savings as reported by customers in the survey, which averaged 16 minutes for GO 25 respondents and 20 minutes for GO 28 respondents. Based on a comparison of schedules between GO Bus and local parallel routes, the perceptions of time savings are greater than actual time savings. Actual time savings on the service is between 5-7 minutes for non-airport customers on GO 28 and 3-4 minutes on GO 25. For Bloomfield Avenue corridor customers traveling to the airport in the midday, direct service via GO 28 is estimated to save 17-27 minutes because it eliminates the need to transfer in downtown Newark. This is more in line with the perceived time savings.

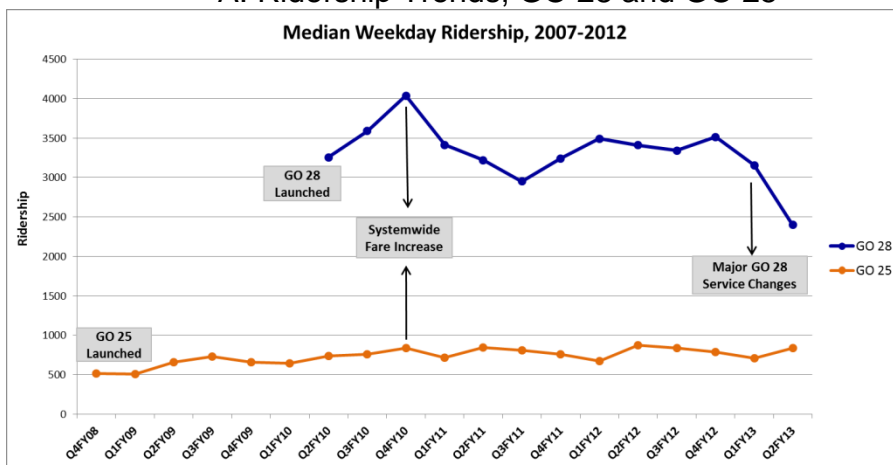
Historical farebox ridership data was obtained from NJ TRANSIT for the routes in the Bloomfield Avenue and Springfield Avenue corridors to compare ridership trends between GO Bus and local, parallel bus routes. As can be seen in Figure 24, overall median weekday ridership in the Bloomfield Avenue corridor increased by about 2,000 in the second quarter of fiscal year 2010 after the introduction of GO 28. While some of this increase includes customers boarding in Downtown Newark who previously would have taken Route 62 to the airport, the data suggests that GO 28 service attracted new customers as well.

GO 28 ridership grew at a faster pace than other routes in the corridor until the systemwide fare increases and service cuts took effect in the fourth quarter of fiscal year 2010. At that time, GO 28 service was reduced from 10-15 minute peak period headways to 15-20 minute peak period headways. GO 28 ridership fell again in fiscal year 2012, coinciding with another major service change that eliminated the University branch and lengthened headways to 30 minutes all day. Most of this ridership was absorbed by Route 28, which experienced nearly a 40% increase in weekday ridership after the recent GO 28 service cuts.

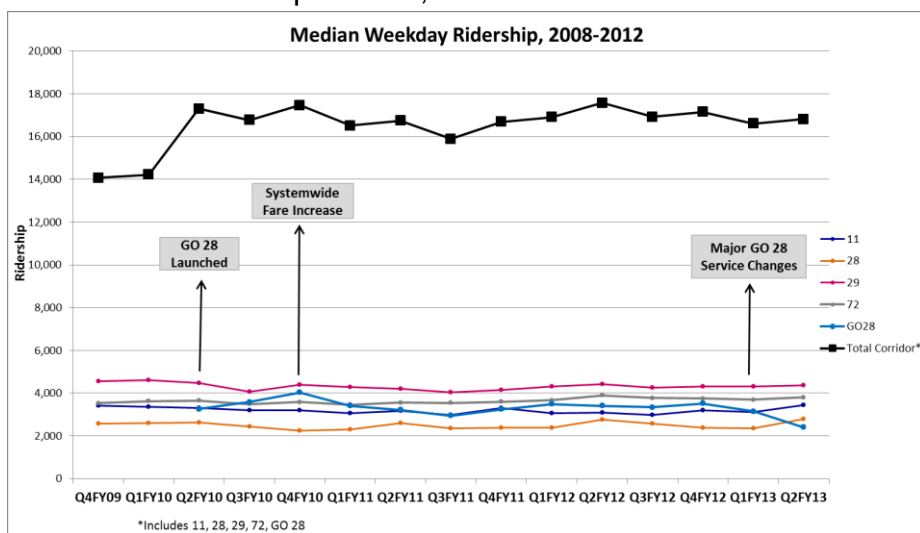
As can be seen in Figure 25, the impact of GO 25 on overall Springfield Avenue corridor ridership has not been as significant. Only modest gains in weekday ridership were seen after the introduction of GO 25, though ridership has remained relatively stable despite the major fare increase in 2010. One of the reasons for only modest gains in ridership may be due to the limited schedule of GO 25, which only operates during AM and PM peak periods.

As documented in Table 6, overall weekday ridership in the Essex/Union/West Hudson local bus market declined by two percent between 2008 and 2013, with total ridership (weekday and weekend) in this market declining by eight percent. When compared to the broader local bus market, both GO Bus corridors performed better over the same time period, with weekday ridership growing nine percent in the Bloomfield Avenue corridor and three percent in the Springfield Avenue corridor.

### A. Ridership Trends, GO 28 and GO 25



### B. Ridership Trends, Bloomfield Avenue Corridor



### C. Ridership Trends, Springfield Avenue Corridor

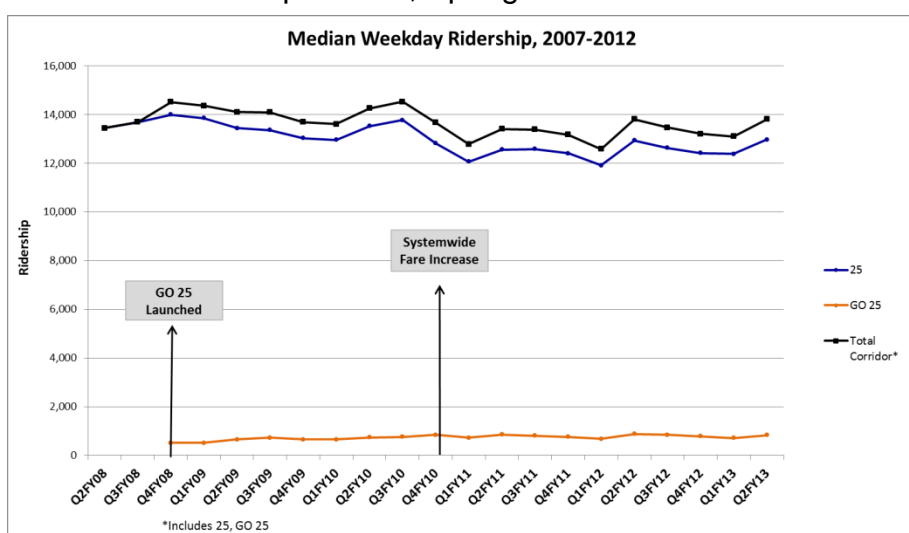


Figure 25. Ridership trends

Table 6. Overall ridership trends

<b>Market Area</b>	<b>Q2FY08 Weekday Ridership</b>	<b>Q2FY13 Weekday Ridership</b>	<b>Percent Change</b>
Bloomfield Ave Corridor (11, 28, 29, 72, GO 28)	15,446	16,821	+9%
Springfield Ave Corridor (25, GO 25)	13,447	13,810	+3%
Essex/Union/West Hudson Local Bus Market	190,495	185,875	-2%

## **7. CONCLUSION**

The results of this study show that NJ TRANSIT's enhanced bus routes, GO 25 and GO 28, provide an attractive alternative to other modes of travel along the Springfield Avenue and Bloomfield Avenue corridors in Newark. While most, 63%, of GO Bus customers switched to using GO Bus from other local buses, roughly 13% switched from driving alone or carpooling, showing the potential of enhanced bus services to attract a broader spectrum of customers. The key findings of the onboard survey, focus group discussions, and MaxDiff survey are summarized below:

### **Attributes of Service**

- Both the onboard survey and MaxDiff survey found that attributes related to travel time, frequency of service, and convenience were most important to GO Bus customers. These attributes were valued twice as high as branding attributes in the MaxDiff survey.
- Though not as important as other attributes, branding and visibility of the buses and shelters were generally well-regarded by customers who participated in the focus groups. Branding and visibility also play a large role in garnering interest and awareness about the GO Bus, with 55% of current GO Bus customers and 77% of local bus customers learning of the service after seeing a shelter or GO Bus running.
- Distinct driver uniforms and branded GO Bus shelters ranked low in the MaxDiff survey and focus group discussions. Customers did value having covered shelters that were easy to identify as GO Bus stops, but commented that the design of the shelters made it difficult to see approaching buses and was not effective at keeping out rain.

### **Customer Satisfaction**

- GO Bus customers are more satisfied with NJ TRANSIT bus service than local customers. Overall satisfaction among GO Bus customers is 8.4 on a scale of 0 to 10, with "0" being unacceptable, "5" being acceptable and "10" being excellent. This compares to an overall satisfaction score of 6.7 among local bus customers.
- Customer satisfaction is also higher among GO Bus customers than local bus customers across a broad range of service attributes, including: condition of shelter; weekday peak bus frequency; weekday off-peak bus frequency; information about the bus; on-time performance; and trip time.

- One of the benefits of GO Bus is that it offers improved service for existing customers, as over 60% of GO customers previously used local bus to make their trip. Additionally, survey results and focus groups reveal that many customers switch between GO Bus and local service, and therefore are able to experience the benefits associated with GO Bus service for a portion of their trips.

## **Travel Time Savings**

- GO Bus customers have a perceived time savings that is well above their actual time savings over local bus. According to the survey results, the average perceived time savings is 16 minutes for GO 25 and 20 minutes for GO 28. Data collected in the field suggests that actual time savings are only 3-4 minutes for GO 25 and 5-7 minutes for non-airport customers of GO 28.
- This finding is significant for transit agencies, as measures to reduce perceived trip time may be easier and less costly to implement than measures to reduce actual trip time, while still enhancing the experience of the customer.

## **Demographic and Travel Characteristics**

- GO Bus customers have slightly higher incomes and tend to be less transit captive than local bus customers, with only 23% of GO Bus customers stating that they have no other way to travel. In contrast, 67% of local bus customers state that they have no other way to travel. This suggests that GO Bus may be attracting customers who have access to a personal vehicle, allowing them to replace some vehicle trips with public transit.
- The results of the onboard survey revealed that a quarter of GO 25 customers transfer to PATH trains at Newark Penn Station. This represents a key trans-Hudson link and may represent a viable option for reducing congestion on selected Interstate Bus routes, such as Route 107, into Port Authority Bus Terminal.
- GO 25 customers who participated in the focus groups mentioned that GO 25 evening peak service terminates too early for those commuting from New York, as the last GO 25 bus leaves Newark Penn Station at 6:05 pm. Given the orientation of GO 25 to New York, extending evening service to accommodate these riders may be worth further investigation.

- An analysis of origins, destinations, and trip purposes reveals that a significant portion of GO 28 customers, approximately 64%, were traveling to or from Newark Liberty International Airport for work. With the airport and related industries providing roughly 25,000-30,000 jobs, GO 28 plays a crucial role in providing connections to employment.
- Local bus ridership in corridors with GO Bus service fared better than overall trends in local bus ridership in the Newark area. Weekday ridership grew nine percent in the Bloomfield Avenue corridor and three percent in the Springfield Avenue corridor, compared to a two percent decline in overall weekday bus ridership and 9% decline in total ridership for local bus routes in the Essex/Union/West Hudson market.

The results of this study indicate that municipalities, transit agencies, and their customers can benefit from the introduction of enhanced bus services, even if they are not full-scale Bus Rapid Transit. The most important features to focus resources on are those that reduce travel times for customers, while branding helps draw attention to the service as a unique, premium service.

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**APPENDIX 1. SURVEY QUESTIONNAIRE FOR GO 25 AND GO 28**



**GO BUS CUSTOMER SURVEY**

NJ TRANSIT is conducting this survey to better understand your travel needs. Please help us by filling out and returning your completed survey to an agent onboard the bus, or drop in any US Mailbox (postage free). **Your responses will be kept confidential.** To show our appreciation for your help, we will enter your name in a drawing to win **ONE FREE MONTHLY PASS or equivalent one way tickets.**

**Thank you for your participation.**

*For this bus trip...*

1. On what bus route did you receive this survey?

- GO 25
- GO 28
- Other

2. The place you have come from is...

- Home
- Work
- School (K-12)
- Post Secondary, College or University
- Shopping
- Medical/Dental
- Personal Business
- Social/Recreational
- Other

3. What is the address of the place you have come from?

---

*Street Address OR Street Intersection*

---

*City/Town*

---

*State ZIP Code*

4. How did you get to this bus? *(Choose one only)*
- Walked \_\_\_\_\_ blocks *(Please specify)*
  - Another bus \_\_\_\_\_ *(Please specify Route)*
  - NJT Train \_\_\_\_\_ *(Please specify)*
  - Drove a Car and Parked
  - Carpooled/Dropped off
  - Newark City Subway/Light rail
  - PATH
  - Other \_\_\_\_\_ *(Please specify)*

5. Where did you get ON this bus?

---

*Street Address OR Street Intersection (your bus stop)*

---

*City/Town*

6. Where will you get OFF this bus?

---

*Street Address OR Street Intersection (your bus stop)*

---

*City/Town*

*State*

*ZIP Code*

7. After getting off this bus, how will you get to your **final destination**? *(Choose one only)*

- Walked \_\_\_\_\_ blocks *(Please specify)*
- Another bus \_\_\_\_\_ *(Please specify Route)*
- NJT Train \_\_\_\_\_ *(Please specify)*
- Drove a Car and Parked
- Carpooled/Dropped off
- Newark City Subway/Light rail
- PATH
- Other \_\_\_\_\_ *(Please specify)*

8. What is the address of the place you are going to? *(Your final destination)*

---

*Street Address OR Street Intersection*

---

*City/Town*

*State*

*ZIP Code*

9. The place you are going to is...
- Home
  - Shopping
  - Social/Recreational
  - Work
  - Medical/Dental
  - Post Secondary, College or University
  - School (K-12)
  - Personal Business
  - Other
10. How did you find out about the Go Bus Service? (Choose one)
- Saw bus stop shelter/Go Bus running
  - Newspaper (Please specify) \_\_\_\_\_
  - Word of mouth
  - Employer
  - Posters/Ads
  - NJ TRANSIT Website
  - Brochure
  - Other (Please specify) \_\_\_\_\_
11. How did you make this trip before you started using the Go Bus? (Check all that apply)
- Drove alone to the final destination
  - Carpooled to final destination
  - Another NJ TRANSIT Bus (Routes?) \_\_\_\_\_
  - Newark Light Rail (Specify boarding station) \_\_\_\_\_
  - NJ TRANSIT Train (Specify boarding station) \_\_\_\_\_
  - Started making this trip because of Go Bus
  - Other (Please specify) \_\_\_\_\_
  - Did not make this trip.
12. If you switched from another mode of travel to the Go Bus, why did you switch? (Check primary reason only)
- Convenience
  - Frequency of Go Bus service
  - Go Bus provides faster service than other buses in this area
  - Go Bus is faster as it makes fewer stops than other buses
  - Cost of parking at my destination
  - Cost of gasoline

- Improved bus shelters
- Other (Please specify)\_\_\_\_\_

13. How much time do you save by using Go Bus service?

- I save \_\_\_\_\_ minutes
- I do not save any time

14. What type of ticket are you using for this trip?

- Monthly Pass (How many trips per month?)\_\_\_\_\_
- One-way/Cash
- 10-Trip
- College Student Monthly
- Student Ticket
- Reduced Fare
- Other\_\_\_\_\_

15. How often do you ride the Go Bus?

- Less than 1 day/month
- 1-3 days/month
- 1-2 days/week
- 3-4 days/week
- 5 or more days/week
- Never

16. How often do you ride another NJ TRANSIT bus?

- Less than 1 day/month
- 1-3 days/month
- 1-2 days/week
- 3-4 days/week
- 5 or more days/week

17. Which other routes do you use?

- 11
- 25
- Other \_\_\_\_\_
- 28
- 72

18. What is the main purpose of the trip you are making today?

- Work
- Shopping
- Personal business
- Airline Passenger
- Company Business
- School
- Recreation
- Other

19. Which of the following statements best applies to you?

- I have no other way to travel, so I use the Go Bus.
- I use the Go Bus because it is the best choice for me, even though there are other ways I could travel.
- I usually use another type of transportation, but I occasionally take the Go Bus.

20. How do you typically travel for your return trip?

- Travel the same way in the opposite direction.
- Take another bus (*Which route?*) \_\_\_\_\_
- Other (*Please specify*) \_\_\_\_\_

21. Based on your travel experience on the Go Bus, how likely are you to recommend the service to a friend or relative?

- Very Unlikely       Somewhat Unlikely       Do Not Know       Somewhat Likely       Very Likely

22. On a scale of 0 to 10, please rate Go Bus on the following attributes of service, where 0=Unacceptable, 5=Acceptable, 10=Excellent or n/a=Not applicable)

		Unacceptable					Acceptable					Excellent											
		▼					▼					▼											
Condition of the Go	N/	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Weekday peak bus	N/	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Weekday off-peak bus	N/	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Information about the	N/	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
On-time performance	N/	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
Trip time on Go Bus	N/	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10
<b>Overall satisfaction with</b>	N/A	0	1	2	3	4	5	6	7	8	9	10	0	1	2	3	4	5	6	7	8	9	10

23. Are you...?       Male       Female

24. What is your age?     Under 18 years     45-54 years  
 18-24 years       55-61 years  
 25-34 years       62 or over  
 35-44 years

25. Are you of Hispanic origin?     Yes     No

26. Are you...? (Choose one)

- White
- Black
- American Indian, Eskimo or Aleut
- Other \_\_\_\_\_ (Please specify)
- Asian or Pacific Islander
- Multi-racial

27. What is your occupation? (Choose one)

- Manager/Professional
- Retail
- Homemaker
- Technical/Skilled
- Service
- Retired
- Clerical
- Health Care
- Domestic
- Food Service
- Student
- Other

28. What is your annual household income?

- Under \$15,000
- \$15,000-\$24,999
- \$25,000-\$34,999
- \$35,000-\$49,999
- \$50,000-\$74,999
- \$75,000-\$99,999
- \$100,000-\$149,999
- \$150,000 and over

29. What is the single most important thing that can be done to improve transit service?

\_\_\_\_\_

**Please be assured your responses will be kept confidential. To enter our drawing to win a free monthly pass, please provide your**

Name \_\_\_\_\_

Street Address \_\_\_\_\_

City/Town \_\_\_\_\_ State/Zip code \_\_\_\_\_

Daytime Phone# \_\_\_\_\_ Evening Phone# \_\_\_\_\_

Email Address \_\_\_\_\_

**Your comments are important to us. If you have specific comments,  
please, e-mail us from our website at [www.njtransit.com](http://www.njtransit.com)**

***Thank you for your help!***

## APPENDIX 2. SURVEY QUESTIONNAIRE FOR CORRIDOR LOCAL ROUTES



### BUS CUSTOMER SURVEY

NJ TRANSIT is conducting this survey to better understand your travel needs. Please help us by filling out and returning your completed survey to an agent onboard the bus, or drop in any US Mailbox (postage free). **Your responses will be kept confidential.** To show our appreciation for your help, we will enter your name in a drawing to win **ONE FREE MONTHLY PASS or equivalent one way tickets.**

Thank you for your participation.

#### ***For this bus trip...***

1. On what bus route did you receive this survey?

- 11                       25
- 28                       72
- Other

2. The place you have come from is...

- Home                                       Shopping
- Work                                         Medical/Dental
- School (K-12)                             Personal Business
- Post Secondary, College or University    Social/Recreational
- Other

3. What is the address of the place you have come from?

\_\_\_\_\_

*Street Address OR Street Intersection*

\_\_\_\_\_

*City/Town*

\_\_\_\_\_

*State ZIP Code*

4. How did you get to this bus? (*Choose one only*)

- Walked \_\_\_\_\_ blocks (*Please specify*)
- Another bus \_\_\_\_\_ (*Please specify Route*)

- NJT Train \_\_\_\_\_ (Please specify)
- Drove a Car and Parked
- Carpooled/Dropped off
- Newark City Subway/Light rail
- PATH
- Other \_\_\_\_\_ (Please specify)

5. Where did you get ON this bus?

\_\_\_\_\_  
*Street Address OR Street Intersection (your bus stop)*

\_\_\_\_\_  
*City/Town*

6. Where will you get OFF this bus?

\_\_\_\_\_  
*Street Address OR Street Intersection (your bus stop)*

\_\_\_\_\_  
*City/Town*

\_\_\_\_\_  
*State*

\_\_\_\_\_  
*ZIP Code*

7. After getting off this bus, how will you get to your **final destination**? (Choose one only)

- Walked \_\_\_\_\_ blocks (Please specify)
- Another bus \_\_\_\_\_ (Please specify Route)
- NJT Train \_\_\_\_\_ (Please specify)
- Drove a Car and Parked
- Carpooled/Dropped off
- Newark City Subway/Light rail
- PATH
- Other \_\_\_\_\_ (Please specify)

8. What is the address of the place you are going to? (Your final destination)

\_\_\_\_\_  
*Street Address OR Street Intersection*

\_\_\_\_\_  
*City/Town*

\_\_\_\_\_  
*State*

\_\_\_\_\_  
*ZIP Code*

9. The place you are going to is...

- Home
- Shopping
- Social/Recreational

- Work
- Medical/Dental
- Post Secondary, College or University
- School (K-12)
- Personal Business
- Other

10. Are you aware of the GO 25 and GO 28? (If yes, please answer Question 11)

- Yes                       No → Go to Question 12

11. How did you find out about the Go Bus Service? (Choose one)

- Saw bus stop shelter/Go Bus running
- Newspaper (Please specify) \_\_\_\_\_
- Word of mouth
- Employer
- Posters/Ads
- NJ TRANSIT Website
- Brochure
- Other (Please specify) \_\_\_\_\_

12. Do you use the GO Bus?

- Yes, less than 1 day/month
- Yes, 3-4 days/week
- Yes, 1-3 days/month
- Yes, 5 or more days/week
- Yes, 1-2 days/week
- No, doesn't go where I need to go
- No, too far to walk to bus stop
- Other (Please specify) \_\_\_\_\_

13. What type of ticket are you using for this trip?

- Monthly Pass (How many trips per month?) \_\_\_\_\_
- One-way/Cash
- 10-Trip
- College Student Monthly
- Student Ticket
- Reduced Fare
- Other \_\_\_\_\_

14. How often do you ride this bus?

- Less than 1 day/month     3-4 days/week  
 1-3 days/month          5 or more days/week  
 1-2 days/week             Never

15. What is the main purpose of the trip you are making today?

- Work                                  Company Business  
 Shopping                             School  
 Personal business                Recreation  
 Airline Passenger                Other

16. Which of the following statements best applies to you?

- I have no other way to travel, so I use the bus.  
 I use the bus because it is the best choice for me, even though there are other ways I could travel.  
 I usually use another type of transportation, but I occasionally take the bus.

17. How do you typically travel for your return trip?

- Travel the same way in the opposite direction.  
 Take another bus (*Which route?*) \_\_\_\_\_  
 Other (*Please specify*) \_\_\_\_\_

18. Based on your travel experience on the bus, how likely are you to recommend the service to a friend or relative?

- Very Unlikely             Somewhat Unlikely             Do Not Know             Somewhat Likely             Very Likely

19. On a scale of 0 to 10, please rate the bus on the following attributes of service, where 0=Unacceptable, 5=Acceptable, 10=Excellent or n/a=Not applicable)

				Unacceptable					Acceptable					Excellent
				▼										▼
Condition	of the	bus	N/	0	1	2	3	4	5	6	7	8	9	10
Weekday	peak	bus	N/	0	1	2	3	4	5	6	7	8	9	10
Weekday	off-peak	bus	N/	0	1	2	3	4	5	6	7	8	9	10
Information about this bus			N/	0	1	2	3	4	5	6	7	8	9	10
On-time performance	of		N/	0	1	2	3	4	5	6	7	8	9	10

Trip time on this bus	N/	0	1	2	3	4	5	6	7	8	9	1
<b>Overall satisfaction with this bus</b>	N/	0	1	2	3	4	5	6	7	8	9	1
	A											0

20. Are you...?       Male                                       Female

21. What is your age?

- Under 18 years
- 18-24 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-61 years
- 62 or over

22. Are you of Hispanic origin?       Yes       No

23. Are you...? (Choose one)

- White
- Black
- American Indian, Eskimo or Aleut
- Other \_\_\_\_\_ (Please specify)
- Asian or Pacific Islander
- Multi-racial

24. What is your occupation? (Choose one)

- Manager/Professional
- Homemaker
- Service
- Clerical
- Domestic
- Student
- Retail
- Technical/Skilled
- Retired
- Health Care
- Food Service
- Other

25. What is your annual household income?

- Under \$15,000
- \$15,000-\$24,999
- \$25,000-\$34,999
- \$35,000-\$49,999

- \$50,000-\$74,999
- \$75,000-\$99,999
- \$100,000-\$149,999
- \$150,000 and over

26. What is the single most important thing that can be done to improve transit service?

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***Please be assured your responses will be kept confidential. To enter our drawing to win a free monthly pass, please provide your...***

Name \_\_\_\_\_

Street Address \_\_\_\_\_

City/Town \_\_\_\_\_ State/Zip code \_\_\_\_\_

Daytime Phone# \_\_\_\_\_ Evening Phone# \_\_\_\_\_

Email Address \_\_\_\_\_

**Your comments are important to us. If you have specific comments, please, e-mail us from our website at [www.njtransit.com](http://www.njtransit.com)**

***Thank you for your help!***

**APPENDIX 3. FIELD AGENT FORM**

**AGENT ASSIGNMENT FORM for Route 28**

Date April 17, 2012

Sign In: \_\_\_\_\_ Sign Out: \_\_\_\_\_

Survey Agent Name: YS

Cell phone: xxx-xxx-3481

Number of Questionnaires: 300

Serial ID: 1-300

Initial Bus Location: **Washington St. at Hill St.**

Initial Boarding Time: **8:30/ To Montclair**

Initial Bus Driver: **029-1**

Change Bus: **Yes**

Trip ID	Driver ID	Bloomfield Center (Bloomfield Ave. at Burroughs Place)	Broad St. at Hill St.	Washington St. at Hill St.	Montclair (Upper Montclair State University)	First ID	Last ID	Refused
1	029_1			830	926/950			
2	029_1		1045	1053	1149/1220			
3	029_1	1246						
4	029_14	1246	115					
5	029_16			213	309			

# AGENT ASSIGNMENT FORM for Route 28

Date April 17, 2012

Sign In: \_\_\_\_\_ Sign Out: \_\_\_\_\_

Survey Agent Name: ZQ

Cell phone: XXX-XXX-3501

Number of Questionnaires: 150

Serial ID: 301-450

Initial Bus Location: Washington St. at Hill St. Initial Boarding Time: 6:05/ To Montclair

Initial Bus Driver: 029-4

Change Bus: Yes

Trip ID	Driver ID	Broad St. at Hill St.	Washington St. at Hill St.	Montclair (Upper Montclair State University)	First ID	Last ID	Refused
1	029_4		605	654/700			
2	029_4	757					
3	029_6		930	1026/1050			
4	029_6	1145	1153	1249			

# AGENT ASSIGNMENT FORM for Route 28

Date April 17, 2012

Sign In: \_\_\_\_\_ Sign Out: \_\_\_\_\_

Survey Agent Name: XK

Cell phone: XXX-XXX-6731

Number of Questionnaires: 300

Serial ID: 451-750

Initial Bus Location: Washington St. at Hill St. Initial Boarding Time: 6:24/ To Montclair

Initial Bus Driver: 029-12

Change Bus: Yes

Trip ID	Driver ID	Broad St. at Hill St.	Washington St. at Hill St.	Montclair (Upper Montclair State University)	First ID	Last ID	Refused
1	029_12		624	718/730			
2	029_12	827					
3	029_10		900	956/1020			
4	029_10	1115	1123	1219/1250			
5	029_10	145					
6	CM670		243	339			

# AGENT ASSIGNMENT FORM for Route 28

Date April 17, 2012

Sign In: \_\_\_\_\_ Sign Out: \_\_\_\_\_

Survey Agent Name: GY

Cell phone: XXX-XXX-9665

Number of Questionnaires: 300

Serial ID: 751-1050

Initial Bus Location: Washington St. at Hill St. Initial Boarding Time: 7:30/ To Montclair

Initial Bus Driver: CM-642

Change Bus: Yes

Trip ID	Driver ID	Broad St. at Hill St.	Washington St. at Hill St.	Bloomfield Center (Bloomfield Ave. at Municipal Plaza)	Montclair (Upper Montclair State University)	First ID	Last ID	Refused
1	CM642		730		826/830			
2	CM642	925						
3	CM603		953	1022				
4	029_13			1022	1049/1120			
5	029_13	1200	1223		119/150			
6	029_13	245						

# AGENT ASSIGNMENT FORM for Route 28

Date April 17, 2012

Sign In: \_\_\_\_\_ Sign Out: \_\_\_\_\_

Survey Agent Name: YF

Cell phone: xxxx-xxx-6826

Number of Questionnaires: 350

Serial ID: 1051-1400

Initial Bus Location: Washington St. at Hill St. Initial Boarding Time: 8:00/ To Montclair

Initial Bus Driver: CM-640

Change Bus: Yes

Trip ID	Driver ID	Broad St. at Hill St.	Washington St. at Hill St.	Bloomfield Center (Bloomfield Ave. at Municipal Plaza)	Montclair (Upper Montclair State University)	First ID	Last ID	Refused
1	CM640		800		856/920			
2	CM640	1015	1023	1052				
3	029_15			1052	1119/1150			
4	029_15	1245	1253		149/220			
5		315						



# AGENT ASSIGNMENT FORM for Route 28

Date April 17, 2012

Sign In: \_\_\_\_\_

Sign Out: \_\_\_\_\_

Survey Agent Name: LG

Cell phone: xxx-xxx-3030

Number of Questionnaires: 100

Serial ID: 1401-1500

Initial Bus Location: Washington St. at Hill St. Initial Boarding Time: 6:40/ To Montclair

Initial Bus Driver: TA-695

Change Bus: No

Trip ID	Broad St. at Hill St.	Washington St. at Hill St.	Montclair (Upper Montclair State University)	First ID	Last ID	Refused
1		640	736/800			
2	857					

## APPENDIX 4. SURVEY RECORD WEIGHTS

Route	Inbound Peak (6AM-10AM)			Inbound Off Peak (10AM-3PM)		
	<i>Completed Surveys</i>	<i>Ridership</i>	<i>Weight</i>	<i>Completed Surveys</i>	<i>Ridership</i>	<i>Weight</i>
GO 25	82	323	3.94	n/a	n/a	n/a
25	297	2068	6.96	222	1954	8.80
GO 28	110	492	4.47	146	499	3.42
11	91	372	4.09	72	427	5.93
28	90	258	2.87	69	445	6.45
72	155	701	4.52	140	699	4.99

Route	Outbound Peak (6AM-10AM)			Outbound Off Peak (10AM-3PM)		
	<i>Completed Surveys</i>	<i>Ridership</i>	<i>Weight</i>	<i>Completed Surveys</i>	<i>Ridership</i>	<i>Weight</i>
GO 25	35	93	2.66	n/a	n/a	n/a
25	185	1395	7.54	143	1818	12.71
GO 28	85	316	3.72	89	452	5.08
11	108	606	5.61	123	412	3.35
28	119	462	3.88	198	490	2.47
72	174	618	3.55	192	528	2.75

## APPENDIX 5. MAXDIFF SURVEY:

### **Study Objectives:**

The survey is being distributed to NJT focus group participants to quantitatively gauge their opinions about the Go Bus enhanced bus service. The survey will be administered to focus group participants after their focus group has been completed.

### **Instructions for Reviewers:**

1. Text in [ ] square brackets appearing before a question indicates a question that will not be seen by all respondents and the logic for the respondents who will see that question. For example: “[*If a transit user*] How much did it cost to ride the metro on your trip?”
2. Text in < > angle brackets within the text of a question is dynamically inserted based on each respondent’s answers to previous questions. For example: “In the questions that follow, please continue to think about your ONE-WAY <trip purpose> trip.”
3. Text in [ ] square brackets appearing after a question indicates the online survey page name for that question. This is a useful reference point for reviewing the survey online. For example: “What is your age? [age]”

## INTRODUCTION

1. This survey is being conducted as part of your focus group to more fully understand your preferences for features of NJ TRANSIT’s enhanced bus service, the **go bus**. We appreciate your time and thoughts!
2. Which of the following Bus routes do you use? [routeUsed]  
Select all routes that you use and how often you use them:

Bus Route	5 or more days/week	3-4 days/week	1-2 days/week	1-3 days/month	Less than 1 day/month	Never
25						
go25						
28						
go28						
11						
72						

3. [*Set primaryRouteUsed = most used route from Question 2. If they have more than one most used route from Question 2:*] Which route do you primarily use? (If you take more than one bus route to complete your trip, please select the primary route that you travel on for the longest time.) [*only list the most often routes chosen for routeUsed*] [primaryRouteUsed]

- 25

- go25
- 28
- go28
- 11
- 72

4. [*If primaryRouteUsed = GO 25*] At which stop do you board the GO 25 bus on your trip going towards Newark Penn Station? [originStop]

- Irvington Terminal
- Maple Ave.
- South 18<sup>th</sup> St.
- South 10<sup>th</sup> St.
- Bergen St.
- Irvine Turner
- MLK Blvd.
- Washington St.
- Broad St.
- Mulberry St.
- Newark Penn Station

[*If primaryRouteUsed = GO 28*] At which stop do you board the GO 28 bus on your trip going towards the Newark Liberty International Airport? [originStop]

- Bloomfield Train Station
- Watsessing Park/Bloomfield Municipal Center
- Grove St.
- 11<sup>th</sup>/12<sup>th</sup> Streets/Columbus Hospital
- Bloomfield Ave. Light Rail Station/Branch Brook Park
- Clifton Ave.
- Summer Ave.
- Broad St. Station/Riverfront Stadium
- Washington Park/Newark Public Library
- Military Park/NJPAC
- Market Street/Prudential Center
- Court/Walnut Streets/Newark City Hall
- Lincoln Park/Newark Symphony Hall
- Newark Airport – Terminal C (Continental Arrivals and Departures)
- Newark Airport – Terminal B (International Arrivals and Departures)
- Newark Airport – Terminal A (Domestic Arrivals and Departures)
- Newark Airport – Building 95
- Newark Airport – Conrad Rd.
- Newark Airport – Airis Dr.
- Newark Airport – North Area Transit Center

[*If primaryRouteUsed = A local route*] Where do you typically start your trip on the <primaryRouteUsed> bus? [originStop]

- Clifton
- Downtown Newark
- Essex Community College
- Irvington
- Maplewood
- Montclair

- Montclair State University
- Newark
- Newark Liberty International Airport
- Newark Penn Station
- NJIT
- Paterson
- Rutgers University - Newark
- Willowbrook Mall
- Other, please specify: \_\_\_\_\_

5. [If *primaryRouteUsed* = GO 25] At which stop do you typically get off the GO 25 bus on your trip going towards Newark Penn Station? [destStop]

- Irvington Terminal
- Maple Ave.
- South 18<sup>th</sup> St.
- South 10<sup>th</sup> St.
- Bergen St.
- Irvine Turner
- MLK Blvd.
- Washington St.
- Broad St.
- Mulberry St.
- Newark Penn Station

[If *primaryRouteUsed* = GO 28] At which stop do you typically get off the GO 28 bus on your trip going towards the Newark Liberty International Airport? [destStop]

- Bloomfield Train Station
- Watsessing Park/Bloomfield Municipal Center
- Grove St.
- 11<sup>th</sup>/12<sup>th</sup> Streets/Columbus Hospital
- Bloomfield Ave. Light Rail Station/Branch Brook Park
- Clifton Ave.
- Summer Ave.
- Broad St. Station/Riverfront Stadium
- Washington Park/Newark Public Library
- Military Park/NJPAC
- Market Street/Prudential Center
- Court/Walnut Streets/Newark City Hall
- Lincoln Park/Newark Symphony Hall
- Newark Airport – Terminal C (Continental Arrivals and Departures)
- Newark Airport – Terminal B (International Arrivals and Departures)
- Newark Airport – Terminal A (Domestic Arrivals and Departures)
- Newark Airport – Building 95
- Newark Airport – Conrad Rd.
- Newark Airport – Airis Dr.
- Newark Airport – North Area Transit Center

[If *primaryRouteUsed* = A local route] What is the destination of your typical trip on the <*primaryRouteUsed*> bus? [destStop]

- Clifton
- Downtown Newark

- Essex Community College
  - Irvington
  - Maplewood
  - Montclair
  - Montclair State University
  - Newark
  - Newark Liberty International Airport
  - Newark Penn Station
  - NJIT
  - Paterson
  - Rutgers University - Newark
  - Willowbrook Mall
  - Other, please specify: \_\_\_\_\_
6. What type of ticket do you use on the *<insert route number from primaryRouteUsed>* bus? [faretype]
- Bus Monthly Pass
  - 10 Trip
  - One-way/Cash fare/Transfer
  - College Student Monthly Pass
  - Student Ticket (One-way and Transfers)
  - Reduced fare for senior citizens and customers with disabilities
  - Other
7. What is the primary reason you are using the *<insert route number from primaryRouteUsed>* bus? [purp]
- Work
  - Shopping
  - Personal business
  - Airline Passenger
  - Airport/Airline Employee
  - Company Business
  - School
  - Recreation
  - Other
8. On a typical travel day what time do you normally begin your trip? [begMAM]
- 12:00 AM – 5:59 AM
  - 6:00 AM – 9:59 AM
  - 10:00 AM – 2:59 PM
  - 3:00 PM – 6:59 PM
  - 7:00 PM – 11:59PM
9. On a typical day you travel on the *<insert route number from primaryRouteUsed>* how do you get to your bus stop? [accMode]
- Walk
  - Bike
  - Drive alone and park
  - Carpool and park
  - Get dropped off by someone else (no parking)
  - Another NJ TRANSIT Bus

- NJ TRANSIT Train
- NJ TRANSIT Light Rail
- Other

10. [If walk access] Thinking about a typical walk to the <insert route number from primaryRouteUsed> bus stop ...

How far is the walk? [walkDist]

- Less than a quarter mile (less than about 5 blocks)
- Between a quarter mile and a half mile (about 5 to 10 blocks)
- Longer than a half mile (more than about 10 blocks)

How long does it take to walk? \_\_\_\_\_ minutes [walkTime]

11. [If drove alone, carpooled, or got dropped off] Thinking about a typical drive to the <insert route number from primaryRouteUsed> bus stop ...

How long does it take to drive? \_\_\_\_\_ minutes [driveTime]

How long does it take to walk from where you parked to the bus stop?  
\_\_\_\_\_ minutes [parkDriveTime]

12. How long does your trip on the <insert route number from primaryRouteUsed> take? [travTime]

- It takes about \_\_\_\_\_ minutes

13. Do you have a SmartPhone with internet access? [smtPhone]

- Yes
- No

14. [If no to smartphone] Do you have a cell phone? [celPhone]

- Yes
- No

15. In a typical week, how often do you travel to the following locations? [tWeek]

Note: This does not have to be by transit – please tell us about all trips you make.

	6 to 7 days per week	5 days per week	4 days per week	1 to 3 days per week	1 to 3 days per month	Less than once per month	Never
Bloomfield							
Downtown Newark							
Essex Community College							
Montclair State University							
Newark Liberty International Airport							
Newark Penn Station							
NJIT							
Paterson							
Rutgers University - Newark							
Willowbrook Mal							

## **MaxDiff Exercises**

In this section, you will see 12 pages, each with a list of 4 features that could be made available for your commute.

For each of the 12 questions, please indicate which feature or statement is the most important to you for quality service and which is the least important to you for quality service.

## **MaxDiff Statements**

- 1) Using go bus takes 5 minutes less travel time than the local bus
- 2) Using go bus takes 10 minutes less travel time than the local bus
- 3) go bus makes fewer stops than the regular local bus route to speed trip times
- 4) Buses arrive every 10 minutes in the peak period and every 20 minutes all day long
- 5) Buses arrive every 15 minutes in the peak period and every 30 minutes all day long
- 6) Buses arrive every 20 minutes in the peak period and every 60 minutes all day long
- 7) go bus gets preferential priority signal when coming to a traffic light
- 8) go bus is very clean, quiet and comfortable relative to a regular bus
- 9) go bus has deluxe seats, hand holds, baggage racks, and enhanced lighting
- 10) Bus is identifiable with a well-known name, "go bus"
- 11) go bus drivers have a unique uniform that is easily identifiable (cap and jacket)
- 12) go bus stops have nicer shelters than regular bus routes
- 13) go bus stops have enhanced lighting for safety & security
- 14) go bus system schedules and routes are clearly posted at stops
- 15) go bus stop is within walking distance of your workplace
- 16) go bus stop is within walking distance of your home
- 17) go bus stops are branded and made more visible using distinct signage
- 18) Information about when the next bus will actually arrive is available for go bus on digital signs at the bus stop (real-time information)
- 19) Information about when the next bus will actually arrive can be accessed for go bus on smart phone app or via text on your cell phone (real-time information)
- 20) Fare payment for go bus is sped up by allowing riders only to enter through the front door and only to exit through the rear door
- 21) Fare payment for go bus is available by just tapping your cell phone on a special reader
- 22) go bus costs the same as a regular bus for the same trip
- 23) A regular bus costs 25 cents less than go bus for the same trip
- 24) go bus has convenient transfers to other NJ Transit modes (local bus, light rail, train)

## **Comments/Debrief**

Please tell us your name, street address, town of residence, and ZIP code (this information will not be shared, but allows us to know what group you were in and to help us compare your survey to the notes we took during the groups):

First Name: \_\_\_\_\_

Last Name: \_\_\_\_\_

Street Address: \_\_\_\_\_

Town of Residence: \_\_\_\_\_

Zip Code: \_\_\_\_\_

*[Note to reviewers: the name question is asked so that we know what group they are in and all their demographics, etc. from the screener survey and so they don't need to repeat that information]*

Thanks for participating in helping plan new services to make your commute by transit faster and more comfortable! Your input is will help us make better decisions about service in the future.

If you have any additional comments about NJ TRANSIT services, the survey, or the focus group session you participated in today please write them now and when you're finished click the 'End Survey' button. Otherwise, please click 'End Survey' to complete the survey. [Comment]

---

---

Thanks again for your participation! Your answers have been saved and you may now close your browser.

## APPENDIX 6. STATED PREFERENCE SURVEY RESULTS



### NJ TRANSIT go bus MaxDiff Survey Technical Memo MaxDiff Survey Results

Focus groups conducted February 27-28, 2013

March 11, 2013

#### Executive Summary

- Most participants overestimated their go vs. local bus time savings
- Frequency is important, every 30 minutes is not enough for go bus
  - This was discussed in the focus group discussions and confirmed with the HB model
- Participants generally liked the go bus branding, mostly because they could see the bus coming up the street
  - Branding may not be as important if real-time information was available
  - Real-time information attributes ranked higher than branding attributes in the HB model
- Participants liked the idea of exit in rear only, but explained it can actually slow things down when people are not aware of the rule
  - This attribute rated somewhat low in the HB model, perhaps for this reason
  - Participants mentioned they would like signs explaining the procedure to be put back up inside the buses
- Almost all participants thought bus driver attitude was very important
  - No one in the go-user focus groups thought their unique uniforms were important, and many had not even noticed it
  - This is consistent with the HB model, where it was rated as least important attribute
- The deluxe seats, hand holds, baggage racks, and enhanced lighting attribute rated very high in the HB model
  - This is consistent with the focus group discussions, although some participants are concerned with the narrowness of the deluxe seats and how well they would stay clean over time
- Few participants noticed go28 has preferential priority signal but many did note its reliability



## Methodology

- Focus groups were held at NJ TRANSIT headquarters in Newark, NJ on February 27<sup>th</sup> and 28<sup>th</sup>, 2013
- There were 7 focus groups with a total of 66 participants
  - Four of the focus groups were comprised of mostly go bus users
    - Routes go25 and go28
  - The remaining three focus groups were comprised of users of bus routes in the same corridors as the go routes
    - Routes 25, 28, 11, 72
- Midway through each focus group, participants were asked to take a web-based MaxDiff survey
- After the MaxDiff survey and wrap-up, participants were asked to complete a First Rank Choice exercise



3

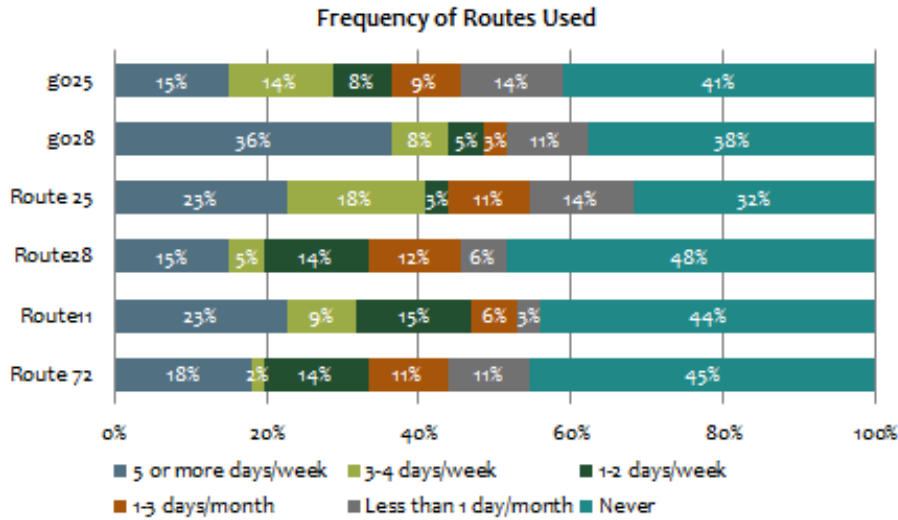
## Survey Results: Participant Information



4

## Frequency of Routes Used

- All participants were asked how often they use each of these pertinent bus routes

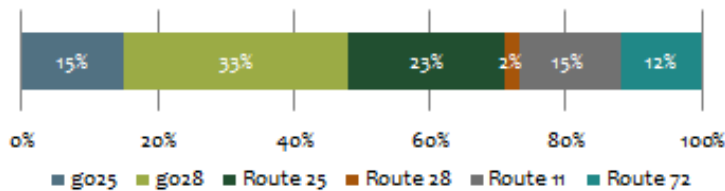


5

## Primary Route Used

- The participants were then asked to chose their primary route

Route	Count	Percent
g025	10	15%
g028	22	33%
Route 25	15	23%
Route 28	1	2%
Route 11	10	15%
Route 72	8	12%
Total go routes	32	48%
Total local routes	34	52%



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## go25 Boarding and Alighting Stops

- The most common boarding station for go25 was Irvington Terminal, and the most common alighting station was Newark Penn Station

go25 Bus Stop Name	Board Count	Alight Count
Irvington Terminal	6	1
Maple Ave.	4	0
Broad St.	0	2
Newark Penn Station	0	7



7

## go28 Boarding and Alighting Stops

- The most common alight station for go28 is Newark Airport

go28 Bus Stop Name	Board Count	Alight Count
Bloomfield Train Station	4	0
Watsessing Park/Bloomfield Municipal Center	4	1
Grove St.	2	0
11 <sup>th</sup> /12 <sup>th</sup> Streets/Columbus Hospital	2	0
Clifton Ave.	4	1
Summer Ave.	1	1
Market Street/Prudential Center	2	5
Lincoln Park/Newark Symphony Hall	2	1
Newark Airport	0	11
Other	1	2

Many participants are employed at the airport



8

## Local Route Boarding and Alighting Locations

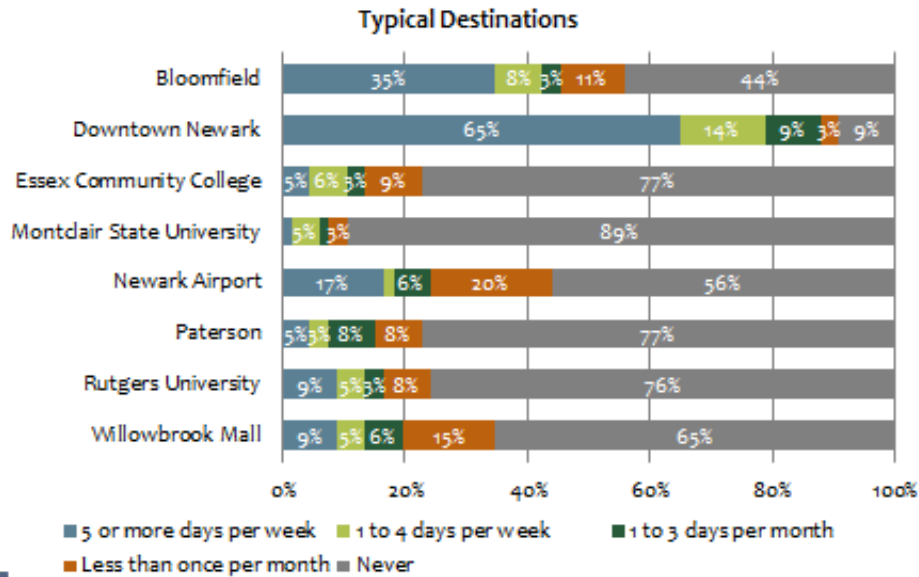
Local Bus Stop Area	Board Count	Alight Count
Bloomfield	7	2
Irvington	7	1
Maplewood	2	0
Montclair	3	0
Newark	8	8
Newark Penn Station	2	11
Paterson	3	0
Rutgers University – Newark	0	2
Willowbrook Mall	0	6
Other	2	4



9

## Typical Destinations

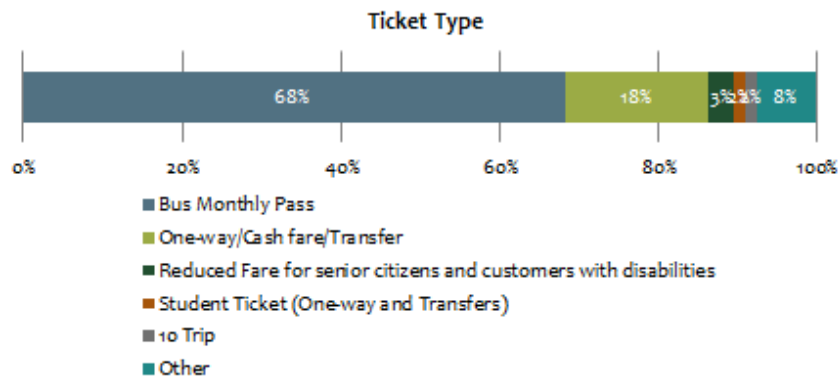
- Downtown Newark is by far the most popular/frequent destination



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## Ticket Type Used

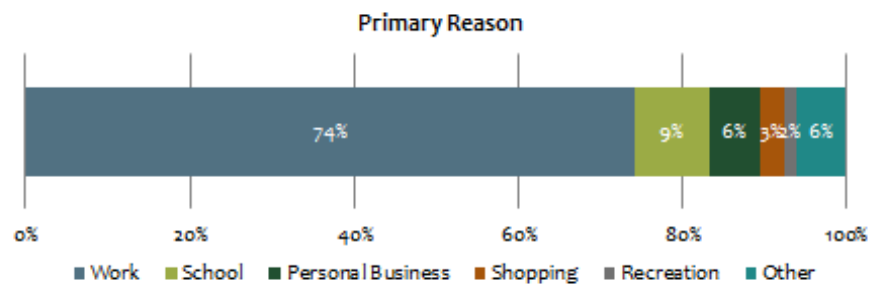
- Over two-thirds of participants use a monthly bus pass



11

## Primary Reason for Using Bus

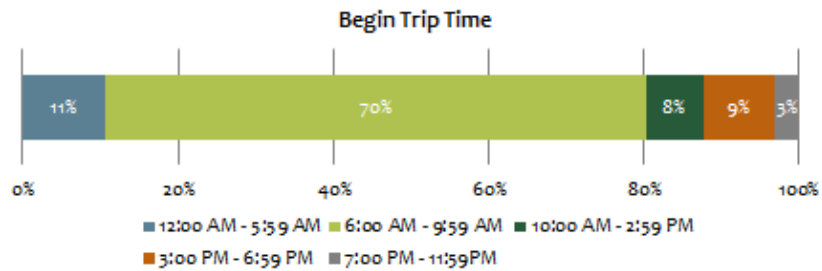
- The vast majority of participants use the bus to get to and from their workplace



12

## Begin Trip Time

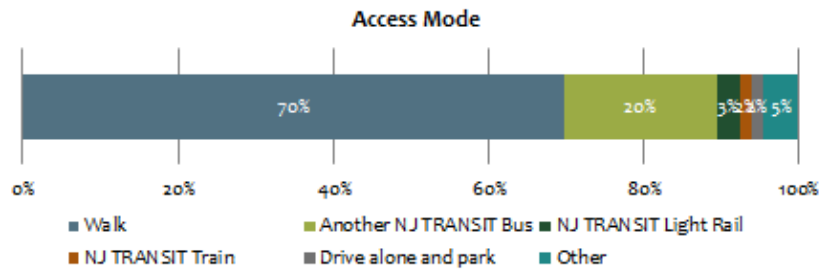
- Eighty percent of begin trip times are before 10:00AM, which is consistent with such a high percentage of participants using the bus service to get to work



13

## Access Mode

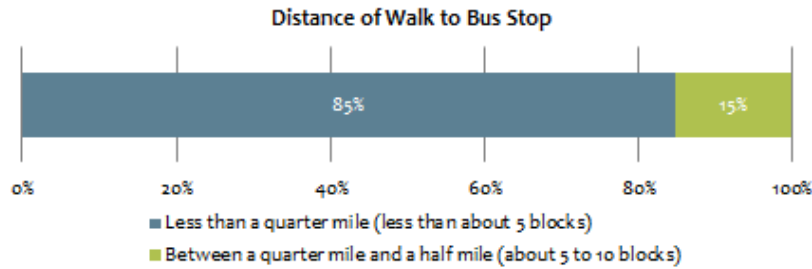
- Almost all participants access their primary bus route by walking or by transferring from another bus



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## Access Travel - Walking

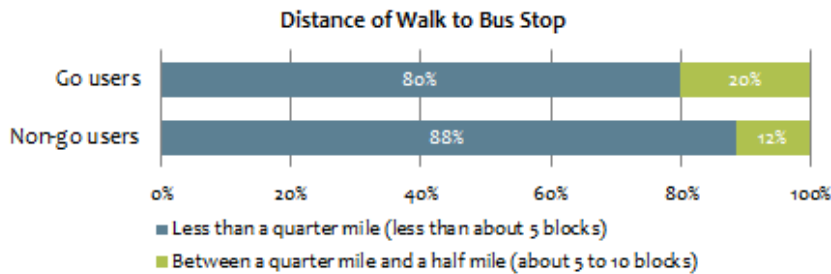
- The average access time for participants who walked to their bus stop is 8 minutes
- The vast majority of people who walk to their bus stop have a walk that is less than 5 blocks



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## Access Travel – Walking – go versus non-go

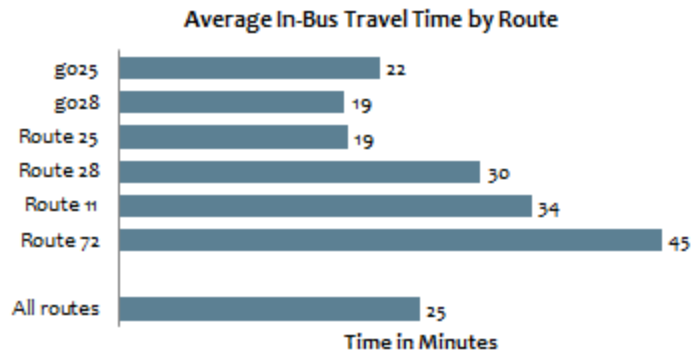
- The average walk time for go users is 8 minutes, compared to the slightly shorter average of 7 minutes for non-go users
- Non-go users are more likely to have a shorter walk, which is consistent with go routes having fewer stops



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## In-Vehicle Travel Time

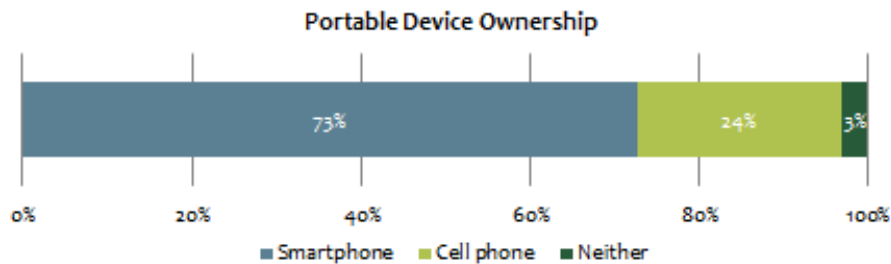
- The average travel time varies by route
  - The average travel time for go25 is not shorter than for route 25
  - The average travel time for go28 is shorter than the local 28, but sample size is very small for route 28 (only 1 person)
  - Although travel times are typically shorter on the go routes for the same travel distance, people may be using the go routes to travel longer distances



17

## Portable Devices

- Almost three-quarters of participants own a smartphone
- Only 3% of participants do not have either a smartphone or a cell phone



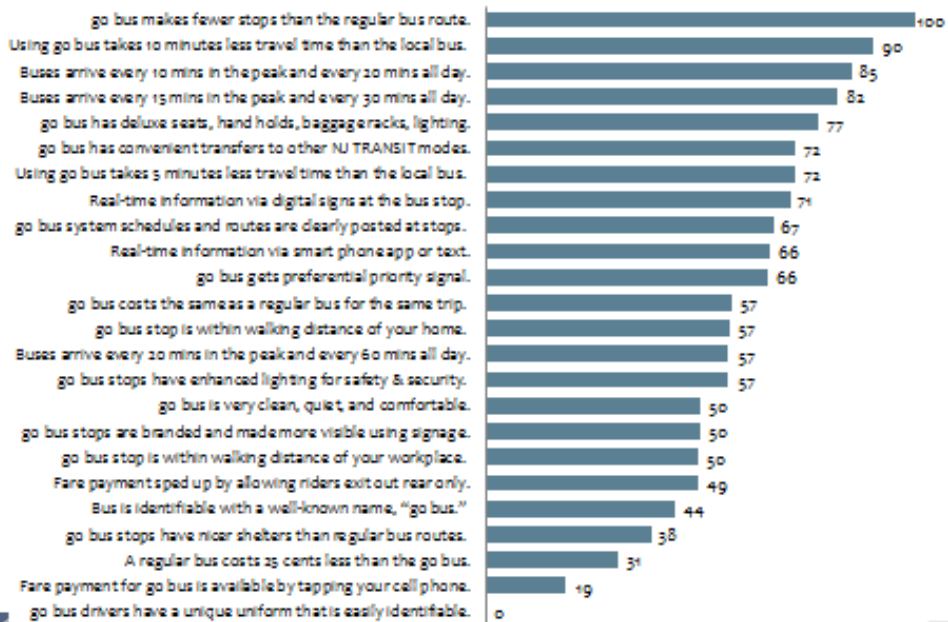
18



### Maxdiff Results: Hierarchical Bayesian (HB) Model



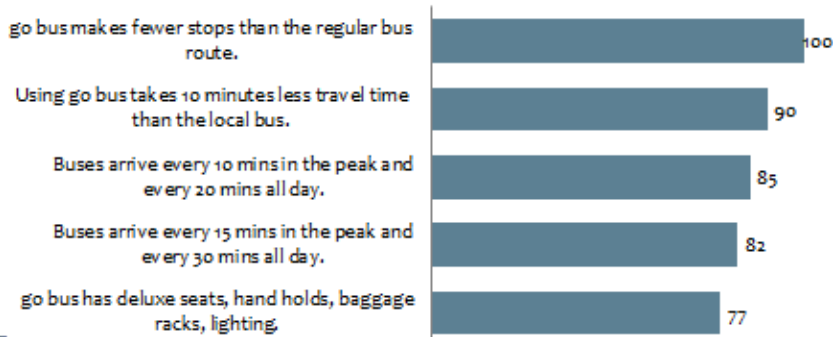
### Ranked Service Improvements



## A Closer Look: Top 5

- The participants ranked the following most important:
  - Travel Time
  - Frequency
  - Comfort and Convenience Features
- These attributes are valued twice as high as the branding attributes as well as go bus being clean, quiet and comfortable

Top 5 Rated Attributes

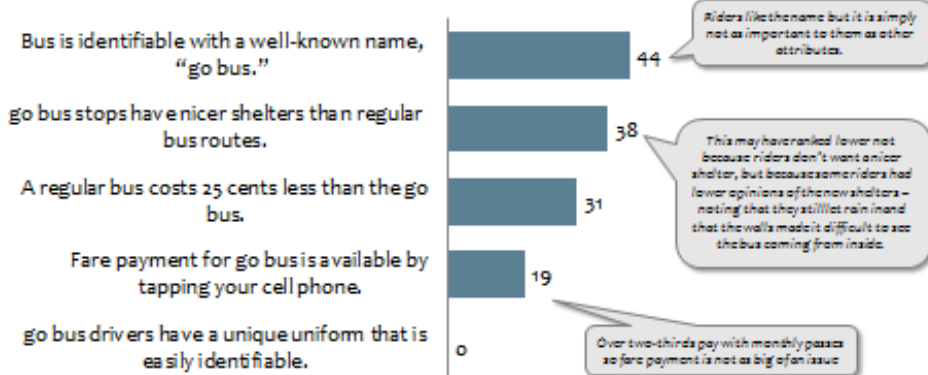


21

## A Closer Look: Bottom 5

- The attributes which participants rated as less important include:
  - Branding (uniforms, identifiable name)
  - Improvements to fare payment
  - go bus shelters

Bottom 5 Rated Attributes



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## Go Users vs. Non-Go Users

- Overall, go users and non-go users have very similar preferences
  - For go users, a 5 minute reduction in wait time is more important than it is for non-go users
  - Non-go users rank the deluxe seats, hand holds, etc. higher than go users
  - Go users find the name “go bus” more important than non-go users

Attribute	Rank: All	Rank: Go Users	Rank: Non-Go Users
go bus makes fewer stops than the regular bus route.	1	1	1
Using go bus takes 10 minutes less travel time than the local bus.	2	2	2
Buses arrive every 10 mins in the peak and every 20 mins all day long.	3	3	5
Buses arrive every 15 mins in the peak and every 30 mins all day long.	4	4	4
go bus has deluxe seats, hand holds, baggage racks, and lighting.	5	7	3
...			
Bus is identifiable with a well-known name, “go bus.”	20	17	21
go bus stops have nicer shelters than regular bus routes.	21	21	20
A regular bus costs 25 cents less than the go bus.	22	22	22
Fare payment for go bus is available by tapping your cell phone.	23	23	23
go bus drivers have a unique uniform that is easily identifiable.	24	24	24



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## Verifying Results

- In order to verify the HB model results, answers from the First Rank Choice exercise were analyzed
  - See table on next slide for detailed comparison
- The rankings found from the First Rank Choice exercise were very close to the HB model rankings
  - The top 3 attributes are the same for both
  - The bottom attributes are consistent
  - Some inconsistencies with the exact ranking of the mid-tier attributes, but this is to be expected due to lower sample sizes for the First Rank Choice Exercise since each person only selected one item, while respondents were shown 12 experiments for the MaxDiff
- However, real-time information via digital signs at the bus stop was rated higher in the First Rank Choice exercise
  - Eleven percent of respondents chose this attribute as being the most important in the exercise (ranked 3<sup>rd</sup>), but it was ranked 8<sup>th</sup> in the HB model
- Count analysis was also conducted to confirm the HB model results
  - The results were extremely similar



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## HB Model v. First Rank Choice Exercise Results

Attribute	Rank: Hierarchical Bayes Model	Rank: Count of First Rank Choice Exercise*
go bus makes fewer stops than the regular bus route.	1	1
Using go bus takes 10 minutes less travel time than the local bus.	2	3-4
Buses arrive every 10 mins in the peak and every 30 mins all day.	3	2
Buses arrive every 15 mins in the peak and every 30 mins all day.	4	5-9
go bus has deluxe seats, hand holds, baggage racks, and lighting.	5	12-16
go bus has convenient transfers to other NJ TRANSIT modes.	6	10-11
Using go bus takes 5 minutes less travel time than the local bus.	7	5-9
Real-time information via digital signs at the bus stop.	8	3-4
go bus system schedules and routes are clearly posted at stops.	9	17-24
Real-time information via smart phone app or text.	10	5-9
go bus gets preferential priority signal.	11	10-11
go bus costs the same as a regular bus for the same trip.	12	5-9
go bus stop is within walking distance of your home.	13	12-16
Buses arrive every 20 mins in the peak and every 60 mins all day.	14	12-16
go bus stops have enhanced lighting for safety & security.	15	17-24
go bus is very clean, quiet, and comfortable.	16	5-9
go bus stops are branded and made more visible using signage.	17	17-24
go bus stop is within walking distance of your workplace.	18	17-24
Fare payment sped up by allowing riders to exit rear only.	19	17-24
Bus is identifiable with a well-known name, "go bus."	20	17-24
go bus stops have nicer shelters than regular bus routes.	21	17-24
A regular bus costs 25 cents less than the go bus.	22	12-16
Fare payment for go bus is available by tapping your cell phone.	23	12-16
go bus drivers have a unique uniform that is easily identifiable.	24	17-24

- top 4
- 5 to 9
- 10 to 16
- 17 to 24

\*Note: many of attributes in the First Rank Choice Exercise were chosen the same number of times and are tied. Attributes ranked 17-24 were not selected by any respondents.

