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FINAL REPORT
ON-BOARD BUS AND RAIL SURVEY
RFP# 135

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Prepared for:

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EXECUTIVE SUMMARY

This final report describes the methods and procedures used by George Hoyt & Associates, Inc. (GH&A), to conduct and analyze ridership survey data for the Metropolitan Atlanta Rapid Transit Authority (MARTA). In all, four surveys were conducted. These included two on-board surveys, for both rail and bus; and two station surveys, one to determine station mode of arrival and one to determine attitudes regarding service quality and cost.

The on-board surveys were conducted in the fall of 1989 (October 16th-December 16th). They included surveying both weekday and weekend trips on a representative sample of trains and buses in operation during the survey period. The station mode of arrival survey was conducted in parallel with the on-board surveys. The service quality/cost survey was conducted in February, 1990.

BACKGROUND & OBJECTIVES OF THE SURVEYS

The research goal and objectives of the On-board Bus and Rail Survey are presented in Exhibit 1. The data collected on the bus and rail ridership will be used to refine and calibrate the various passenger demand models used by MARTA staff.

The major focus of the on-board surveys was to determine the characteristics of MARTA's passengers and their usage of the system. Since a large proportion of MARTA's bus riders also use the rail system for some portion of their trips, the major emphasis of the study was the rail system. The objective of the bus survey was to capture data on bus-only patrons and movements (e.g., bus-only trips, bus-to-bus transfers, bus ride-thrus).

In addition to the on-board components of the study, GH&A conducted a special enumeration of passengers entering rail stations, to provide a basis for estimating mode of arrival by time of day. The objective of this survey was to provide a reliable estimate of the proportion of patrons arriving by all available modes by time period.

EXHIBIT 1
STATEMENT OF RESEARCH GOAL AND OBJECTIVES

Goal: To learn travel characteristics, patterns, needs, and prevailing attitudes as they relate to MARTA's current level of service.

Objectives:

1. Identify General Ridership Characteristics (from On-board Survey data):
 - A. Fare Payment Method
 - B. Trip Purpose
 - C. Trip Frequency
 - D. Demographics
 - E. Attitudinal and Psychographic Data
 - F. Mode of Access
 - G. Mode of Egress
2. Rail Entry Analysis (from On-board Survey data):
 - A. Average Rail Trip Length
 - B. % Rail-to-Rail Transferring
 - C. % Rail-to-Bus Transferring
3. Determine Total TransCard Bus Boardings (from On-board Survey data):
 - A. % TransCard Rail-Bus Transfers Outside Stations
 - B. % Transcard Bus-Bus Transfers Outside Stations
4. Determine TransCard Bus-Rail Transfers Outside Stations as a Proportion of TransCard Faregate Entries (from On-board Survey data)
5. Determine Percent Bus-Bus Transfers to Total Bus Linked Trips (from On-board Survey data)
6. Collect Mode of Access at Rail Stations by Time of Day (Auto, Bus and Pedestrian Arrivals) (from Mode of Arrival Survey data)
7. Stratify Rail Trips By (from On-board Survey data):
 - A. Trip Purpose
 - B. Income
 - C. Mode of Access to Rail Station
 - D. Station of Entry
 - E. Station of Egress
 - F. Mode of Egress from Rail Station

EXHIBIT 1 (cont)
STATEMENT OF RESEARCH GOAL AND OBJECTIVES

8. Origin and Destination Analysis (from On-board Survey data):
 - A. Trip Length Frequency by Income
 - B. Sub-Corridor Trip Movements by Income
9. Elderly and Handicapped Analysis (from On-board Survey data):
 - A. Proportion of Total System Patronage
 - B. Percent of Cash Fares
10. TransCard Analysis (from On-board Survey data):
 - A. Ratio of TransCard Initial Bus Boardings to Cash-fare Initial Bus Boardings
 - B. Ratio of Cash-fare Bus-to-Bus Transfers to Cash-fare Bus Initial Boardings
 - C. Ratio of TransCard Bus-to-Bus Transfers to TransCard Initial Bus Boardings
 - D. Ratio of TransCard Initial Rail Boardings to Total Rail Transcard Entries
11. Free Intermodal Pass-Thru Analysis (from On-board Survey data):
 - A. % Inbound and Outbound Pass-Thrus from Area
 - B. % Inbound and Outbound Bus-to-Bus Pass-Thrus
 - C. % Ride-Thrus

Finally, a special attitudinal survey was conducted over a one week time frame to gather data on the riderships' attitudes regarding service quality and cost. The objective of this survey was to provide data to MARTA policy makers as they deliberated tariff and schedule changes.

GENERAL APPROACH

The primary form of data collection for the on-board surveys was the dissemination of questionnaires by surveyors aboard sample bus and train-car trips. The mode of arrival and service quality/cost attitude data were gathered through a combination of direct observation, for enumeration of demographic data, and personal interviews.

Sampling plans were developed for each survey component. For the on-board surveys, these plans were developed to ensure system-wide reliability of $\pm 10\%$ at the 95% confidence interval or better. The mode of arrival survey was designed to produce reliability of $\pm 10\%$ at the 90% confidence interval or better by station/time period. The accuracy requirement for the special attitudinal survey was $\pm 3\%$ at the 95% confidence interval system-wide. Once the sampling plans were approved, several critical procedures were developed and implemented. These included the development of the surveyor's on-board procedures manual, sample selection procedures, and the survey instrument and control logs. After these elements were in place, the necessary survey materials were ordered and temporary personnel (surveyors, editors, coders) were hired and trained. Surveyors attended a classroom training session to become familiarized with procedures, and were then trained under live conditions.

The data editing phase of the survey occurred simultaneously with the conduct of the surveys. As assignments were completed, they were inspected to ensure that the work was successfully performed. The control logs were entered into databases specifically designed for the project, and machine edited. Once the control logs were corrected and rejected work removed, the response data entry phase commenced. Following data entry, all information from the control logs and the responses were

merged and processed through an intense response edit program. This program was designed to detect many kinds of respondent and coder errors. Errors detected by this program, including improperly reported trip patterns, were resolved by survey staff to ensure the cleanest possible data in the final file.

The study design for each survey was based on stratified random sampling techniques. This approach seeks to minimize variance, and thereby improve the precision of the resulting estimates by grouping sampling units into reasonably homogeneous groups (strata). Characteristics used to stratify the target population were based on the research objectives of each survey. Using this approach, survey results were easily weighted by stratum to reflect the entire target population.

Another feature of the study designs was the incorporation of explicit methods of detecting and adjusting for response bias. Response bias occurs when attribute groups within sampling strata respond to the survey at consistently high or low rates. Unless specific methods are designed to detect and adjust for response bias, attribute groups may be misrepresented in the final estimates. Gender and race were selected as relevant attributes for response bias analysis.

Following the data collection and editing activities, the results of each survey were weighted to represent the target population and adjusted for response bias. These weights were computed at the stratum level and then compounded to achieve the final weight for each response. Where possible, survey data were used to generate estimates for comparison to "known" control totals. These comparisons provided a basis for validating the survey techniques and results.

SUMMARY OF SURVEY RESULTS

The general profile of the MARTA transit rider is black male, between the ages of 25 and 39. Survey respondents were asked to report their annual household income. More than one-fourth of the weekday and Saturday respondents indicated they made \$35,000 or more per year. However, most of the survey respondents from Sunday

reported their annual income to be between \$15,000 to \$24,999. Patrons having less than \$15,000 in household income comprise over 30% of the ridership. The average household size of MARTA patrons, based on the results of the survey is one to three members.

The results of the on-board bus and rail survey indicate that the primary "home based" trip making purpose for weekday riders is work (63.7%). The same observation is true for Saturday riders (46.9%). However, as might be expected, the primary trip making purpose on Sunday is personal business (42.0%), followed by work trips (38.6%).

Passengers were asked could they have made the trip another way - without using MARTA. The results showed that most of the weekday (43.4%) and weekend (40.5% - Saturday; 47.5% - Sunday) riders are transit dependent.

Data from the mode of arrival survey show that patterns follow traditional observations. Auto and bus are the primary modes of arrival at suburban rail stations, and walking is the primary mode of arrival at downtown rail stations.

The results of the service quality/attitudinal survey indicated that MARTA passengers would be willing to pay for a fare increase to maintain the level of service they have presently. The dollar amount of increase they would be willing to pay differed based on the mode(s) they used and what type of fare payment they used. Regardless of mode used - rail only, bus only, or both bus and rail - patrons using a senior/handicapped pass would, on the average, pay a higher percent increase than other fare group types.

ACCURACY OF RESULTS

An accuracy analysis was performed to ensure compliance with the research objectives. Better than expected accuracy was produced. The results of this analysis is described below. In each case, the stated accuracy level applies to the statistically worst

case proportion (.5). Appendix A provides a detailed discussion regarding the accuracy of the survey proportions.

The sampling plans for the on-board surveys projected substantially better accuracy than was required by the research objectives. While the actual level of response to these surveys was somewhat lower than planned (8,806 actual versus 10,000 planned), better than expected accuracy resulted. This was due to the nature of the questionnaire. Because a complete travel pattern was determined for each respondent, a single response using both rail and bus contributed to the accuracy of both modes. Final response and accuracy at the 95% confidence interval are presented below.

<u>Mode</u>	<u>Day Type</u>	<u>Response</u>	<u>95% C.I. Accuracy</u>
Rail	Weekday	6,183	$\pm 1.25\%$
	Saturday	1,296	$\pm 2.72\%$
	Sunday	1,014	$\pm 3.08\%$
Bus	Weekday	4,001	$\pm 1.55\%$
	Saturday	769	$\pm 3.53\%$
	Sunday	557	$\pm 4.15\%$

The accuracy objective for the mode of arrival survey was $\pm 10\%$ at the 90% confidence interval by station/time period. This level of accuracy could be achieved by collecting 68 representative responses. Generally, the expected minimum number of responses was produced, except during low volume survey hours. Overall, 16,747 responses were gathered during this survey. On the average, accuracy of $\pm 7.44\%$ was achieved for weekday station/time periods, and $\pm 8.36\%$ for weekend station/time periods. Both of these accuracy results are at the 90% confidence interval.

The expected level of accuracy for the service quality/cost attitude survey was $\pm 3\%$ at the 95% confidence level, system-wide. Overall, 1,496 responses were collected during this survey. This resulted in accuracy of $\pm 2.53\%$ at the 95% confidence interval.

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SECTION 1

ON-BOARD BUS AND RAIL SURVEY

This section of the report contains information on the sample design and survey procedures used, as well as procedures for data management and analysis for the on-board bus and rail survey. Analysis of the survey results is also presented. Where appropriate, accuracy of the results is shown. These analyses are presented for the worst case proportion (.5) at the 95% confidence interval. The Research Objectives indicated that accuracy of ± 10 at the 95% confidence interval was desired. In each case, the accuracy achieved was better than required by the Research Objectives.

Section 1.1 provides an overview of the procedures employed in conducting the surveys. This includes the sampling plans. Section 1.2 details the data collection procedures, data analysis, weighting and validation of survey results. Section 1.3 presents a summary of the results and their reliability. Appendix A presents a more detailed discussion of the accuracy of the survey proportions. Appendix B contains the record layout for the final factored file and geocoded addresses from the on-board survey.

1.1 SURVEY DESIGN AND PREPARATION

The survey design phase of the project established the basic framework and parameters for conducting the other, subsequent survey-specific tasks. A technical memorandum describing refinements to the original study design contained in GH&A's technical proposal was submitted to MARTA in early October 1989.

The data collected from the on-board surveys were designed to provide estimates for the bus and rail components of the system. These included general ridership characteristics; passenger movement patterns, with special emphasis on within and between mode transfers and origin/destination data; and, fare payment method, particularly Transcard utilization and elderly and handicapped fares.

1.1.1 Sampling Plan

GH&A's sampling plan for the on-board surveys was patterned after UMTA's guidance contained in the "Bus Transit Monitoring Manual." Basically, this involved sampling at the route level, using a sampling rate sufficient to achieve a $\pm 10\%$ reliability at the 90% confidence interval. Route data of this accuracy should produce estimates with $\pm 10\%$ reliability at the 95% confidence interval, system-wide. Finally, more sampling should occur during the peak hours than during other times since a larger proportion of a systems' resources are allocated to providing peak period service.

However, given that the stated objectives of the survey were rail oriented, the sampling plan was modified to be responsive in this manner. The sampling plan was developed to produce a total of 10,000 passenger responses, 8,000 from the rail system and 2,000 from the bus system. It was projected that this level of response would require sampling 1320 train-car trips and 267 bus trips. Since the research objectives for the project required results by day type, the sample plan allocated these samples as follows:

<u>Day Type</u>	<u>Train-car Trips</u>	<u>Bus Trips</u>
Weekday	776	157
Saturday	320	60
Sunday	224	50
Totals	1,320	267

The final sample resulted in slightly more trips since it was decided to survey positioning trips, as well as designated sample trips.

In addition to the mode and travel day characteristics suggested by the research objectives, the sampling plans for the on-board surveys proposed further subdividing the

system into groups defined by service corridor and type, time of day and direction of travel. This stratification was proposed to improve sample accuracy.

1.1.2 Procedures Development

The on-board survey required development of well documented procedures for data collection and control. Because of the complexity of the on-board surveyor's duties, a special manual was prepared for use by on-board personnel. Procedures developed included sample selection, control system design, and data editing and error resolution.

1.1.2.1 On-board Surveyor's Manual

The on-board surveyor's manual described every aspect of the surveyor's job, from administrative matters through safeguarding data and courtesy to the public. In addition, tips on how to do the job accurately and efficiently were included. The manual described the equipment the surveyor would use, defined various terms used frequently in the conduct of the study, and included a section specifically detailing on-board procedures. These included when and where to arrive for the assigned survey; installation of survey equipment; and a description of the various data collection procedures. The material contained in the manual was reviewed extensively with each surveyor during a mandatory training session. The surveyors were instructed to carry their manual with them over the course of the survey, so they could refer to it if there were questions. In addition, each surveyor was given the phone numbers and contact names of everyone working in the survey management office, in case they had a problem or needed help.

1.1.2.2 Sample Selection

GH&A staff enumerated all train and bus trips expected to be in operation during the survey period (the universe) by stratum (day, time period, service type and corridor, and direction). Then trips were selected randomly. Each trip was considered for sampling independently, with equal probability of selection. When possible, trips were

selected in inbound/outbound block pairs to effect some efficiency in scheduling surveyors.

1.1.2.3 Survey Instrument and Control Log Design

Two survey instruments were designed and pre-tested for the on-board survey. Based on the results of the pre-test, the instrument shown in Exhibit 1-1 was chosen. The questionnaire was printed on card stock, serially numbered for control, and contained a postage paid mail-back feature.

Control logs, used to collect relevant survey control data, were generated automatically by the survey scheduling system developed by GH&A and customized for the project. (Examples of these are shown in Section 1.2.) Bus surveyors were required to enumerate passengers by gender/race group (for response bias adjustment) and record serial numbers by bus trip segment. For the rail survey, surveyors were required to enumerate total boardings and record card serial numbers at each stop. Response bias control for the on-board rail survey was developed as part of the mode of arrival survey.

1.1.3 Survey Preparation

Several tasks comprised the survey preparation phase of the project. First, GH&A procured all the necessary equipment and supplies for the field work. Next, GH&A subcontracted with a local temporary staffing firm to provide the necessary personnel (surveyors, editors and coders) for the project.

Surveyors were required to attend a classroom training session to become familiar with survey procedures. Secondly, they were required to attend a "live" training session where they actually performed survey work.

Next, data collection schedules were developed. These schedules, along with other relevant information, were loaded into a specially adapted version of GH&A's Survey

EXHIBIT 1-1 ON-BOARD SURVEY QUESTIONNAIRE

Nº 29491

Dear MARTA Passenger:

Please take a minute to help us plan for your transit needs by filling out this survey. Place the completed card in the special box located near the exit door of this vehicle or drop it in any mailbox, no postage necessary.

Please fill out this survey even if you filled one out before. THANK YOU FOR YOUR HELP.

► **WHERE DID YOU COME FROM BEFORE THIS ONE-WAY TRIP? (Check only one)**

- | | | |
|-------------------------------------|--|---|
| <input type="checkbox"/> 1 Work | <input type="checkbox"/> 4 Meal | <input type="checkbox"/> 7 Social, Church, or Personal Business |
| <input type="checkbox"/> 2 Home | <input type="checkbox"/> 5 Medical Appointment | <input type="checkbox"/> 8 Grade/High/Vocational School |
| <input type="checkbox"/> 3 Shopping | <input type="checkbox"/> 6 College | <input type="checkbox"/> 9 Other (describe) _____ |

► **WHERE IS THAT PLACE?**

Address, Nearest Street Corner, or Building Name _____ City NE NW SE SW _____ Zip Code _____

► **HOW DID YOU PAY FOR THIS ONE-WAY TRIP? (Check only one)**

- | | | |
|--|---|----------------------------------|
| <input type="checkbox"/> 1 Token | <input type="checkbox"/> 4 Senior or Handicapped Pass | <input type="checkbox"/> 7 Other |
| <input type="checkbox"/> 2 Weekly Transcard | <input type="checkbox"/> 5 Cash | |
| <input type="checkbox"/> 3 Monthly Transcard | <input type="checkbox"/> 6 Cobb County Transfer | (describe how) _____ |

► **HOW DID YOU GET TO YOUR FIRST BUS OR TRAIN? (Check only one)**

- | | | |
|---|---|---|
| <input type="checkbox"/> 1 Walked or rode a bike | <input type="checkbox"/> 3 Drove a car | <input type="checkbox"/> 5 Was dropped off by someone |
| <input type="checkbox"/> 2 Rode with someone who parked | <input type="checkbox"/> 4 Rode in a taxi | |

► **WHAT BUSES AND TRAINS DO YOU USE ON THIS ONE-WAY TRIP?**

Describe each part of this trip in order from beginning to end on a separate line. Write down the route number of every bus and each place you change buses or trains.

1. First, I ride ☐ 1 a train ☐ 2 bus route _____ from _____ Station, Address, Nearest Street Corner, or Building Name _____
2. Then, I ride ☐ 1 a train ☐ 2 bus route _____ from _____ Station, Address, Nearest Street Corner, or Building Name _____
3. Then, I ride ☐ 1 a train ☐ 2 bus route _____ from _____ Station, Address, Nearest Street Corner, or Building Name _____
4. Then, I ride ☐ 1 a train ☐ 2 bus route _____ from _____ Station, Address, Nearest Street Corner, or Building Name _____
5. Then, I ride ☐ 1 a train ☐ 2 bus route _____ from _____ Station, Address, Nearest Street Corner, or Building Name _____

► **WHERE WILL YOU GET OFF YOUR LAST BUS OR TRAIN?**

Station, Address, Nearest Street Corner, or Building Name _____ City NE NW SE SW _____ Zip Code _____

► **HOW WILL YOU LEAVE THAT PLACE? (Check only one)**

- | | | |
|---|---|--|
| <input type="checkbox"/> 1 Walk or ride a bike | <input type="checkbox"/> 3 Drive a car | <input type="checkbox"/> 5 Be picked up by someone |
| <input type="checkbox"/> 2 Ride with someone who parked | <input type="checkbox"/> 4 Ride in a taxi | |

► **WHERE ARE YOU GOING AFTER THIS ONE-WAY TRIP? (Check only one)**

- | | | |
|-------------------------------------|--|---|
| <input type="checkbox"/> 1 Work | <input type="checkbox"/> 4 Meal | <input type="checkbox"/> 7 Social, Church, or Personal Business |
| <input type="checkbox"/> 2 Home | <input type="checkbox"/> 5 Medical Appointment | <input type="checkbox"/> 8 Grade/High/Vocational School |
| <input type="checkbox"/> 3 Shopping | <input type="checkbox"/> 6 College | <input type="checkbox"/> 9 Other (describe) _____ |

► **WHERE IS THAT PLACE?**

Address, Nearest Street Corner, or Building Name _____ City NE NW SE SW _____ Zip Code _____

► **HOW MANY DAYS A WEEK DO YOU MAKE THIS KIND OF TRIP ON MARTA?**

- | | | | |
|--------------------------------|----------------------------------|---------------------------------|--|
| <input type="checkbox"/> 1 One | <input type="checkbox"/> 3 Three | <input type="checkbox"/> 5 Five | <input type="checkbox"/> 7 Seven |
| <input type="checkbox"/> 2 Two | <input type="checkbox"/> 4 Four | <input type="checkbox"/> 6 Six | <input type="checkbox"/> 8 Don't go every week |

► **WHERE ARE YOU LIVING NOW?**

Address, Nearest Street Corner, or Building Name _____ City NE NW SE SW _____ Zip Code _____

► **HOW MANY PEOPLE LIVE WITH YOU? (include yourself)** _____

► **HOW MANY WORKING MOTOR VEHICLES ARE THERE?** _____

► **COULD YOU HAVE MADE THIS TRIP ANOTHER WAY?**

- ☐ 1 No ☐ 2 Yes, I could have driven ☐ 3 Yes, I could have ridden with someone

► **I AM:** ☐ 1 Male ☐ 2 Female

► **I AM:** ☐ 1 Black ☐ 2 White ☐ 3 Hispanic ☐ 4 Asian ☐ 5 Other

► **MY AGE IS:** ☐ 1 Under 18 ☐ 3 25 - 39 ☐ 5 60 - 64

☐ 2 18 - 24 ☐ 4 40 - 59 ☐ 6 65 or over

► **THE COMBINED TOTAL INCOME OF EVERYONE LIVING AT MY HOME IS:**

- | | | |
|--|--|--|
| <input type="checkbox"/> 1 Less than \$5,000 | <input type="checkbox"/> 3 \$10,000 - 14,999 | <input type="checkbox"/> 5 \$25,000 - 34,999 |
| <input type="checkbox"/> 2 \$5,000 - 9,999 | <input type="checkbox"/> 4 \$15,000 - 24,999 | <input type="checkbox"/> 6 \$35,000 or more |

► **HOW LONG HAVE YOU BEEN USING MARTA?**

- ☐ 1 Under 1 month ☐ 2 1 - 6 months ☐ 3 7 - 12 months ☐ 4 Over 12 months

Thank you again. If you need help, ask the person who handed you this card.

Management Support System (SMSS). This computerized system generated all control logs and trip envelope labels, maintained information on schedule adherence, and provided a data entry environment for capturing survey results. Related systems tracked and verified sample compliance and controlled disposition of serially numbered questionnaires.

1.2 DATA COLLECTION AND ANALYSIS

GH&A staff arrived in Atlanta on October 8, 1989 to set up the field office to manage the data collection phase of the project. Actual field work for the on-board survey was conducted between October and December 1989.

1.2.1 Data Collection Activities

GH&A staff established the survey management office at MARTA one week prior to the actual data collection. At least one of our staff members was on-site every day the survey was in the field, and on-call every hour a surveyor was scheduled to work. During the week prior to the survey, the staff ordered last minute survey supplies, assembled surveyor kits and prepared the daily work schedules. As assignments were prepared, card decks and serial number ranges allocated to each assignment were entered into the SMSS deck/serial database. It was also during this first week that temporary personnel were hired and trained.

The job of the on-board surveyor was to hand out survey questionnaires to boarding passengers on their assigned bus or train trip. When necessary, surveyors provided assistance to passengers in completing the questionnaire. In addition to this, surveyors were required to either count passengers as they boarded (for rail), or enumerate passengers by gender and race (for bus). They recorded these data on their Assignment Control Log.

There were two Assignment Control Logs - one for the bus and one for the rail (see Exhibits 1-2 and 1-3). These forms are presented in reduced form. The original size was 8 1/2 by 14 inches. The two logs were similar, both in form and detail. The front page of the control log was used by the surveyor to record the range of questionnaires used on each assignment. At specified locations, the surveyor was required to write down the serial number of the next card to be issued and record passenger boardings on the trip detail page.

Completed work was reviewed daily to identify any surveyors with problems. Surveyors that performed below expected levels of accuracy were individually retrained. Surveyors who consistently produced faulty work were dismissed.

1.2.2 Data Editing

As survey assignments were returned from the field, they were reviewed to ensure that the work was successfully completed and that all survey materials were returned. Following that, all data from the completed control logs were immediately keyed into the appropriate control logs data base. Then an edit program was applied to validate the surveyor's work. The resulting edit report provided feedback on surveyor performance, and formed the basis for error resolution.

Once all errors were resolved, the edit program updated other survey files to reflect the current status of each assignment. The program also generated control records, including issued serial number ranges by assignment, trip, and time period. These records were used to associate passenger response records (by serial number) with the assignment where they were issued.

After this association, all records were passed through a second level edit program. This program flagged any inconsistencies between data contained in the control records and data coded or entered in individual response records. For example, this program

EXHIBIT 1-2: CARD SERIAL NUMBER LOG, BUS

MARTA Fall 1989 BUS Passenger Survey Assignment Control Log			Weekday Assignment A501, Page 1		
Report to: 4TH ST & MANOR DR PARK & RI at: 4:43 AM			Surveyor's Name: _____		
Board Route 120, Block 3 Bus			Date: _____ Weather: _____		
BEGIN SURVEY IMMEDIATELY			Editor's Name: _____		
Record the first and last Serial Number of every card deck OPENED on this assignment					
<u>Deck</u>	<u>Top Card Serial Number</u>	<u>Bottom Card Serial Number</u>	<u>Deck</u>	<u>Top Card Serial Number</u>	<u>Bottom Card Serial Number</u>
1	- - - - -	- - - - -	4	- - - - -	- - - - -
2	- - - - -	- - - - -	5	- - - - -	- - - - -
3	- - - - -	- - - - -	6	- - - - -	- - - - -
TRANSFER INSTRUCTIONS:					
Surveyor's Comments:					
IF YOU HAVE PROBLEMS OR QUESTIONS, CALL 848-5309 (DAY) OR 239-0677 Ext 811 (NIGHT)					

EXHIBIT 1-2: TRIP DETAIL PAGE, BUS

Assignment A501, Trip 5176, Page 2						
Lv. 4TH ST & MANOR DR PARK & RIDE Schedule Time 5:03 AM Route 120, Block 3 Actual Time _ _ : _ _ _ M Card Number _ _ _ _ _	BF	BM	WF	WM	OF	OM
Ar. E Ponce De Leon & N Claredon Actual Time _ _ : _ _ _ M Card Number _ _ _ _ _	BF	BM	WF	WM	OF	OM
END OF LINE Ar. AVONDALE STATION (NORTH) Actual Time _ _ : _ _ _ M Card Number _ _ _ _ _						

EXHIBIT 1-3: CARD SERIAL NUMBER LOG, RAIL

<p>MARTA Fall 1989 RAIL Passenger Survey Assignment Control Log</p> <p>Report to: Hightower at: 4:31 PM</p> <p>Board Train 110, Car 2 on the EASTBOUND track BEGIN SURVEY IMMEDIATELY</p>	<p>Weekday Assignment A038, Page 1</p> <p>Surveyor's Name: _____</p> <p>Date: _____ Weather: _____</p> <p>Editor's Name: _____</p>																												
<p>Record the first and last Serial Number of every card deck OPENED on this assignment</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; width: 10%;">Deck</th> <th style="text-align: center; width: 20%;">Top Card Serial Number</th> <th style="text-align: center; width: 20%;">Bottom Card Serial Number</th> <th style="width: 10%;"></th> <th style="text-align: center; width: 10%;">Deck</th> <th style="text-align: center; width: 20%;">Top Card Serial Number</th> <th style="text-align: center; width: 20%;">Bottom Card Serial Number</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">- - - - -</td> <td style="text-align: center;">- - - - -</td> <td></td> <td style="text-align: center;">4</td> <td style="text-align: center;">- - - - -</td> <td style="text-align: center;">- - - - -</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">- - - - -</td> <td style="text-align: center;">- - - - -</td> <td></td> <td style="text-align: center;">5</td> <td style="text-align: center;">- - - - -</td> <td style="text-align: center;">- - - - -</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">- - - - -</td> <td style="text-align: center;">- - - - -</td> <td></td> <td style="text-align: center;">6</td> <td style="text-align: center;">- - - - -</td> <td style="text-align: center;">- - - - -</td> </tr> </tbody> </table>		Deck	Top Card Serial Number	Bottom Card Serial Number		Deck	Top Card Serial Number	Bottom Card Serial Number	1	- - - - -	- - - - -		4	- - - - -	- - - - -	2	- - - - -	- - - - -		5	- - - - -	- - - - -	3	- - - - -	- - - - -		6	- - - - -	- - - - -
Deck	Top Card Serial Number	Bottom Card Serial Number		Deck	Top Card Serial Number	Bottom Card Serial Number																							
1	- - - - -	- - - - -		4	- - - - -	- - - - -																							
2	- - - - -	- - - - -		5	- - - - -	- - - - -																							
3	- - - - -	- - - - -		6	- - - - -	- - - - -																							
<p>TRANSFER INSTRUCTIONS:</p>																													
<p>Surveyor's Comments:</p>																													
<p>IF YOU HAVE PROBLEMS OR QUESTIONS, CALL 848-5309 (DAY) OR 239-0677 Ext 811 (NIGHT)</p>																													

EXHIBIT 1-3: TRIP DETAIL PAGE, RAIL

Train 110, Car 2		Assignment A038, Trips 0295 and 0296, Page 2					
Station	Schedule	Actual Time		Card Number	Board	Type	
						Car	Door
Lv. Hightower	4:51 PM	--	: -- M	-- -- --	---	[]	[]
Ar. West Lake		--	: -- M	-- -- --	---	[]	[]
Ar. Ashby		--	: -- M	-- -- --	---	[]	[]
Ar. Vine City		--	: -- M	-- -- --	---	[]	[]
Ar. Omni		--	: -- M	-- -- --	---	[]	[]
Ar. Five Points	5:00 PM	--	: -- M	-- -- --	---	[]	[]
Ar. Georgia State		--	: -- M	-- -- --	---	[]	[]
Ar. King Memorial		--	: -- M	-- -- --	---	[]	[]
Ar. Inman Park/Reynoldstown		--	: -- M	-- -- --	---	[]	[]
Ar. Edgewood/Candler Park		--	: -- M	-- -- --	---	[]	[]
Ar. East Lake		--	: -- M	-- -- --	---	[]	[]
Ar. Decatur		--	: -- M	-- -- --	---	[]	[]
END OF LINE							
Ar. Avondale	5:14 PM	--	: -- M	-- -- --	0		

validated that the coded "stop on" for each numbered response was consistent with the location of the bus (or train) at the time the response card was issued, and validated that the coded "stop off" was down-line from the issue point.

1.2.3 Sample Weighting and Validation

Once all data inconsistencies were resolved, sample data were weighted to represent all target MARTA patrons. The methods used to weight the two components of the on-board survey are described below.

1.2.3.1 On-board Rail Survey

All weighting of on-board rail survey data was performed by boarding station at the stratum level (day type, time period and direction). Initially, sampled train-car boardings were accumulated by station/stratum. Then, station/stratum total sampled boardings were weighted to estimate station/stratum train-car boardings. The weighting factor was:

$$\text{Weight}(1) = \frac{\text{Station/stratum train-car trips}}{\text{Sampled station/stratum train-car trips}}$$

This provided an estimate of total boardings by station/stratum. This factor was applied at the station level and was sensitive to both consist length and train turn-backs.

Then, valid responses by station/stratum were weighted to represent all station/stratum train-car boardings. The weighting factor was:

$$\text{Weight}(2) = \frac{\text{Station/stratum train-car boardings}}{\text{Station/stratum valid responses}}$$

Weight(2) represented the initial weight for most responses. Travel patterns indicating

a rail-to-rail transfer at Five Points were given the average of their originating station weight(2) and the appropriate Five Points weight(2).

Following initial weighting, all responses were weighted to eliminate response bias. This weight was derived from the mode of arrival survey counts and applied by station, day type and time period.

1.2.3.2 On-board Bus Survey

All weighting of on-board bus survey data was performed at the stratum level (day type, route/service type group, time period and direction). Initially, sampled bus trip boardings were accumulated by stratum. Then, stratum total sampled boardings were weighted to estimate stratum bus trip boardings. The weighting factor was:

$$\text{Weight}(1) = \frac{\text{Stratum bus trips}}{\text{Sampled stratum bus trips}}$$

Then, valid responses by stratum were weighted to represent stratum boardings. The weighting factor was:

$$\text{Weight}(2) = \frac{\text{Stratum bus trip boardings}}{\text{Stratum valid responses}}$$

Weight(2) represented the initial weight for most responses. Response travel patterns indicating more than one bus boarding were re-weighted to reflect the additional boardings (i.e., the initial weight was divided by the number of boardings reported).

Next, all responses were weighted to eliminate response bias. This weight was derived from bus boarding counts and applied by day type, route/service type group and

direction. In addition, a final adjustment was applied to balance inbound and outbound bus travel by day type.

1.2.3.3 Combined On-board Survey File

The rail and bus on-board survey files provided two independent estimates of MARTA patronage. Passengers using only one mode (i.e., rail or bus) required no additional weighting. However, passengers using both modes were double counted. In order to remove this undesirable effect, responses from either survey which indicated a bus-to-rail or rail-to-bus transfer were adjusted. This final adjustment was:

$$\text{Weight}(3) = \frac{\text{Weight}(2)}{2}$$

Following this final adjustment, a combined file of survey records from both surveys was produced. The record format for this file and information regarding its use are contained in Appendix B. All on-board survey related information contained in Section 1.3 of this report was produced using the final weight from this file.

Once these files were combined, survey estimated patronage was:

<u>Day Type</u>	<u>----- Rail -----</u>		<u>Bus</u>	<u>System</u>
	<u>Boardings</u>	<u>Trips</u>	<u>Boardings</u>	<u>Trips</u>
Weekday	252,094	198,606	230,655	246,016
Saturday	128,651	100,671	135,401	145,014
Sunday	57,829	47,343	59,627	68,070

These results compared favorably with other independent data sources maintained by MARTA.

1.2.4 Geographic Coding of Addresses

The on-board survey questionnaire sought to determine a full description of each

passenger's travel pattern on MARTA trains and/or buses. This could produce as many as nine separate geographic reference points (addresses) for a single response. In all, over 50,000 addresses were produced. These were analyzed and coded to census tract-block. Address matching for non-rail station points was performed by the Atlanta Regional Commission. Address verification and cleanup was performed by GH&A staff. The format of the geocoded address file is contained in Appendix B.

1.3 SUMMARY OF RESULTS

The research goal and objectives for this project are restated in Exhibit 1-4. The exhibits which follow were prepared to provide data relevant to each objective. Many other tabulations of survey data providing more detailed, cross sectional analysis were delivered to MARTA Research staff separately.

1.3.1 General Ridership Characteristics

Exhibits 1-5 through 1-17 describe the general characteristics of MARTA's patrons based on analysis of the results of the on-board bus and rail survey. The data in these exhibits address Research Objective 1. Frequency distributions are presented for the following variables: fare payment method, combined trip purpose, trip frequency, household size, auto availability, alternative methods of travel, gender, race, age, income, length of time using MARTA, mode of access, and mode of egress. Separate statistics are presented for weekday, Saturday and Sunday observations. The percents contained in the text of this section refer to the valid percent, which excludes missing observations from the calculation.

The resulting accuracy analysis is shown below. The analysis frame for these statistics is system-wide.

<u>Day Type</u>	<u>Accuracy</u>
Weekday	±1.21%
Saturday	±2.63%
Sunday	±3.00%

EXHIBIT 1-4
STATEMENT OF RESEARCH GOAL AND OBJECTIVES

Goal: To learn travel characteristics, patterns, needs, and prevailing attitudes as they relate to MARTA's current level of service.

Objectives:

1. Identify General Ridership Characteristics Including:
 - A. Fare Payment Method
 - B. Trip Purpose
 - C. Trip Frequency
 - D. Demographics
 - E. Attitudinal and Psychographic Data
 - F. Mode of Access
 - G. Mode of Egress
2. Rail Entry Analysis
 - A. Average Rail Trip Length
 - B. % Rail-to-Rail Transferring
 - C. % Rail-to-Bus Transferring
3. Determine Total TransCard Bus Boardings
 - A. % TransCard Rail-Bus Transfers Outside Stations
 - B. % Transcard Bus-Bus Transfers Outside Stations
4. Determine TransCard Bus-Rail Transfers Outside Stations as a Proportion of TransCard Faregate Entries
5. Determine Percent Bus-Bus Transfers to Total Bus Linked Trips
6. Collect Mode of Access at Rail Stations by Time of Day (Auto, Bus and Pedestrian Arrivals) (SEE SECTION 2)
7. Stratify Rail Trips By:
 - A. Trip Purpose
 - B. Income
 - C. Mode of Access to Rail Station
 - D. Station of Entry
 - E. Station of Egress
 - F. Mode of Egress from Rail Station

EXHIBIT 1-4 (cont)
STATEMENT OF RESEARCH GOAL AND OBJECTIVES

8. Origin and Destination Analysis
 - A. Trip Length Frequency by Income
 - B. Sub-Corridor Trip Movements by Income
9. Elderly and Handicapped Analysis
 - A. Proportion of Total System Patronage
 - B. Percent of Cash Fares
10. TransCard Analysis
 - A. Ratio of TransCard Initial Bus Boardings to Cash-fare Initial Bus Boardings
 - B. Ratio of Cash-fare Bus-to-Bus Transfers to Cash-fare Bus Initial Boardings
 - C. Ratio of TransCard Bus-to-Bus Transfers to TransCard Initial Bus Boardings
 - D. Ratio of TransCard Initial Rail Boardings to Total Rail Transcard Entries
11. Free Intermodal Pass-Thru Analysis
 - A. % Inbound and Outbound Pass-Thrus from Area
 - B. % Inbound and Outbound Bus-to-Bus Pass-Thrus
 - C. % Ride-Thrus

Cash is the most prevalent form of payment by MARTA patrons, without regard to travel day. Almost 33% of weekday riders used cash, compared to 38.2% on Saturday and 45.1% on Sunday. The weekly transcard and token were the other predominant methods of payment. Thirty one percent of weekday riders used the weekly transcard followed by 21.2% who paid with a token. These and other statistics are presented in Exhibit 1-5.

Exhibit 1-6 presents the analysis of a computed variable, combined trip purpose. This variable represents the traditional "home based" trip purpose used in trip generation models. The results of the on-board bus and rail survey indicate that the primary trip making purpose for weekday riders is work (63.7%). The same observation is true for Saturday riders (46.9%). However, as might be expected, the primary trip making purpose on Sunday is personal business (42.0%), followed by work trips (38.6%).

Survey respondents were asked how many days a week they made similar trips using MARTA. Since work was the most frequent trip type, it is not surprising that most of the weekday and Saturday respondents answered five days/week (Weekday - 50.8%; Saturday - 25.8%). However, most Sunday respondents indicated they did not make the trip every week (22.9%). Frequency of trip making is shown in Exhibit 1-7.

The average household size of MARTA patrons is one to three members. Two-thirds of the weekday respondents stated this, compared to 65.3% of the Saturday and 61.2% of Sunday riders. Household size data are presented in Exhibit 1-8.

Survey respondents were asked how many working vehicles there were in their household. For weekday and Saturday riders, one third indicated they had no vehicle and another third indicated they had only one vehicle. A higher proportion of Sunday riders indicated zero vehicles. Passengers were also asked could they have made the trip another way, that is without MARTA. The results show that the most weekday

(43.4%) and weekend (40.5% - Saturday; 47.5% - Sunday) riders had no alternative to MARTA. Thirty eight percent of the remaining weekday riders indicated they could have driven, compared to 36.5% of Saturday riders and 35.0% of Sunday riders. The frequencies and percents for these two variables are presented in Exhibits 1-9 and 1-10, respectively.

Demographic data are presented in Exhibits 1-11 through 1-14. The largest percentage of MARTA riders are black males, between the ages of 25 and 39. Survey respondents were asked to report their annual household income. More than one-fourth of the weekday and Saturday respondents indicated they made \$35,000 or more per year. However, 24.4% of survey respondents from Sunday reported their annual income to be between \$15,000 to \$24,999. Riders with low household incomes (less than \$15,000/year) are significant. Almost 30% of the weekday riders and over 35% of the weekend riders report income at this level.

When asked how long had they been using MARTA, the majority of respondents indicated over 12 months (68.3% - Weekday; 75.6% - Saturday; 70.8% - Sunday). The next largest group was between 1 and 6 months. These statistics can be found in Exhibit 1-15.

Data relating to mode of access and mode of egress are presented in Exhibits 1-16 and 1-17, respectively. More than three fourths of weekday riders indicated they walked or rode a bike to or from MARTA. A similarly high number of Saturday and Sunday respondents answered in the same manner. Other significant means of access or egress were to drive or be dropped off.

1.3.2 Rail Entry Analysis

Research Objective 2A requires an analysis of the average rail trip length. The

table below summarizes the overall average trip length and accuracy by day. All rail patrons is used as the analysis frame for these statistics.

<u>Day Type</u>	<u>Mean Length</u>	<u>Accuracy</u>
Weekday	7.08 mi	$\pm 1.52\%$
Saturday	6.81 mi	$\pm 3.78\%$
Sunday	7.49 mi	$\pm 4.08\%$

Data on rail-to-rail transfer percents are presented in the table below, and respond to Research Objective 2B. These were derived from Exhibit 1-30.

<u>Day Type</u>	<u>Rail Patrons</u>	<u>----- Transfers -----</u>	
		<u>Rail-Rail</u>	<u>%</u>
Weekday	198,606	53,488	26.93
Saturday	100,671	27,980	27.79
Sunday	47,343	10,486	22.15

Rail-to-MARTA bus transfer percents are provided below, and respond to Research Objective 2C. These were derived from Exhibit 1-30.

<u>Day Type</u>	<u>Rail Patrons</u>	<u>----- Transfers -----</u>	
		<u>Rail-Bus</u>	<u>%</u>
Weekday	198,606	82,881	41.73
Saturday	100,671	39,991	39.72
Sunday	47,343	16,552	34.96

The resulting accuracy for both sets of statistics is presented below. Rail patrons is the analysis frame.

<u>Day Type</u>	<u>Accuracy</u>
Weekday	$\pm 1.23\%$
Saturday	$\pm 2.70\%$
Sunday	$\pm 3.04\%$

1.3.3 TransCard Rail-Bus Transfers

Research Objective 3A addresses the percent TransCard Rail-outside bus transfers related to Transcard initial bus boardings. The analysis is provided below, and is only relevant to free intermodal stations. This data was derived from Exhibit 1-18, which describes outside transfers and initial bus boardings for all fare types.

<u>Day Type</u>	<u>TransCard Rail- Outside Bus</u>	<u>TransCard Initial Bus Boardings</u>	<u>%</u>
Weekday	15,249	62,880	24.25
Saturday	11,457	37,353	30.67
Sunday	2,373	14,821	16.01

1.3.4 TransCard Bus-Bus Transfers

Research Objective 3B addresses the percent TransCard bus-outside bus transfers related to Transcard initial bus boardings. The analysis is provided below, and is only relevant to free intermodal stations. This data was derived from Exhibit 1-18, which describes outside transfers and initial bus boardings for all fare payment methods.

<u>Day Type</u>	<u>TransCard Outside- Bus-Outside Bus</u>	<u>TransCard Initial Bus Boardings</u>	<u>%</u>
Weekday	6,941	62,880	11.04
Saturday	2,387	37,353	6.39
Sunday	2,400	14,821	16.19

1.3.5 Faregate Entries

Research Objective 4A is to determine the Transcard bus-rail transfers outside stations as a percent of Transcard faregate entries. The analysis is provided below, and is only relevant at free intermodal stations. This data was derived from Exhibit 1-18, which describes all outside transfers and faregate entries by fare type.

<u>Day Type</u>	<u>TransCard Outside- Bus-Rail</u>	<u>TransCard Gate Entries</u>	<u>%</u>
Weekday	17,139	61,913	27.68
Saturday	8,646	32,637	26.49
Sunday	3,139	11,681	26.87

1.3.6 Bus-Bus Transfers and Bus Linked Trips

Data on MARTA bus-to-bus transfer percents are provided below. These were derived from Exhibit 1-30, and respond to Research Objective 5.

<u>Day Type</u>	<u>Bus Patrons</u>	<u>---- Transfers ---- Bus-Bus</u>	<u>%</u>
Weekday	130,648	17,190	13.16
Saturday	83,184	12,645	15.20
Sunday	37,184	6,440	17.32

The resulting accuracy for this analysis is presented below at the 95% confidence interval. Passengers initially using bus is the analysis frame.

<u>Day Type</u>	<u>Accuracy</u>
Weekday	±1.82%
Saturday	±4.08%
Sunday	±4.86%

1.3.7 Stratification of Rail Trips

Exhibits 1-19 through 1-24 provide profiles of the requested attributes for MARTA's rail patrons. The data in these exhibits address Research Objective 7. Frequency distributions are presented for the following variables: combined trip purpose, income, mode of access, station of entry, station of exit and mode of egress. Separate statistics are presented for weekday, Saturday and Sunday observations. The percents presented in the text of this section refer to the valid percent, which excludes missing observations from the calculation.

The resulting accuracy is consistently better than required by the Research Objectives. The analysis frame for these statistics is patrons using rail.

<u>Day Type</u>	<u>Accuracy</u>
Weekday	$\pm 1.23\%$
Saturday	$\pm 2.70\%$
Sunday	$\pm 3.04\%$

The weekday and Saturday rail patrons that participated in the on-board survey indicated that their primary trip making purpose was work. Almost two-thirds of the weekday respondents indicated work, compared to 45.4% for Saturday. The primary trip making purpose on Sunday was personal business (45.3%), followed by work (38.2%). These data are presented in Exhibit 1-19.

The income profile of the rail patron is similar to the average MARTA bus and rail patron. That is, the majority of the rail respondents indicated their annual household income was \$35,000 or more. This observation is consistent for weekday and weekend riders. Income statistics are presented in Exhibit 1-20.

The primary mode of access for rail respondents, Exhibit 1-21, is walking or riding a bike, followed by driving and being dropped off. Almost 80% of weekday riders indicated they walked to MARTA, compared to 78.4% for Saturday and 73.5% for Sunday.

The Five Points rail station serves Atlanta's downtown business district with direct access to all rail lines. Therefore, it is not surprising that Five Points is the prevalent station of entry and exit for all rail patrons, without regard to survey day type. For weekday and Saturday survey respondents, Chamblee, Lenox, Hightower and Avondale are also frequent stations of entry and exit. On Sunday, the Airport is the second most frequent rail station of entry and exit. Data on station of entry and exit are presented in Exhibits 1-22 and 1-23, respectively.

Exhibit 1-24 presents the frequency and percents for the variable mode of egress. The observation for mode of egress is similar to that for mode of access. That is, most rail patrons indicated they walked or rode their bike to their destination after exiting MARTA. This is followed by either driving a car or being dropped off by someone.

1.3.8 Origin and Destination Analysis

Rail trip length by income group is shown in Exhibit 1-25. The data in this exhibit addresses Research Objective 8A. The accuracy analysis for this data is included in the exhibit and is calculated at the 95% confidence interval, with patrons using rail as the analysis frame.

Research Objective 8B, patrons by line and income group, is addressed in Exhibit 1-26. Caution should be used in analyzing these data, since transferring passengers are counted twice, once on their "from line" and again on their "to line".

1.3.9 Elderly and Handicapped Analysis

Research Objective 9 relates to elderly and handicapped patrons. Specifically, the requirements are to provide the proportion of elderly and handicapped riders to total system patrons and as a percentage of cash fares. The statistics are provided below, and are derived from Exhibit 1-5.

<u>Day Type</u>	<u>E&H Patrons</u>	<u>System Patrons</u>	<u>%</u>	<u>Cash Patrons</u>	<u>%</u>
Weekday	4,077	246,016	1.66	80,224	5.08
Saturday	2,591	145,014	1.79	55,376	4.68
Sunday	456	68,070	0.67	30,673	1.49

The resulting accuracy of the worst case proportion (.5) at the 95% confidence interval is shown below. The analysis frame for these statistics is system-wide.

1

<u>Day Type</u>	<u>Accuracy</u>
Weekday	± 1.21%
Saturday	± 2.63%
Sunday	± 3.00%

1.3.10 TransCard Analysis

The ratios from the Transcard analyses are provided below. These were derived from Exhibits 1-27 and 1-28. These data correspond to Research Objective 10.

10A.	<u>Day Type</u>	<u>TransCard Initial Bus Boardings</u>	<u>Cash-fare Initial Bus Boardings</u>	<u>Ratio</u>
	Weekday	62,880	50,173	1.2533
	Saturday	37,353	34,617	1.0790
	Sunday	14,821	19,376	.7649

10B.	<u>Day Type</u>	<u>Cash-fare Bus-to Bus Transfers</u>	<u>Cash-fare Initial Bus Boardings</u>	<u>Ratio</u>
	Weekday	5,226	50,173	.1042
	Saturday	4,895	34,617	.1414
	Sunday	2,963	19,376	.1529

10C.	<u>Day Type</u>	<u>TransCard Bus-to Bus Transfers</u>	<u>TransCard Initial Bus Boardings</u>	<u>Ratio</u>
	Weekday	8,905	62,880	.1416
	Saturday	3,688	37,353	.0987
	Sunday	3,478	14,821	.2347

The resulting accuracy for these various statistics is presented below. The analysis frame for this is initial bus users.

<u>Day Type</u>	<u>Accuracy</u>
Weekday	± 1.82%
Saturday	± 4.08%
Sunday	± 4.86%

Research Objective 10D relates to rail data, as opposed to the bus. The ratio of Transcard initial rail boardings to total rail Transcard Entries is shown below.

10D. <u>Day Type</u>	<u>TransCard Initial Rail Boardings</u>	<u>Total Rail Trans-Card Entries</u>	<u>Ratio</u>
Weekday	43,644	85,645	.5096
Saturday	19,262	37,592	.5124
Sunday	7,893	13,921	.5670

The resulting accuracy for this analysis is presented below. The analysis frame for this is total rail users.

<u>Day Type</u>	<u>Accuracy</u>
Weekday	± 1.23%
Saturday	± 2.70%
Sunday	± 3.04%

1.3.11 Free Intermodal Pass-Thru Analysis

Exhibit 1-29 provides a complete analysis of passenger movements from and to free intermodal buses. Data contained in this exhibit responds to Research Objectives 11A through 11C.

Much of the data for Exhibit 1-29 came from Exhibit 1-30. In addition, while not specifically called for by any Research Objective, Exhibit 1-30 describes movements through other rail stations (i.e., not free intermodal stations), non-rail station places and all places combined.

EXHIBIT 1-5
TYPE OF FARE PAID

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
TOKEN	1	52062	21.2	21.2	21.2
WEEKLY TCARD	2	76282	31.0	31.1	52.3
MONTHLY TCARD	3	30241	12.3	12.3	64.6
E-H PASS	4	4077	1.7	1.7	66.2
CASH	5	80224	32.6	32.7	98.9
COBB CO XFER	6	780	.3	.3	99.2
OTHER	7	1947	.8	.8	100.0
	.	404	.2	Missing	
Total		246016	100.0	100.0	

Valid cases 245612

Missing cases 404

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
TOKEN	1	28337	19.5	19.5	19.5
WEEKLY TCARD	2	49311	34.0	34.0	53.5
MONTHLY TCARD	3	7303	5.0	5.0	58.6
E-H PASS	4	2591	1.8	1.8	60.4
CASH	5	55376	38.2	38.2	98.6
COBB CO XFER	6	719	.5	.5	99.1
OTHER	7	1377	.9	.9	100.0
Total		145014	100.0	100.0	

Valid cases 145014

Missing cases 0

SUNDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
TOKEN	1	13588	20.0	20.0	20.0
WEEKLY TCARD	2	15446	22.7	22.7	42.7
MONTHLY TCARD	3	7268	10.7	10.7	53.3
E-H PASS	4	456	.7	.7	54.0
CASH	5	30673	45.1	45.1	99.1
OTHER	7	639	.9	.9	100.0
Total		68070	100.0	100.0	

Valid cases 68070

Missing cases 0

EXHIBIT 1-6
COMBINED TRIP PURPOSE

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WORK	1.00	156591	63.7	63.7	63.7
SHOPPING	3.00	13270	5.4	5.4	69.0
MEAL	4.00	2014	.8	.8	69.9
MEDICAL	5.00	3653	1.5	1.5	71.4
COLLEGE	6.00	26538	10.8	10.8	82.1
PERSONAL	7.00	32976	13.4	13.4	95.5
OTHER SCHOOL	8.00	10952	4.5	4.5	100.0
OTHER	9.00	5	.0	.0	100.0
	.	18	.0	Missing	
		-----	-----	-----	
Total		246016	100.0	100.0	

Valid cases 245998

Missing cases 18

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WORK	1.00	67962	46.9	46.9	46.9
HOME	2.00	92	.1	.1	46.9
SHOPPING	3.00	32905	22.7	22.7	69.6
MEAL	4.00	1643	1.1	1.1	70.8
MEDICAL	5.00	728	.5	.5	71.3
COLLEGE	6.00	4027	2.8	2.8	74.1
PERSONAL	7.00	36372	25.1	25.1	99.1
OTHER SCHOOL	8.00	1238	.9	.9	100.0
	.	47	.0	Missing	
		-----	-----	-----	
Total		145014	100.0	100.0	

Valid cases 144966

Missing cases 47

SUNDAY RESPONSES

	Value	Frequency	Percent	Valid Percent	Cum Percent
WORK	1.00	26270	38.6	38.6	38.6
SHOPPING	3.00	6207	9.1	9.1	47.7
MEAL	4.00	3842	5.6	5.6	53.4
MEDICAL	5.00	600	.9	.9	54.2
COLLEGE	6.00	1809	2.7	2.7	56.9
PERSONAL	7.00	28592	42.0	42.0	98.9
OTHER SCHOOL	8.00	750	1.1	1.1	100.0
		-----	-----	-----	
Total		68070	100.0	100.0	

Valid cases 68070

Missing cases 0

EXHIBIT 1-7
FREQUENCY OF RIDING MARTA

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
1 DAY - WEEK	1	7455	3.0	3.2	3.2
2 DAYS - WEEK	2	9295	3.8	3.9	7.1
3 DAYS - WEEK	3	8619	3.5	3.7	10.8
4 DAYS - WEEK	4	12775	5.2	5.4	16.2
5 DAYS - WEEK	5	119697	48.7	50.8	67.0
6 DAYS - WEEK	6	28141	11.4	11.9	78.9
7 DAYS - WEEK	7	23794	9.7	10.1	89.0
NOT EVRY WEEK	8	25915	10.5	11.0	100.0
	.	10326	4.2	Missing	
<hr/>					
Total		246016	100.0	100.0	

Valid cases 235690

Missing cases 10326

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
1 DAY - WEEK	1	9651	6.7	7.1	7.1
2 DAYS - WEEK	2	5555	3.8	4.1	11.1
3 DAYS - WEEK	3	4939	3.4	3.6	14.8
4 DAYS - WEEK	4	5314	3.7	3.9	18.6
5 DAYS - WEEK	5	35161	24.2	25.8	44.4
6 DAYS - WEEK	6	25238	17.4	18.5	62.9
7 DAYS - WEEK	7	18170	12.5	13.3	76.2
NOT EVRY WEEK	8	32489	22.4	23.8	100.0
	.	8497	5.9	Missing	
<hr/>					
Total		145014	100.0	100.0	

Valid cases 136516

Missing cases 8497

SUNDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
1 DAY - WEEK	1	5877	8.6	8.9	8.9
2 DAYS - WEEK	2	5552	8.2	8.4	17.3
3 DAYS - WEEK	3	2939	4.3	4.5	21.8
4 DAYS - WEEK	4	3812	5.6	5.8	27.6
5 DAYS - WEEK	5	10007	14.7	15.2	42.8
6 DAYS - WEEK	6	8965	13.2	13.6	56.4
7 DAYS - WEEK	7	13666	20.1	20.7	77.1
NOT EVRY WEEK	8	15094	22.2	22.9	100.0
	.	2159	3.2	Missing	
<hr/>					
Total		68070	100.0	100.0	

Valid cases 65911

Missing cases 2159

**EXHIBIT 1-8
HOUSEHOLD SIZE**

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
1-3 PERSONS	1	155262	63.1	66.4	66.4
4-6 PERSONS	2	68354	27.8	29.2	95.6
7-9 PERSONS	3	7935	3.2	3.4	99.0
10 PERSONS OR MORE	4	2337	1.0	1.0	100.0
	.	12127	4.9	Missing	
		-----	-----	-----	
Total		246016	100.0	100.0	

Valid cases 233889

Missing cases 12127

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
1-3 PERSONS	1	88048	60.7	65.3	65.3
4-6 PERSONS	2	41436	28.6	30.7	96.0
7-9 PERSONS	3	4616	3.2	3.4	99.4
10 PERSONS OR MORE	4	760	.5	.6	100.0
	.	10153	7.0	Missing	
		-----	-----	-----	
Total		145014	100.0	100.0	

Valid cases 134860

Missing cases 10153

SUNDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
1-3 PERSONS	1	39334	57.8	61.2	61.2
4-6 PERSONS	2	20135	29.6	31.3	92.5
7-9 PERSONS	3	4499	6.6	7.0	99.5
10 PERSONS OR MORE	4	344	.5	.5	100.0
	.	3758	5.5	Missing	
		-----	-----	-----	
Total		68070	100.0	100.0	

Valid cases 64312

Missing cases 3758

**EXHIBIT 1-9
AVAILABLE AUTOS**

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
NONE	1	83105	33.8	33.8	33.8
ONE	2	75769	30.8	30.8	64.6
TWO	3	56515	23.0	23.0	87.6
THREE	4	21001	8.5	8.5	96.1
FOUR OR MORE	5	9626	3.9	3.9	100.0
		-----	-----	-----	
	Total	246016	100.0	100.0	

Valid cases 246016

Missing cases 0

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
NONE	1	48076	33.2	33.2	33.2
ONE	2	48843	33.7	33.7	66.8
TWO	3	32358	22.3	22.3	89.1
THREE	4	11251	7.8	7.8	96.9
FOUR OR MORE	5	4486	3.1	3.1	100.0
		-----	-----	-----	
	Total	145014	100.0	100.0	

Valid cases 145014

Missing cases 0

SUNDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
NONE	1	27927	41.0	41.0	41.0
ONE	2	19522	28.7	28.7	69.7
TWO	3	13835	20.3	20.3	90.1
THREE	4	4298	6.3	6.3	96.4
FOUR OR MORE	5	2466	3.6	3.6	100.0
	.	23	.0	Missing	
		-----	-----	-----	
	Total	68070	100.0	100.0	

Valid cases 68047

Missing cases 23

EXHIBIT 1-10
ALTERNATIVE MODE W/O MARTA

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
COULDN'T GO	1	103374	42.0	43.4	43.4
WOULD DRIVE	2	90609	36.8	38.1	81.5
RODE WITH SOMEONE	3	44011	17.9	18.5	100.0
	.	8022	3.3	Missing	
		-----	-----	-----	
Total		246016	100.0	100.0	

Valid cases 237994

Missing cases 8022

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
COULDN'T GO	1	55053	38.0	40.5	40.5
WOULD DRIVE	2	49601	34.2	36.5	77.0
RODE WITH SOMEONE	3	31221	21.5	23.0	100.0
	.	9138	6.3	Missing	
		-----	-----	-----	
Total		145014	100.0	100.0	

Valid cases 135876

Missing cases 9138

SUNDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
COULDN'T GO	1	30760	45.2	47.5	47.5
WOULD DRIVE	2	22653	33.3	35.0	82.5
RODE WITH SOMEONE	3	11354	16.7	17.5	100.0
	.	3303	4.9	Missing	
		-----	-----	-----	
Total		68070	100.0	100.0	

Valid cases 64767

Missing cases 3303

1

EXHIBIT 1-11

GENDER

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
MALE	1	125248	50.9	52.7	52.7
FEMALE	2	112371	45.7	47.3	100.0
	.	8397	3.4	Missing	
		-----	-----	-----	
	Total	246016	100.0	100.0	

Valid cases 237619

Missing cases 8397

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
MALE	1	75038	51.7	54.2	54.2
FEMALE	2	63436	43.7	45.8	100.0
	.	6540	4.5	Missing	
		-----	-----	-----	
	Total	145014	100.0	100.0	

Valid cases 138474

Missing cases 6540

SUNDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
MALE	1	37896	55.7	59.1	59.1
FEMALE	2	26257	38.6	40.9	100.0
	.	3917	5.8	Missing	
		-----	-----	-----	
	Total	68070	100.0	100.0	

Valid cases 64153

Missing cases 3917

1.

EXHIBIT 1-12

RACE

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
BLACK	1	159349	64.8	69.6	69.6
WHITE	2	62611	25.4	27.4	97.0
HISPANIC	3	1819	.7	.8	97.8
ASIAN	4	1764	.7	.8	98.6
OTHER	5	3304	1.3	1.4	100.0
	.	17169	7.0	Missing	
		-----	-----	-----	
Total		246016	100.0	100.0	

Valid cases 228847

Missing cases 17169

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
BLACK	1	88663	61.1	68.7	68.7
WHITE	2	37628	25.9	29.2	97.9
HISPANIC	3	904	.6	.7	98.6
ASIAN	4	1280	.9	1.0	99.5
OTHER	5	586	.4	.5	100.0
	.	15954	11.0	Missing	
		-----	-----	-----	
Total		145014	100.0	100.0	

Valid cases 129060

Missing cases 15954

SUNDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
BLACK	1	40963	60.2	65.5	65.5
WHITE	2	19543	28.7	31.3	96.8
HISPANIC	3	948	1.4	1.5	98.3
ASIAN	4	587	.9	.9	99.3
OTHER	5	461	.7	.7	100.0
	.	5569	8.2	Missing	
		-----	-----	-----	
Total		68070	100.0	100.0	

Valid cases 62501

Missing cases 5569

EXHIBIT 1-13

AGE

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
UNDER 16	1	6761	2.7	2.8	2.8
16-24	2	75423	30.7	31.7	34.6
25-39	3	106914	43.5	45.0	79.6
40-59	4	41759	17.0	17.6	97.1
60-64	5	3403	1.4	1.4	98.6
65 OR OVER	6	3415	1.4	1.4	100.0
	.	8340	3.4	Missing	
		-----	-----	-----	
Total		246016	100.0	100.0	

Valid cases 237676

Missing cases 8340

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
UNDER 16	1	6374	4.4	4.7	4.7
16-24	2	41552	28.7	30.3	35.0
25-39	3	57273	39.5	41.8	76.8
40-59	4	24206	16.7	17.7	94.5
60-64	5	3593	2.5	2.6	97.1
65 OR OVER	6	3949	2.7	2.9	100.0
	.	8066	5.6	Missing	
		-----	-----	-----	
Total		145014	100.0	100.0	

Valid cases 136948

Missing cases 8066

SUNDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
UNDER 16	1	2319	3.4	3.6	3.6
16-24	2	23329	34.3	35.8	39.3
25-39	3	26056	38.3	39.9	79.2
40-59	4	12319	18.1	18.9	98.1
60-64	5	579	.9	.9	99.0
65 OR OVER	6	650	1.0	1.0	100.0
	.	2818	4.1	Missing	
		-----	-----	-----	
Total		68070	100.0	100.0	

Valid cases 65252

Missing cases 2818

EXHIBIT 1-14
INCOME

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
< \$5000	1	21024	8.5	9.6	9.6
\$5000-9999	2	16879	6.9	7.7	17.3
\$10,000-14,999	3	25595	10.4	11.7	29.0
\$15,000-24,999	4	49829	20.3	22.8	51.8
\$25,000-34,999	5	41888	17.0	19.2	71.0
\$35,000 OR MORE	6	63374	25.8	29.0	100.0
	.	27428	11.1	Missing	
		-----	-----	-----	
Total		246016	100.0	100.0	

Valid cases 218588

Missing cases 27428

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
< \$5000	1	10616	7.3	8.3	8.3
\$5000-9999	2	13921	9.6	10.9	19.2
\$10,000-14,999	3	20823	14.4	16.3	35.5
\$15,000-24,999	4	21012	14.5	16.5	52.0
\$25,000-34,999	5	23202	16.0	18.2	70.1
\$35,000 OR MORE	6	38139	26.3	29.9	100.0
	.	17302	11.9	Missing	
		-----	-----	-----	
Total		145014	100.0	100.0	

Valid cases 127712

Missing cases 17302

SUNDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
< \$5000	1	5590	8.2	9.2	9.2
\$5000-9999	2	7842	11.5	12.9	22.1
\$10,000-14,999	3	9231	13.6	15.2	37.3
\$15,000-24,999	4	14828	21.8	24.4	61.7
\$25,000-34,999	5	9389	13.8	15.5	77.2
\$35,000 OR MORE	6	13851	20.3	22.8	100.0
	.	7339	10.8	Missing	
		-----	-----	-----	
Total		68070	100.0	100.0	

Valid cases 60731

Missing cases 7339

EXHIBIT 1-15
TIME USING MARTA

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
UNDER 1 MONTH	1	15452	6.3	6.6	6.6
1-6 MONTHS	2	40362	16.4	17.1	23.7
7-12 MONTHS	3	18980	7.7	8.1	31.7
OVER 12 MONTHS	4	160956	65.4	68.3	100.0
	.	10266	4.2	Missing	
		-----	-----	-----	
Total		246016	100.0	100.0	

Valid cases 235750

Missing cases 10266

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
UNDER 1 MONTH	1	9167	6.3	6.6	6.6
1-6 MONTHS	2	14379	9.9	10.4	17.0
7-12 MONTHS	3	10185	7.0	7.4	24.4
OVER 12 MONTHS	4	104523	72.1	75.6	100.0
	.	6760	4.7	Missing	
		-----	-----	-----	
Total		145014	100.0	100.0	

Valid cases 138254

Missing cases 6760

SUNDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
UNDER 1 MONTH	1	6376	9.4	9.8	9.8
1-6 MONTHS	2	7363	10.8	11.4	21.2
7-12 MONTHS	3	5179	7.6	8.0	29.2
OVER 12 MONTHS	4	45955	67.5	70.8	100.0
	.	3197	4.7	Missing	
		-----	-----	-----	
Total		68070	100.0	100.0	

Valid cases 64873

Missing cases 3197

**EXHIBIT 1-16
MODE OF ACCESS**

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WALKED-BIKED	1	199614	81.1	81.4	81.4
AUTO PASSNGR-PARKED	2	4078	1.7	1.7	83.0
DROVE	3	21437	8.7	8.7	91.8
TAXI	4	673	.3	.3	92.0
DROPPED OFF	5	19523	7.9	8.0	100.0
	.	690	.3	Missing	
		-----	-----	-----	
Total		246016	100.0	100.0	

Valid cases 245326

Missing cases 690

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WALKED-BIKED	1	114900	79.2	79.2	79.2
AUTO PASSNGR-PARKED	2	2590	1.8	1.8	81.0
DROVE	3	16045	11.1	11.1	92.1
TAXI	4	416	.3	.3	92.4
DROPPED OFF	5	11062	7.6	7.6	100.0
		-----	-----	-----	
Total		145014	100.0	100.0	

Valid cases 145014

Missing cases 0

SUNDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WALKED-BIKED	1	53265	78.2	78.3	78.3
AUTO PASSNGR-PARKED	2	1512	2.2	2.2	80.6
DROVE	3	4217	6.2	6.2	86.8
TAXI	4	1912	2.8	2.8	89.6
DROPPED OFF	5	7090	10.4	10.4	100.0
	1	74	.1	Missing	
		-----	-----	-----	
Total		68070	100.0	100.0	

Valid cases 67996

Missing cases 74

EXHIBIT 1-17
MODE OF EGRESS

WEEKDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WALK-BIKE	1	192842	78.4	79.0	79.0
AUTO PASSNGR-PARKED	2	3305	1.3	1.4	80.3
DRIVE	3	23113	9.4	9.5	89.8
TAXI	4	1332	.5	.5	90.3
PICKED UP	5	23606	9.6	9.7	100.0
	.	1819	.7	Missing	
		-----	-----	-----	
Total		246016	100.0	100.0	

Valid cases 244197

Missing cases 1819

SATURDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WALK-BIKE	1	122581	84.5	84.9	84.9
AUTO PASSNGR-PARKED	2	2854	2.0	2.0	86.8
DRIVE	3	7015	4.8	4.9	91.7
TAXI	4	1064	.7	.7	92.4
PICKED UP	5	10914	7.5	7.6	100.0
	.	586	.4	Missing	
		-----	-----	-----	
Total		145014	100.0	100.0	

Valid cases 144428

Missing cases 586

SUNDAY Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WALK-BIKE	1	54559	80.2	80.6	80.6
AUTO PASSNGR-PARKED	2	1252	1.8	1.8	82.5
DRIVE	3	4795	7.0	7.1	89.6
TAXI	4	559	.8	.8	90.4
PICKED UP	5	6505	9.6	9.6	100.0
	.	400	.6	Missing	
		-----	-----	-----	
Total		68070	100.0	100.0	

Valid cases 67670

Missing cases 400

EXHIBIT 1-18
FARE MEDIA OF OUTSIDE TRANSFERS

WEEKDAY

Media Used	----- Outside Transfers -----			Initial	Faregate
	Rail-Bus	Bus-Bus	Bus-Rail	Bus Boardings	
Token	4522	141	3801	13616	42694
Weekly TC	13092	4872	14424	49476	42243
Monthly TC	2157	2069	2715	13404	19670
E/H Pass	886	714	862	2617	2322
Cash	10459	4415	11695	50173	42284
Cobb Xfr	0	513	0	587	193
Other	69	182	105	940	1112
Unknown	39	0	74	209	269
Totals	31225	12906	33675	131019	150786

SATURDAY

Media Used	----- Outside Transfers -----			Initial	Faregate
	Rail-Bus	Bus-Bus	Bus-Rail	Bus Boardings	
Token	1860	501	2174	7627	22885
Weekly TC	10425	2106	7064	32567	28537
Monthly TC	1032	281	1582	4786	4100
E/H Pass	346	0	293	1976	907
Cash	4495	3700	10091	34617	35063
Cobb Xfr	0	57	0	719	0
Other	253	206	367	1275	469
Unknown	0	0	0	0	0
Totals	18412	6851	21571	83567	91961

SUNDAY

Media Used	----- Outside Transfers -----			Initial	Faregate
	Rail-Bus	Bus-Bus	Bus-Rail	Bus Boardings	
Token	848	0	623	2286	11925
Weekly TC	2215	729	2284	9903	8477
Monthly TC	158	1671	855	4918	3204
E/H Pass	27	0	47	112	391
Cash	3271	1753	3116	19376	14969
Cobb Xfr	0	0	0	0	0
Other	0	0	30	589	80
Unknown	0	0	0	0	0
Totals	6519	4153	6953	37184	39046

EXHIBIT 1-19
COMBINED TRIP PURPOSE

WEEKDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WORK	1.00	127759	64.3	64.3	64.3
SHOPPING	3.00	9614	4.8	4.8	69.2
MEAL	4.00	1717	.9	.9	70.0
MEDICAL	5.00	2600	1.3	1.3	71.3
COLLEGE	6.00	21650	10.9	10.9	82.3
PERSONAL	7.00	28143	14.2	14.2	96.4
OTHER SCHOOL	8.00	7101	3.6	3.6	100.0
OTHER	9.00	5	.0	.0	100.0
	.	18	.0	Missing	
		-----	-----	-----	
Total		198606	100.0	100.0	

Valid cases 198588

Missing cases 18

SATURDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WORK	1.00	45653	45.3	45.4	45.4
HOME	2.00	92	.1	.1	45.5
SHOPPING	3.00	15847	15.7	15.7	61.2
MEAL	4.00	1643	1.6	1.6	62.8
MEDICAL	5.00	728	.7	.7	63.6
COLLEGE	6.00	3131	3.1	3.1	66.7
PERSONAL	7.00	32717	32.5	32.5	99.2
OTHER SCHOOL	8.00	812	.8	.8	100.0
	.	47	.0	Missing	
		-----	-----	-----	
Total		100671	100.0	100.0	

Valid cases 100624

Missing cases 47

SUNDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WORK	1.00	18103	38.2	38.2	38.2
SHOPPING	3.00	4433	9.4	9.4	47.6
MEAL	4.00	932	2.0	2.0	49.6
MEDICAL	5.00	600	1.3	1.3	50.8
COLLEGE	6.00	1055	2.2	2.2	53.1
PERSONAL	7.00	21469	45.3	45.3	98.4
OTHER SCHOOL	8.00	750	1.6	1.6	100.0
		-----	-----	-----	
Total		47343	100.0	100.0	

Valid cases 47343

Missing cases 0

EXHIBIT B-1
FINAL FACTORED SHORT RESPONSE RECORD FORMAT

=> Station Codes

01	CH	CHAMBLEE	Chamblee
02	BR	BROOKHAVEN	Brookhaven
03	LE	LENOX	Lenox
04	LI	LINDBERGH CENTER	Lindbergh Center
05	AR	ARTS CENTER	Arts Center
06	MI	MIDTOWN	Midtown
07	NO	NORTH AVENUE	North Avenue
08	CI	CIVIC CENTER	Civic Center
09	PE	PEACHTREE CENTER	Peachtree Center
10	GA	GARNETT	Garnett
11	WE	WEST END	West End
12	OA	OAKLAND CITY	Oakland City
13	LA	LAKEWOOD/FORT MCPHERSON	Lakewood/Fort McPherson
14	EP	EAST POINT	East Point
15	CO	COLLEGE PARK	College Park
16	AI	AIRPORT	Airport
17	FI	FIVE POINTS	Five Points
18	HI	HIGHTOWER	Hightower
19	WL	WEST LAKE	West Lake
20	AS	ASHBY	Ashby
21	VI	VINE CITY	Vine City
22	OM	OMNI	Omni
23	GE	GEORGIA STATE	Georgia State
24	KI	KING MEMORIAL	King Memorial
25	IN	INMAN PARK/REYNOLDSTOWN	Inman Park/Reynoldstown
26	ED	EDGEWOOD/CANDLER PARK	Edgewood/Candler Park
27	EL	EAST LAKE	East Lake
28	DE	DECATUR	Decatur
29	AV	AVONDALE	Avondale
00	No rail entry or exit or beyond scope of travel pattern		
99	Off-rail board or alight point (used only in travel pattern)		

=> Time Period Codes

Weekday:	Weekend:
1 AM Peak	1 Daytime (Weekday 2+3)
2 Midday	2 Other (Weekday 1+4)
3 PM Peak	
4 Other	

=> Line Codes

Rail:	Weekday Bus:	Weekend Bus:
01 North	01 NE - East	07 SW - West
02 South	02 NE - North	08 SW - South
03 East	03 NW - West	09 NE - Local
04 West	04 NW - North	10 NW - Local
	05 SE - East	11 SE - Local
	06 SE - South	12 SW - Local
		09 NE - All
		10 NW - All
		11 SE - All
		12 SW - All

=> Bus Route Codes

0 - bus not used
Marta Bus - Route Number
Cobb Co Bus - Route Number + 500

EXHIBIT B-2
GEOCODED ADDRESS RECORD FORMAT

Columns	Format	Description	
1-5	I5	Source Response Serial Number	
6-6	I1	Source Response Address Number (1-9)	
7-7	I1	Address Type (1-4)	
8-55	A48	Address (see below)	
56-57	A2	Quadrant	
58-67	A10	City/Town/Village Name	
68-72	I5	Zip Code	
73-77	I5	1st Census Tract	> G
78-80	I3	" " Block	> E
81-85	I5	2nd Census Tract	> O
86-88	I3	" " Block	> C
89-93	I5	3rd Census Tract	> O
94-96	I3	" " Block	> D
97-101	I5	4th Census Tract	> E
102-104	I3	" " Block	> S

Address Formats:

=> Address Type 1 - Intersection

Columns	Format	Description
8-27	A20	On Street Name
28-31	A4	" " Type
32-51	A20	At Street Name
52-55	A4	" " Type

=> Address Type 2 - Street Address

Columns	Format	Description
8-13	A6	House Number
14-17	A4	House Number Suffix
18-41	A24	On Street Name
42-45	A4	" " Type
46-55	A10	Apartment/Unit ID

=> Address Type 3 - Landmark

Columns	Format	Description
8-55	A48	Landmark Name
		Note: Landmark "OOT" is used for addresses outside the Atlanta Area. When geocoded, this landmark is associated with 1st tract 99999 and 1st block 999

=> Address Type 4 - MARTA Station

Columns	Format	Description
8-9	A2	Two Character Station Code
10-55	A46	blank

EXHIBIT 1-20
INCOME

WEEKDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
< \$5000	1	17223	8.7	9.8	9.8
\$5000-9999	2	12709	6.4	7.2	17.0
\$10,000-14,999	3	20169	10.2	11.5	28.5
\$15,000-24,999	4	37436	18.8	21.3	49.7
\$25,000-34,999	5	31604	15.9	18.0	67.7
\$35,000 OR MORE	6	56820	28.6	32.3	100.0
	.	22644	11.4	Missing	
		-----	-----	-----	
	Total	198606	100.0	100.0	

Valid cases 175962

Missing cases 22644

SATURDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
< \$5000	1	5086	5.1	5.7	5.7
\$5000-9999	2	10210	10.1	11.5	17.2
\$10,000-14,999	3	8643	8.6	9.7	27.0
\$15,000-24,999	4	16380	16.3	18.4	45.4
\$25,000-34,999	5	18184	18.1	20.5	65.9
\$35,000 OR MORE	6	30302	30.1	34.1	100.0
	.	11866	11.8	Missing	
		-----	-----	-----	
	Total	100671	100.0	100.0	

Valid cases 88805

Missing cases 11866

SUNDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
< \$5000	1	3699	7.8	8.9	8.9
\$5000-9999	2	3569	7.5	8.6	17.5
\$10,000-14,999	3	6852	14.5	16.5	34.0
\$15,000-24,999	4	6833	14.4	16.4	50.4
\$25,000-34,999	5	6756	14.3	16.3	66.7
\$35,000 OR MORE	6	13851	29.3	33.3	100.0
	.	5782	12.2	Missing	
		-----	-----	-----	
	Total	47343	100.0	100.0	

Valid cases 41561

Missing cases 5782

EXHIBIT 1-21
MODE OF ACCESS

WEEKDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WALKED-BIKED	1	156214	78.7	78.9	78.9
AUTO PASSNGR-PARKED	2	3087	1.6	1.6	80.5
DROVE	3	21437	10.8	10.8	91.3
TAXI	4	673	.3	.3	91.7
DROPPED OFF	5	16504	8.3	8.3	100.0
	.	690	.3	Missing	
		-----	-----	-----	
	Total	198606	100.0	100.0	
Valid cases	197916	Missing cases	690		

SATURDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WALKED-BIKED	1	78942	78.4	78.4	78.4
AUTO PASSNGR-PARKED	2	2590	2.6	2.6	81.0
DROVE	3	12112	12.0	12.0	93.0
TAXI	4	416	.4	.4	93.4
DROPPED OFF	5	6612	6.6	6.6	100.0
		-----	-----	-----	
	Total	100671	100.0	100.0	
Valid cases	100671	Missing cases	0		

SUNDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WALKED-BIKED	1	34756	73.4	73.5	73.5
AUTO PASSNGR-PARKED	2	1512	3.2	3.2	76.7
DROVE	3	3223	6.8	6.8	83.5
TAXI	4	851	1.8	1.8	85.3
DROPPED OFF	5	6926	14.6	14.7	100.0
	.	74	.2	Missing	
		-----	-----	-----	
	Total	47343	100.0	100.0	
Valid cases	47269	Missing cases	74		

EXHIBIT 1-22
RAIL STATION OF ENTRY

WEEKDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
CHAMBLEE	1	11207	5.6	5.6	5.6
BROOKHAVEN	2	4577	2.3	2.3	7.9
LENOX	3	12305	6.2	6.2	14.1
LINDBERGH CENTER	4	10584	5.3	5.3	19.5
ARTS CENTER	5	6922	3.5	3.5	23.0
MIDTOWN	6	3287	1.7	1.7	24.6
NORTH AVENUE	7	7533	3.8	3.8	28.4
CIVIC CENTER	8	1647	.8	.8	29.2
PEACHTREE CENTER	9	10103	5.1	5.1	34.3
GARNETT	10	1758	.9	.9	35.2
WEST END	11	8134	4.1	4.1	39.3
OAKLAND CITY	12	5400	2.7	2.7	42.0
LAKEWOOD	13	6099	3.1	3.1	45.1
EAST POINT	14	5738	2.9	2.9	48.0
COLLEGE PARK	15	7260	3.7	3.7	51.6
AIRPORT	16	4531	2.3	2.3	53.9
FIVE POINTS	17	35261	17.8	17.8	71.7
HIGHTOWER	18	11631	5.9	5.9	77.5
WEST LAKE	19	4837	2.4	2.4	80.0
ASHBY	20	3118	1.6	1.6	81.5
VINE CITY	21	1344	.7	.7	82.2
OMNI	22	3852	1.9	1.9	84.1
GEORGIA STATE	23	5421	2.7	2.7	86.9
KING MEMORIAL	24	1511	.8	.8	87.6
INMAN PARK	25	1748	.9	.9	88.5
EDGEWOOD-CANDLER	26	2257	1.1	1.1	89.7
EAST LAKE	27	2793	1.4	1.4	91.1
DECATUR	28	7999	4.0	4.0	95.1
AVONDALE	29	9750	4.9	4.9	100.0
Total		198606	100.0	100.0	

Valid cases 198606

Missing cases 0

EXHIBIT 1-22
RAIL STATION OF ENTRY

SATURDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
CHAMBLEE	1	5338	5.3	5.3	5.3
BROOKHAVEN	2	2670	2.7	2.7	8.0
LENOX	3	6692	6.6	6.6	14.6
LINDBERGH CENTER	4	4261	4.2	4.2	18.8
ARTS CENTER	5	3528	3.5	3.5	22.3
MIDTOWN	6	1511	1.5	1.5	23.8
NORTH AVENUE	7	1400	1.4	1.4	25.2
CIVIC CENTER	8	352	.3	.3	25.6
PEACHTREE CENTER	9	6288	6.2	6.2	31.8
GARNETT	10	554	.6	.6	32.4
WEST END	11	4140	4.1	4.1	36.5
OAKLAND CITY	12	2301	2.3	2.3	38.8
LAKEWOOD	13	2525	2.5	2.5	41.3
EAST POINT	14	1069	1.1	1.1	42.3
COLLEGE PARK	15	2408	2.4	2.4	44.7
AIRPORT	16	4191	4.2	4.2	48.9
FIVE POINTS	17	19327	19.2	19.2	68.1
HIGHTOWER	18	6638	6.6	6.6	74.7
WEST LAKE	19	3587	3.6	3.6	78.3
ASHBY	20	1213	1.2	1.2	79.5
VINE CITY	21	1223	1.2	1.2	80.7
OMNI	22	3044	3.0	3.0	83.7
GEORGIA STATE	23	1139	1.1	1.1	84.8
KING MEMORIAL	24	508	.5	.5	85.3
INMAN PARK	25	972	1.0	1.0	86.3
EDGEWOOD-CANDLER	26	2072	2.1	2.1	88.4
EAST LAKE	27	1004	1.0	1.0	89.4
DECATUR	28	3066	3.0	3.0	92.4
AVONDALE	29	7650	7.6	7.6	100.0
Total		100671	100.0	100.0	

Valid cases 100671

Missing cases 0

EXHIBIT 1-22
RAIL STATION OF ENTRY

SUNDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
CHAMBLEE	1	2396	5.1	5.1	5.1
BROOKHAVEN	2	1323	2.8	2.8	7.9
LENOX	3	3532	7.5	7.5	15.3
LINDBERGH CENTER	4	1945	4.1	4.1	19.4
ARTS CENTER	5	1310	2.8	2.8	22.2
MIDTOWN	6	590	1.2	1.2	23.4
NORTH AVENUE	7	1762	3.7	3.7	27.2
CIVIC CENTER	8	178	.4	.4	27.5
PEACHTREE CENTER	9	2161	4.6	4.6	32.1
GARNETT	10	379	.8	.8	32.9
WEST END	11	1602	3.4	3.4	36.3
OAKLAND CITY	12	3383	7.1	7.1	43.4
LAKEWOOD	13	684	1.4	1.4	44.9
EAST POINT	14	721	1.5	1.5	46.4
COLLEGE PARK	15	1877	4.0	4.0	50.4
AIRPORT	16	5048	10.7	10.7	61.0
FIVE POINTS	17	5651	11.9	11.9	73.0
HIGHTOWER	18	2768	5.8	5.8	78.8
WEST LAKE	19	1497	3.2	3.2	82.0
ASHBY	20	2459	5.2	5.2	87.2
VINE CITY	21	241	.5	.5	87.7
OMNI	22	1286	2.7	2.7	90.4
GEORGIA STATE	23	553	1.2	1.2	91.6
KING MEMORIAL	24	698	1.5	1.5	93.0
INMAN PARK	25	260	.5	.5	93.6
EDGEWOOD-CANDLER	26	221	.5	.5	94.0
EAST LAKE	27	830	1.8	1.8	95.8
DECATUR	28	880	1.9	1.9	97.7
AVONDALE	29	1110	2.3	2.3	100.0
Total		47343	100.0	100.0	

Valid cases 47343

Missing cases 0

EXHIBIT 1-23
RAIL STATION ON EXIT

WEEKDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
CHAMBLEE	1	10469	5.3	5.3	5.3
BROOKHAVEN	2	4729	2.4	2.4	7.7
LENOX	3	11156	5.6	5.6	13.3
LINDBERGH CENTER	4	9902	5.0	5.0	18.3
ARTS CENTER	5	6675	3.4	3.4	21.6
MIDTOWN	6	2180	1.1	1.1	22.7
NORTH AVENUE	7	8659	4.4	4.4	27.1
CIVIC CENTER	8	2235	1.1	1.1	28.2
PEACHTREE CENTER	9	11019	5.5	5.5	33.7
GARNETT	10	750	.4	.4	34.1
WEST END	11	8319	4.2	4.2	38.3
OAKLAND CITY	12	3756	1.9	1.9	40.2
LAKEWOOD	13	5971	3.0	3.0	43.2
EAST POINT	14	7566	3.8	3.8	47.0
COLLEGE PARK	15	9537	4.8	4.8	51.8
AIRPORT	16	8899	4.5	4.5	56.3
FIVE POINTS	17	27852	14.0	14.0	70.3
HIGHTOWER	18	14172	7.1	7.1	77.5
WEST LAKE	19	2816	1.4	1.4	78.9
ASHBY	20	2992	1.5	1.5	80.4
VINE CITY	21	963	.5	.5	80.9
OMNI	22	2115	1.1	1.1	81.9
GEORGIA STATE	23	9313	4.7	4.7	86.6
KING MEMORIAL	24	311	.2	.2	86.8
INMAN PARK	25	647	.3	.3	87.1
EDGEWOOD-CANDLER	26	3244	1.6	1.6	88.7
EAST LAKE	27	3041	1.5	1.5	90.3
DECATUR	28	6943	3.5	3.5	93.8
AVONDALE	29	12375	6.2	6.2	100.0
		-----	-----	-----	
Total		198606	100.0	100.0	

Valid cases 198606

Missing cases 0

EXHIBIT 1-23
RAIL STATION ON EXIT

SATURDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
CHAMBLEE	1	4570	4.5	4.5	4.5
BROOKHAVEN	2	2071	2.1	2.1	6.6
LENOX	3	8099	8.0	8.0	14.6
LINDBERGH CENTER	4	4032	4.0	4.0	18.6
ARTS CENTER	5	4143	4.1	4.1	22.8
MIDTOWN	6	740	.7	.7	23.5
NORTH AVENUE	7	6090	6.0	6.0	29.5
CIVIC CENTER	8	246	.2	.2	29.8
PEACHTREE CENTER	9	6923	6.9	6.9	36.7
GARNETT	10	35	.0	.0	36.7
WEST END	11	4354	4.3	4.3	41.0
OAKLAND CITY	12	1084	1.1	1.1	42.1
LAKEWOOD	13	3494	3.5	3.5	45.6
EAST POINT	14	1636	1.6	1.6	47.2
COLLEGE PARK	15	3340	3.3	3.3	50.5
AIRPORT	16	4389	4.4	4.4	54.9
FIVE POINTS	17	19947	19.8	19.8	74.7
HIGHTOWER	18	5694	5.7	5.7	80.3
WEST LAKE	19	1586	1.6	1.6	81.9
ASHBY	20	373	.4	.4	82.3
VINE CITY	21	229	.2	.2	82.5
OMNI	22	3172	3.2	3.2	85.7
GEORGIA STATE	23	649	.6	.6	86.3
KING MEMORIAL	24	651	.6	.6	87.0
INMAN PARK	25	565	.6	.6	87.5
EDGEWOOD-CANDLER	26	1410	1.4	1.4	88.9
EAST LAKE	27	1081	1.1	1.1	90.0
DECATUR	28	2426	2.4	2.4	92.4
AVONDALE	29	7643	7.6	7.6	100.0
Total		100671	100.0	100.0	

Valid cases 100671

Missing cases 0

EXHIBIT 1-23
RAIL STATION ON EXIT

SUNDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
CHAMBLEE	1	1900	4.0	4.0	4.0
BROOKHAVEN	2	1279	2.7	2.7	6.7
LENOX	3	4665	9.9	9.9	16.6
LINDBERGH CENTER	4	2977	6.3	6.3	22.9
ARTS CENTER	5	1168	2.5	2.5	25.3
MIDTOWN	6	494	1.0	1.0	26.4
NORTH AVENUE	7	1544	3.3	3.3	29.6
CIVIC CENTER	8	230	.5	.5	30.1
PEACHTREE CENTER	9	3284	6.9	6.9	37.0
GARNETT	10	20	.0	.0	37.1
WEST END	11	3483	7.4	7.4	44.5
OAKLAND CITY	12	634	1.3	1.3	45.8
LAKEWOOD	13	859	1.8	1.8	47.6
EAST POINT	14	691	1.5	1.5	49.1
COLLEGE PARK	15	869	1.8	1.8	50.9
AIRPORT	16	4384	9.3	9.3	60.2
FIVE POINTS	17	8555	18.1	18.1	78.2
HIGHTOWER	18	2438	5.1	5.1	83.4
WEST LAKE	19	463	1.0	1.0	84.4
ASHBY	20	350	.7	.7	85.1
VINE CITY	21	603	1.3	1.3	86.4
OMNI	22	1127	2.4	2.4	88.8
GEORGIA STATE	23	322	.7	.7	89.4
KING MEMORIAL	24	92	.2	.2	89.6
INMAN PARK	25	637	1.3	1.3	91.0
EDGEWOOD-CANDLER	26	634	1.3	1.3	92.3
EAST LAKE	27	442	.9	.9	93.2
DECATUR	28	1451	3.1	3.1	96.3
AVONDALE	29	1748	3.7	3.7	100.0
Total		47343	100.0	100.0	
Valid cases	47343	Missing cases	0		

**EXHIBIT 1-24
MODE OF EGRESS**

WEEKDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WALK-BIKE	1	153070	77.1	77.6	77.6
AUTO PASSNGR-PARKED	2	3221	1.6	1.6	79.2
DRIVE	3	20616	10.4	10.4	89.7
TAXI	4	1332	.7	.7	90.3
PICKED UP	5	19048	9.6	9.7	100.0
	.	1319	.7	Missing	
		-----	-----	-----	
Total		198606	100.0	100.0	

Valid cases 197287

Missing cases 1319

SATURDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WALK-BIKE	1	81390	80.8	81.3	81.3
AUTO PASSNGR-PARKED	2	1703	1.7	1.7	83.0
DRIVE	3	6798	6.8	6.8	89.8
TAXI	4	1064	1.1	1.1	90.9
PICKED UP	5	9130	9.1	9.1	100.0
	.	586	.6	Missing	
		-----	-----	-----	
Total		100671	100.0	100.0	

Valid cases 100085

Missing cases 586

SUNDAY Rail Responses

	Value	Frequency	Percent	Valid Percent	Cum Percent
WALK-BIKE	1	36094	76.2	76.9	76.9
AUTO PASSNGR-PARKED	2	1252	2.6	2.7	79.6
DRIVE	3	4795	10.1	10.2	89.8
TAXI	4	559	1.2	1.2	91.0
PICKED UP	5	4243	9.0	9.0	100.0
	.	400	.8	Missing	
		-----	-----	-----	
Total		47343	100.0	100.0	

Valid cases 46943

Missing cases 400

EXHIBIT 1-25
RAIL TRIPS AND AVERAGE TRIP LENGTH
BY INCOME GROUP

WEEKDAY

Income Group	Trips	Average Length (miles)	Standard Error of the Mean	95% CI Accuracy
Less than \$5,000	17223	5.67	.1948	6.73%
\$5,000 - \$9,999	12709	6.07	.2087	6.74%
\$10,000 - \$14,999	20169	6.78	.1818	5.26%
\$15,000 - \$24,999	37436	6.86	.1299	3.71%
\$25,000 - \$34,999	31604	7.47	.1318	3.46%
\$35,000 or more	56820	7.90	.0987	2.45%
Unknown	22644	6.78	.1699	4.91%
All Rail Trips	198606	7.08	.0548	1.52%

SATURDAY

Income Group	Trips	Average Length (miles)	Standard Error of the Mean	95% CI Accuracy
Less than \$5,000	5086	6.15	.4669	14.88%
\$5,000 - \$9,999	10210	5.11	.4785	18.35%
\$10,000 - \$14,999	8643	6.15	.4269	13.61%
\$15,000 - \$24,999	16380	6.53	.3020	9.06%
\$25,000 - \$34,999	18184	6.81	.3667	10.55%
\$35,000 or more	30302	7.93	.2315	5.72%
Unknown	11866	6.59	.3691	10.98%
All Rail Trips	100671	6.81	.1311	3.78%

SUNDAY

Income Group	Trips	Average Length (miles)	Standard Error of the Mean	95% CI Accuracy
Less than \$5,000	3699	6.90	.4702	13.36%
\$5,000 - \$9,999	3569	6.36	.4400	13.56%
\$10,000 - \$14,999	6852	6.09	.4443	14.30%
\$15,000 - \$24,999	6833	7.01	.4108	11.49%
\$25,000 - \$34,999	6756	6.98	.4357	12.23%
\$35,000 or more	13851	9.34	.2879	6.04%
Unknown	5782	6.93	.4473	12.65%
All Rail Trips	47343	7.49	.1561	4.08%

EXHIBIT 1-26
RAIL TRIPS BY LINE AND INCOME GROUP

WEEKDAY

Income Group	Rail Line				All Lines
	North	South	East	West	
Less than \$5,000	6791	6265	4251	4136	21442
\$5,000 - \$9,999	5400	4083	2742	3278	15502
\$10,000 - \$14,999	7893	5674	5659	5774	24999
\$15,000 - \$24,999	18806	10984	9274	8829	47893
\$25,000 - \$34,999	15558	9725	9797	5202	40283
\$35,000 or more	32798	16381	16608	6830	72617
Unknown	9597	7432	5631	6697	29357
All Income Groups	96843	60544	53961	40746	252094

SATURDAY

Income Group	Rail Line				All Lines
	North	South	East	West	
Less than \$5,000	1916	1357	1111	1719	6103
\$5,000 - \$9,999	3990	2409	2376	4357	13132
\$10,000 - \$14,999	3006	3562	2639	1179	10386
\$15,000 - \$24,999	7336	6393	3574	3534	20837
\$25,000 - \$34,999	11430	2839	7228	2257	23755
\$35,000 or more	19094	6716	8316	5624	39749
Unknown	5042	4046	1966	3636	14689
All Income Groups	51814	27322	27208	22307	128651

SUNDAY

Income Group	Rail Line				All Lines
	North	South	East	West	
Less than \$5,000	1476	1449	808	1041	4775
\$5,000 - \$9,999	1751	683	412	1729	4574
\$10,000 - \$14,999	2132	3225	1079	1831	8268
\$15,000 - \$24,999	3138	2548	1595	1240	8521
\$25,000 - \$34,999	2905	2841	1113	1418	8277
\$35,000 or more	7218	4447	2652	2332	16749
Unknown	2267	2161	707	1531	6666
All Income Groups	20887	17455	8366	11120	57829

Note: Transferring Passengers are Counted Twice.

EXHIBIT 1-27
FARE MEDIA OF INITIAL BUS BOARDINGS AND BUS TRANSFERS

WEEKDAY

Fare Media	Initial Boardings	Bus-Bus Transfers
Token	13616	919
Weekly TC	49476	6194
Monthly TC	13404	2711
E/H Pass	2617	714
Cash	50173	5226
Cobb Xfr	587	513
Other	940	182
Unknown	209	0
Total	131019	16459

SATURDAY

Fare Media	Initial Boardings	Bus-Bus Transfers
Token	7627	2945
Weekly TC	32567	3407
Monthly TC	4786	281
E/H Pass	1976	880
Cash	34617	4895
Cobb Xfr	719	57
Other	1275	206
Unknown	0	0
Total	83567	12672

SUNDAY

Fare Media	Initial Boardings	Bus-Bus Transfers
Token	2286	0
Weekly TC	9903	1626
Monthly TC	4918	1852
E/H Pass	112	0
Cash	19376	2963
Cobb Xfr	0	0
Other	589	0
Unknown	0	0
Total	37184	6441

EXHIBIT 1-28
FARE MEDIA OF INITIAL AND TOTAL RAIL ENTRIES

WEEKDAY

Fare Media	Initial Entries	Total Entries
Token	38446	48079
Weekly TC	26806	61641
Monthly TC	16838	24004
E/H Pass	1460	3024
Cash	30051	59538
Cobb Xfr	193	431
Other	1007	1486
Unknown	195	404
Total	114997	198606

SATURDAY

Fare Media	Initial Entries	Total Entries
Token	20711	24925
Weekly TC	16744	32225
Monthly TC	2518	5367
E/H Pass	614	1001
Cash	20759	36405
Cobb Xfr	0	129
Other	102	618
Unknown	0	0
Total	61447	100671

SUNDAY

Fare Media	Initial Entries	Total Entries
Token	11302	13588
Weekly TC	5543	10093
Monthly TC	2350	3828
E/H Pass	344	456
Cash	11297	18739
Cobb Xfr	0	0
Other	50	639
Unknown	0	0
Total	30886	47343

EXHIBIT 1-29
FREE INTERMODAL (FIM) BUS MOVEMENTS

	WEEKDAY:		SATURDAY:		SUNDAY:	
Movement	Volume	% of Gross	Volume	% of Gross	Volume	% of Gross
Outbound to Bus	76	0.12%	303	1.16%	0	0.00%
Outbound to Area	5626	8.91%	2228	8.51%	226	1.69%
Ride-thrus	3257	5.16%	590	2.25%	1976	14.81%
To FIM Bus	4597	7.28%	5741	21.92%	1637	12.27%
To Rail	49563	78.52%	17324	66.16%	9504	71.23%
Gross FIM Bus Arrivals	63119		26186		13343	
Inbound from Bus	0	0.00%	234	0.63%	650	4.38%
Inbound from Area	2115	3.43%	8709	23.63%	556	3.74%
Ride-thrus	3257	5.28%	590	1.60%	1976	13.30%
From FIM Bus	4597	7.45%	5741	15.58%	1637	11.02%
From Rail	51726	83.84%	21579	58.55%	10033	67.55%
Gross FIM Bus Departures	61695		36853		14852	

EXHIBIT 1-30
TRANSFER ANALYSIS - WEEKDAY

AT FREE-INTERMODAL (FIM) RAIL STATIONS

From:	To:	Area	Rail	---FIM Bus---		-Outside Bus-		Total
				MARTA	Cobb	MARTA	Cobb	
Area		0	47391	2115	0	0	0	49505
Rail		48469	0	51726	493	3939	0	104627
FIM MARTA Bus		5626	49563	4597	0	76	0	59862
FIM Cobb Bus		0	371	0	0	0	0	371
Out MARTA Bus		0	2280	0	0	335	0	2615
Out Cobb Bus		0	0	0	0	0	0	0
Total		54095	99605	58437	493	4350	0	

AT OTHER RAIL STATIONS

From:	To:	Area	Rail	---FIM Bus---		-Outside Bus-		Total
				MARTA	Cobb	MARTA	Cobb	
Area		0	67606	0	0	6143	0	73748
Rail		66693	53488	0	0	27216	71	147468
FIM MARTA Bus		0	0	0	0	0	0	0
FIM Cobb Bus		0	0	0	0	0	0	0
Out MARTA Bus		5664	31395	0	0	6662	0	43720
Out Cobb Bus		0	0	0	0	0	0	0
Total		72357	152489	0	0	40020	71	

AT OTHER PLACES

From:	To:	Area	Rail	---FIM Bus---		-Outside Bus-		Total
				MARTA	Cobb	MARTA	Cobb	
Area		0	0	0	0	122391	371	122762
Rail		0	0	0	0	0	0	0
FIM MARTA Bus		0	0	0	0	0	0	0
FIM Cobb Bus		0	0	0	0	0	0	0
Out MARTA Bus		119001	0	0	0	5521	0	124522
Out Cobb Bus		563	0	0	0	0	313	876
Total		119564	0	0	0	127912	684	

AT ALL PLACES

From:	To:	Area	Rail	---FIM Bus---		-Outside Bus-		Total
				MARTA	Cobb	MARTA	Cobb	
Area		0	114997	2115	0	128534	371	246016
Rail		115162	53488	51726	493	31155	71	252094
FIM MARTA Bus		5626	49563	4597	0	76	0	59862
FIM Cobb Bus		0	371	0	0	0	0	371
Out MARTA Bus		124664	33675	0	0	12517	0	170857
Out Cobb Bus		563	0	0	0	0	313	876
Total		246016	252094	58437	493	172282	754	

EXHIBIT 1-30
TRANSFER ANALYSIS - SATURDAY

AT FREE-INTERMODAL (FIM) RAIL STATIONS

From:	To:	Area	Rail	---FIM Bus--- MARTA	Cobb	-Outside Bus- MARTA	Cobb	Total
Area		0	28013	8709	0	0	0	36723
Rail		24890	0	21579	833	2859	0	50161
FIM MARTA Bus		2228	17324	5741	0	303	0	25596
FIM Cobb Bus		0	329	0	0	0	0	329
Out MARTA Bus		428	3553	234	0	0	0	4215
Out Cobb Bus		0	0	0	0	0	0	0
Total		27546	49219	36262	833	3162	0	

AT OTHER RAIL STATIONS

From:	To:	Area	Rail	---FIM Bus--- MARTA	Cobb	-Outside Bus- MARTA	Cobb	Total
Area		0	33434	0	0	7632	0	41065
Rail		34957	27980	0	0	15553	0	78490
FIM MARTA Bus		0	0	0	0	0	0	0
FIM Cobb Bus		0	0	0	0	0	0	0
Out MARTA Bus		5989	17964	0	0	3715	0	27667
Out Cobb Bus		0	54	0	0	0	0	54
Total		40946	79432	0	0	26900	0	

AT OTHER PLACES

From:	To:	Area	Rail	---FIM Bus--- MARTA	Cobb	-Outside Bus- MARTA	Cobb	Total
Area		0	0	0	0	66842	383	67226
Rail		0	0	0	0	0	0	0
FIM MARTA Bus		0	0	0	0	0	0	0
FIM Cobb Bus		0	0	0	0	0	0	0
Out MARTA Bus		75688	0	0	0	2652	0	78340
Out Cobb Bus		833	0	0	0	0	181	1015
Total		76522	0	0	0	69494	565	

AT ALL PLACES

From:	To:	Area	Rail	---FIM Bus--- MARTA	Cobb	-Outside Bus- MARTA	Cobb	Total
Area		0	61447	8709	0	74474	383	145014
Rail		59847	27980	21579	833	18412	0	128651
FIM MARTA Bus		2228	17324	5741	0	303	0	25596
FIM Cobb Bus		0	329	0	0	0	0	329
Out MARTA Bus		82105	21517	234	0	6367	0	110223
Out Cobb Bus		833	54	0	0	0	181	1069
Total		145014	128651	36262	833	99556	565	

EXHIBIT 1-30
TRANSFER ANALYSIS - SUNDAY

AT FREE-INTERMODAL (FIM) RAIL STATIONS

From:	To:	Area	Rail	---FIM Bus--- MARTA	Cobb	-Outside Bus- MARTA	Cobb	Total
Area		0	12498	556	0	1061	0	14116
Rail		12242	0	10033	42	393	0	22711
FIM MARTA Bus		226	9504	1637	0	0	0	11367
FIM Cobb Bus		0	0	0	0	0	0	0
Out MARTA Bus		0	648	650	0	0	0	1298
Out Cobb Bus		0	0	0	0	0	0	0
Total		12468	22650	12877	42	1455	0	

AT OTHER RAIL STATIONS

From:	To:	Area	Rail	---FIM Bus--- MARTA	Cobb	-Outside Bus- MARTA	Cobb	Total
Area		0	18388	0	0	4052	0	22440
Rail		18506	10486	0	0	6126	0	35119
FIM MARTA Bus		0	0	0	0	0	0	0
FIM Cobb Bus		0	0	0	0	0	0	0
Out MARTA Bus		1686	6305	0	0	2424	0	10416
Out Cobb Bus		0	0	0	0	0	0	0
Total		20193	35180	0	0	12603	0	

AT OTHER PLACES

From:	To:	Area	Rail	---FIM Bus--- MARTA	Cobb	-Outside Bus- MARTA	Cobb	Total
Area		0	0	0	0	31514	0	31514
Rail		0	0	0	0	0	0	0
FIM MARTA Bus		0	0	0	0	0	0	0
FIM Cobb Bus		0	0	0	0	0	0	0
Out MARTA Bus		35367	0	0	0	1729	0	37096
Out Cobb Bus		42	0	0	0	0	0	42
Total		35410	0	0	0	33243	0	

AT ALL PLACES

From:	To:	Area	Rail	---FIM Bus--- MARTA	Cobb	-Outside Bus- MARTA	Cobb	Total
Area		0	30886	556	0	36628	0	68070
Rail		30748	10486	10033	42	6519	0	57829
FIM MARTA Bus		226	9504	1637	0	0	0	11367
FIM Cobb Bus		0	0	0	0	0	0	0
Out MARTA Bus		37053	6953	650	0	4153	0	48810
Out Cobb Bus		42	0	0	0	0	0	42
Total		68070	57829	12877	42	47300	0	

SECTION 2

MODE OF ARRIVAL SURVEY

This section of the report contains information on the sample design and survey procedures used, as well as procedures for data management and analysis for the mode of arrival survey. Analysis of the survey results is also presented, along with an accuracy analysis of the results. This analysis is presented for the worst case proportion (.5) at the 90% confidence interval. The Research Objective indicated that accuracy of ± 10 at the 90% confidence interval was desired. The accuracy achieved was better than required by the Research Objective.

Section 2.1 provides an overview of the procedures employed in conducting the mode of arrival survey, including the sampling plan. Section 2.2 details the data collection procedures, data analysis, weighting and validation of survey results. Section 2.3 presents a summary of the results and discusses the reliability of these results. Appendix A presents a discussion of the precision or accuracy of the survey proportions.

2.1 SURVEY DESIGN AND PREPARATION

The survey design phase of the project established the basic framework and parameters for conducting the other, subsequent survey-specific tasks. A technical memorandum describing refinements to the original study design contained in GH&A's technical proposal was submitted to MARTA in early October 1989.

GH&A conducted a special enumeration of passengers entering rail stations, to provide a basis for estimating mode of arrival by time of day. The objective of this survey was to provide a reliable estimate of the proportion of patrons arriving by all available modes by time period.

2.1.1 Sampling Plan

The design accuracy for mode of arrival proportions was $\pm 10\%$ reliability at the 90% confidence interval. Statistically, this objective could be satisfied by 68 responses. In order to provide representative estimates it was necessary to gather these responses on several different days.

Our sampling plan for this survey called for samples to be collected at each rail station/time period on four separate days (two weekdays, one Saturday and one Sunday). On weekdays, four time periods were defined (AM peak, midday, PM peak, and other). On weekends, two time periods were defined (daytime and other). Execution of this plan required surveying each rail station for eight separate weekday hours, two Saturday hours, and two Sunday hours. At free intermodal stations, two parallel surveys were required, one based on mode of arrival through the fare gates and one based on free intermodal bus arrivals.

2.1.2 Procedures Development

The mode of arrival survey required development of well documented procedures for data collection and control. Procedures developed included specialized training, sample selection, and data editing and error resolution.

2.1.2.1 Surveyor Training

Due to the nature of the mode of arrival survey, a special classroom training sessions was required for personnel who were going to administer the survey. Individuals were trained in how to properly "choose" the respondents so as to not introduce bias in the selection process and how to collect the demographic data.

2.1.2.2 Sample Selection

For weekdays, two separate samples were planned for each station/time period. In order to obtain a representative distribution, one sample was designated early and the

other late. Then samples were selected for scheduling randomly with the stipulation that no early and late time period sample for a station be scheduled for the same day. After the initial schedule was drawn, revisions were made to effect a reasonable geographic distribution of samples by time period and day.

The weekend sample was drawn in a similar fashion. However, instead of designating samples as early and late, station/time period samples were designated for Saturday and Sunday. As with the weekday sample, the initial, random schedule was revised to improve the geographic distribution of data collection.

2.1.2.3 Survey Instrument and Control Log Design

The mode of arrival survey objectives were considerably less complex than those for the on-board surveys. This survey was designed as a brief personal interview to determine how passengers entering through fare gates arrived at the station. The interview form used to capture this information is shown in Exhibit 2-1. There was no pre-testing of this form, due to the limited nature of the questions. Passengers arriving by bus at free intermodal stations were determined by direct enumeration, therefore no survey instrument was required.

Response bias control information for the mode of arrival survey and the on-board rail survey was gathered as part of the mode of arrival survey. Surveyors were required to record the gender and race of each patron approached for interview (including those that refused to participate). This provided an accurate profile of these attributes by station and time period.

Two control logs were designed for the mode of arrival survey. The first of these, the Faregate Reading Control Log, was used by surveyors to record gate readings both before and after the survey period. The second control log, the Bus Load Count Control Log, was used to record inbound bus load information at free intermodal stations.

EXHIBIT 2-2
MODE OF ARRIVAL SURVEY QUESTIONNAIRE

Location Name _____ Page 1 of _____
Survey Date ____/____/1989 Weather _____
Start Time ____ : ____ AM PM Surveyor _____
Stop Time ____ : ____ AM PM Editor _____

BE COURTEOUS. THANK EACH PERSON YOU SPEAK TO EVEN IF THEY REFUSE TO RESPOND.

1. How did you get here (to this station) today? [] 9 Refused (go to 3.)
- [] 1 Walked
[] 2 Rode a bike
[] 3 Was dropped off. By a bus? (check 4). By a taxi? (check 5).
[] 4 Rode a bus
[] 5 Rode in a taxi
[] 6 Drove or rode in a car parked here. How many people including yourself rode in the car? ____
2. Are you going to a train or a bus?
- [] 1 Train
[] 2 Bus
3. By observation the respondent is [] 1 Male [] 2 Female
[] 1 Black [] 2 White [] 3 Asian [] 4 Other

1. How did you get here (to this station) today? [] 9 Refused (go to 3.)
- [] 1 Walked
[] 2 Rode a bike
[] 3 Was dropped off. By a bus? (check 4). By a taxi? (check 5).
[] 4 Rode a bus
[] 5 Rode in a taxi
[] 6 Drove or rode in a car parked here. How many people including yourself rode in the car? ____
2. Are you going to a train or a bus?
- [] 1 Train
[] 2 Bus
3. By observation the respondent is [] 1 Male [] 2 Female
[] 1 Black [] 2 White [] 3 Asian [] 4 Other

1. How did you get here (to this station) today? [] 9 Refused (go to 3.)
- [] 1 Walked
[] 2 Rode a bike
[] 3 Was dropped off. By a bus? (check 4). By a taxi? (check 5).
[] 4 Rode a bus
[] 5 Rode in a taxi
[] 6 Drove or rode in a car parked here. How many people including yourself rode in the car? ____
2. Are you going to a train or a bus?
- [] 1 Train
[] 2 Bus
3. By observation the respondent is [] 1 Male [] 2 Female
[] 1 Black [] 2 White [] 3 Asian [] 4 Other

1. How did you get here (to this station) today? [] 9 Refused (go to 3.)
- [] 1 Walked
[] 2 Rode a bike
[] 3 Was dropped off. By a bus? (check 4). By a taxi? (check 5).
[] 4 Rode a bus
[] 5 Rode in a taxi
[] 6 Drove or rode in a car parked here. How many people including yourself rode in the car? ____
2. Are you going to a train or a bus?
- [] 1 Train
[] 2 Bus
3. By observation the respondent is [] 1 Male [] 2 Female
[] 1 Black [] 2 White [] 3 Asian [] 4 Other

2.1.3 Survey Preparation

Because the mode of arrival survey was conducted in conjunction with the on-board surveys, all necessary equipment, supplies, personnel and training needed to complete the data collection and analysis phases of the project were completed simultaneously.

2.2 DATA COLLECTION AND ANALYSIS

GH&A staff arrived in Atlanta on October 8, 1989 to set up the field office to manage the data collection phase for both the mode of arrival and on-board surveys. Actual field work for the mode of arrival survey occurred between the months of October through December, 1989.

2.2.1 Data Collection Activities

The data collection efforts for the mode of arrival survey were different from the on-board surveys. As previously mentioned, these were personal interviews, conducted inside the rail stations. Surveyors were also required to enumerate candidate respondents (including refusals) by gender and race, and take fare gate readings at scheduled times. A copy of the fare gate reading log is shown in Exhibit 2-2.

Observers at free intermodal bus platforms were required to record the passengers aboard each inbound bus and record route and time information. The control log used for this aspect of the mode of arrival survey is shown in Exhibit 2-3.

2.2.2 Data Editing

As mode of arrival surveys were completed, they were reviewed to ensure that the work was successfully performed. Following that, all data from the completed control logs and questionnaires were immediately keyed into the appropriate control logs data base.

EXHIBIT 2-2
MODE OF ARRIVAL FAREGATE READINGS CONTROL LOG

MARTA Fall 1989 Rail Station Survey Station Faregate Readings Sample 10521, Survey for 30 minutes FAREGATE READINGS BEFORE SURVEY					Assignment MA090, Page 5 Arts Center - West Peachtree Weekday Date: / /89 During Period: 6:30 am to 8:00 am					Surveyors: Weather: _____			
Gate	Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
13D	DO NOT READ THIS GATE												
1X	DO NOT READ THIS GATE												
2E	:												
3E	:												
4E	:												
5H	:												
FAREGATE READINGS AFTER SURVEY													
Gate	Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
13D	DO NOT READ THIS GATE												
1X	DO NOT READ THIS GATE												
2E	:												
3E	:												
4E	:												
5H	:												

MODE OF ARRIVAL BUS LOAD COUNT CONTROL LOG

[illegible]

2.2.3 Sample Weighting and Validation

All weighting of mode of arrival survey data was performed at the stratum level (day type, station and time period). Weighting within time period was accomplished by normalizing each count by type (fare gate and bus load if appropriate) to a full hour and then averaging the observations.

Response bias adjustments were based on data enumerated during the survey. These were applied by day type, station and time period.

No independent comprehensive data on mode of arrival were available for validation. Final estimates were provided to MARTA Service Planning and Monitoring staff for review. The estimates were found to be reasonable.

2.3 SUMMARY OF RESULTS

Research Objective 6 dealt with the mode of arrival survey. Specifically, data was to be collected to determine mode of access proportions by station and time period. Unlike the on-board surveys, the mode of arrival survey was conducted using two day types, weekday and weekend. Also, there were four time periods on the weekday and two time periods on the weekend.

2.3.1 Mode of Access at Rail Stations

Exhibit 2-4 describes mode of access proportions. Mode of arrival patterns follow traditional observations. Auto and bus are the primary modes of arrival at suburban rail stations, and walking is the primary mode of arrival at downtown rail stations.

The accuracy analysis for this survey is shown below. It is based on the worst case proportion (.5) at the 90% confidence interval, and is the average of all stations by day type and time period. Similar statistics by station are shown in Appendix A, which also contains a discussion of the computation of the accuracy of survey proportions.

<u>Day Type</u>	<u>Time Period</u>	<u>Accuracy</u>
Weekday	AM Rush	$\pm 7.14\%$
	Midday	$\pm 7.68\%$
	PM Rush	$\pm 6.34\%$
	Other	$\pm 7.77\%$
Weekend	Daytime	$\pm 7.27\%$
	Other	$\pm 8.07\%$

EXHIBIT 2-4
STATION MODE OF ARRIVAL PROPORTIONS - WEEKDAY Page 1

Station	Period	-----Fare Gate Arrivals-----								-Bus Arrivals-	
		Weighted Entering Volume	Completed Responses	Proportion by						Weighted Entering Bus Load	by Bus
				Walk	Bike	Drop	Bus	Taxi	Auto		
Chamblee	AM Peak	631	63	.007	.000	.000	.000	.011	.563	454	.418
	Midday	251	64	.082	.000	.228	.000	.008	.215	220	.467
	PM Peak	378	77	.074	.000	.192	.000	.017	.122	555	.595
	Other	81	16	.154	.000	.192	.000	.000	.106	98	.547
Brookhaven	AM Peak	369	155	.014	.000	.000	.000	.008	.445	421	.533
	Midday	142	98	.148	.000	.186	.006	.000	.136	156	.523
	PM Peak	275	109	.164	.000	.146	.007	.007	.087	395	.590
	Other	146	94	.162	.007	.166	.000	.043	.218	99	.404
Lenox	AM Peak	364	132	.097	.000	.040	.011	.000	.232	593	.620
	Midday	404	91	.381	.000	.060	.029	.000	.143	255	.387
	PM Peak	1183	155	.353	.000	.060	.035	.000	.050	1190	.501
	Other	304	60	.314	.000	.000	.000	.003	.084	455	.599
Lindbergh Center	AM Peak	555	134	.042	.000	.013	.000	.000	.221	1450	.723
	Midday	387	85	.231	.000	.081	.000	.013	.189	364	.485
	PM Peak	755	126	.285	.000	.022	.008	.005	.027	1417	.652
	Other	248	120	.236	.000	.084	.057	.023	.216	155	.385
Arts Center	AM Peak	286	85	.231	.000	.053	.005	.000	.002	695	.708
	Midday	480	132	.496	.000	.019	.004	.002	.000	441	.479
	PM Peak	932	220	.465	.000	.034	.005	.000	.009	885	.487
	Other	113	22	.295	.000	.000	.000	.000	.000	270	.705
Midtown	AM Peak	364	110	.482	.000	.047	.364	.000	.108		
	Midday	194	47	.932	.028	.041	.000	.000	.000		
	PM Peak	630	98	.699	.000	.072	.154	.000	.074		
	Other	75	31	.752	.000	.147	.064	.000	.036		

EXHIBIT 2-4
STATION MODE OF ARRIVAL PROPORTIONS - WEEKDAY Page 2

Station	Period	-----Fare Gate Arrivals-----								-Bus Arrivals-	
		Weighted Entering Volume	Completed Responses	Proportion by						Weighted Entering Bus Load	by Bus
-----	-----	-----	-----	Walk	Bike	Drop	Bus	Taxi	Auto	-----	-----
North Avenue	AM Peak	566	108	.470	.000	.103	.418	.000	.008		
	Midday	893	172	.810	.000	.028	.148	.000	.014		
	PM Peak	1274	225	.689	.000	.035	.256	.002	.017		
	Other	288	80	.613	.000	.038	.349	.000	.000		
Civic Center	AM Peak	69	15	.704	.000	.000	.197	.099	.000		
	Midday	167	32	1.000	.000	.000	.000	.000	.000		
	PM Peak	298	77	.978	.000	.022	.000	.000	.000		
	Other	17	6	.686	.000	.157	.157	.000	.000		
Peachtree Center	AM Peak	421	88	.833	.000	.047	.107	.000	.014		
	Midday	1212	137	.958	.012	.003	.027	.000	.000		
	PM Peak	4557	195	.969	.000	.008	.023	.000	.000		
	Other	416	87	.984	.000	.000	.016	.000	.000		
Garnett	AM Peak	181	64	.564	.000	.011	.414	.000	.011		
	Midday	88	34	.625	.000	.061	.314	.000	.000		
	PM Peak	231	72	.905	.000	.000	.095	.000	.000		
	Other	194	47	.442	.000	.041	.495	.000	.022		
West End	AM Peak	407	112	.160	.000	.001	.000	.006	.081	1230	.751
	Midday	360	74	.294	.010	.012	.055	.000	.030	539	.600
	PM Peak	519	133	.361	.004	.041	.000	.004	.036	647	.555
	Other	419	73	.453	.000	.010	.000	.000	.016	455	.521
Oakland City	AM Peak	314	48	.117	.000	.006	.000	.006	.061	1339	.810
	Midday	101	40	.134	.000	.083	.008	.000	.014	323	.762
	PM Peak	211	67	.184	.000	.081	.009	.000	.022	502	.704
	Other	135	45	.093	.000	.010	.000	.000	.158	382	.739

EXHIBIT 2-4
STATION MODE OF ARRIVAL PROPORTIONS - WEEKDAY Page 3

Station	Period	-----Fare Gate Arrivals-----								-Bus Arrivals-	
		Weighted Entering Volume	Completed Responses	Walk	Bike	Drop	Bus	Taxi	Auto	Weighted Entering Bus Load	by Bus
Lakewood/Ft. McPherson	AM Peak	287	68	.009	.000	.024	.000	.003	.194	956	.769
	Midday	77	23	.045	.000	.045	.008	.000	.107	299	.795
	PM Peak	173	66	.100	.000	.116	.000	.000	.037	511	.747
	Other	155	61	.042	.000	.014	.000	.004	.190	468	.751
East Point	AM Peak	202	55	.212	.000	.076	.000	.021	.055	353	.636
	Midday	142	59	.291	.013	.027	.000	.000	.061	221	.609
	PM Peak	147	47	.219	.010	.127	.007	.007	.035	216	.595
	Other	183	53	.154	.000	.177	.050	.000	.090	206	.530
College Park	AM Peak	729	108	.025	.000	.059	.000	.013	.291	1150	.612
	Midday	145	48	.129	.000	.050	.040	.000	.088	328	.693
	PM Peak	301	98	.151	.000	.120	.013	.003	.053	584	.660
	Other	276	109	.070	.000	.047	.017	.000	.199	554	.667
Airport	AM Peak	487	187	.956	.000	.006	.000	.038	.000		
	Midday	374	120	.945	.027	.000	.028	.000	.000		
	PM Peak	947	245	.821	.003	.093	.008	.009	.065		
	Other	448	85	.644	.000	.206	.149	.000	.000		
Five Points	AM Peak	2065	177	.198	.000	.119	.684	.000	.000		
	Midday	4365	182	.587	.000	.025	.383	.005	.000		
	PM Peak	4872	181	.705	.000	.017	.255	.017	.005		
	Other	2260	181	.306	.008	.042	.591	.000	.054		

EXHIBIT 2-4
STATION MODE OF ARRIVAL PROPORTIONS - WEEKDAY Page 4

Station	Period	-----Fare Gate Arrivals-----								-Bus Arrivals-	
		Weighted Entering Volume	Completed Responses	Walk	Bike	Drop	Bus	Taxi	Auto	Weighted Entering Bus Load	by Bus
Hightower	AM Peak	743	107	.015	.000	.057	.002	.006	.173	2187	.746
	Midday	154	51	.068	.000	.030	.013	.000	.027	966	.863
	PM Peak	471	164	.114	.002	.119	.050	.000	.051	929	.664
	Other	305	100	.119	.000	.020	.000	.002	.131	818	.728
West Lake	AM Peak	662	154	.094	.000	.131	.688	.010	.077		
	Midday	223	94	.208	.020	.031	.664	.010	.067		
	PM Peak	375	180	.247	.000	.009	.739	.000	.005		
	Other	346	172	.144	.000	.049	.749	.000	.057		
Ashby	AM Peak	586	111	.494	.007	.025	.475	.000	.000		
	Midday	231	83	.524	.000	.024	.452	.000	.000		
	PM Peak	513	144	.559	.009	.122	.288	.015	.007		
	Other	310	140	.646	.000	.014	.339	.000	.000		
Vine City	AM Peak	239	96	.496	.000	.061	.421	.000	.023		
	Midday	191	86	.635	.000	.060	.306	.000	.000		
	PM Peak	171	89	.652	.000	.037	.312	.000	.000		
	Other	75	20	.643	.000	.123	.140	.000	.093		
Omni	AM Peak	56	52	.927	.000	.018	.055	.000	.000		
	Midday	159	127	1.000	.000	.000	.000	.000	.000		
	PM Peak	380	112	.969	.000	.010	.021	.000	.000		
	Other	56	53	.962	.018	.000	.020	.000	.000		
Georgia State	AM Peak	319	48	1.000	.000	.000	.000	.000	.000		
	Midday	657	102	.925	.075	.000	.000	.000	.000		
	PM Peak	931	169	.949	.000	.025	.013	.000	.013		
	Other	208	58	.842	.000	.052	.095	.000	.012		

EXHIBIT 2-4
STATION MODE OF ARRIVAL PROPORTIONS - WEEKDAY Page 5

Station	Period	-----Fare Gate Arrivals-----								-Bus Arrivals-	
		Weighted Entering Volume	Completed Responses	Proportion by						Weighted Entering Bus Load	by Bus
				Walk	Bike	Drop	Bus	Taxi	Auto		
King Memorial	AM Peak	77	72	.712	.027	.027	.137	.000	.096		
	Midday	105	84	.744	.000	.026	.129	.000	.100		
	PM Peak	160	123	.690	.000	.205	.105	.000	.000		
	Other	59	32	.867	.028	.067	.039	.000	.000		
Inman Park/Reynoldstown	AM Peak	379	177	.145	.000	.039	.529	.000	.287		
	Midday	56	44	.570	.000	.070	.218	.000	.141		
	PM Peak	210	140	.370	.000	.193	.402	.000	.036		
	Other	156	101	.294	.000	.054	.616	.000	.036		
Edgewood/Candler Park	AM Peak	583	159	.203	.000	.073	.573	.000	.152		
	Midday	250	104	.224	.000	.027	.634	.008	.108		
	PM Peak	392	142	.152	.004	.038	.666	.015	.125		
	Other	273	175	.220	.004	.016	.707	.000	.053		
East Lake	AM Peak	390	136	.155	.000	.095	.424	.013	.313		
	Midday	201	191	.216	.000	.075	.576	.000	.133		
	PM Peak	213	164	.213	.006	.280	.417	.000	.084		
	Other	241	129	.406	.000	.241	.257	.000	.095		
Decatur	AM Peak	485	79	.323	.010	.023	.588	.000	.057		
	Midday	772	172	.475	.000	.043	.473	.000	.009		
	PM Peak	677	183	.299	.000	.098	.589	.000	.014		
	Other	351	93	.303	.000	.049	.631	.017	.000		
Avondale	AM Peak	762	117	.035	.000	.049	.246	.014	.144	798	.512
	Midday	303	94	.086	.007	.035	.208	.004	.172	288	.487
	PM Peak	970	253	.076	.000	.028	.197	.002	.299	640	.398
	Other	498	139	.130	.006	.108	.226	.006	.224	213	.300

EXHIBIT 2-4
STATION MODE OF ARRIVAL PROPORTIONS - WEEKEND Page 1

Station	Period	-----Fare Gate Arrivals-----								-Bus Arrivals-	
		Weighted Entering Volume	Completed Responses	Proportion by						Weighted Entering Bus Load	by Bus
				Walk	Bike	Drop	Bus	Taxi	Auto		
Chamblee	Daytime	675	71	.021	.000	.066	.000	.053	.574	270	.286
	Other	174	24	.000	.000	.158	.000	.000	.519	83	.323
Brookhaven	Daytime	682	146	.114	.000	.229	.008	.010	.516	96	.123
	Other	108	107	.135	.007	.301	.000	.080	.259	30	.217
Lenox	Daytime	831	135	.376	.000	.046	.278	.015	.052	252	.233
	Other	79	23	.149	.000	.009	.032	.000	.008	319	.802
Lindbergh Center	Daytime	190	80	.110	.003	.076	.013	.019	.154	316	.625
	Other	327	110	.135	.000	.168	.000	.020	.255	238	.421
Arts Center	Daytime	204	116	.468	.003	.020	.000	.000	.000	212	.510
	Other	63	29	.209	.000	.026	.000	.000	.072	142	.693
Midtown	Daytime	219	54	.572	.000	.082	.000	.000	.346		
	Other	71	27	.289	.000	.123	.216	.000	.372		
North Avenue	Daytime	236	73	.432	.103	.000	.457	.000	.008		
	Other	173	60	.475	.000	.039	.266	.000	.219		
Civic Center	Daytime	51	16	.813	.000	.000	.000	.000	.187		
	Other	24	6	1.000	.000	.000	.000	.000	.000		
Peachtree Center	Daytime	487	103	.803	.011	.000	.052	.000	.133		
	Other	648	60	.948	.052	.000	.000	.000	.000		
Garnett	Daytime	79	37	.816	.000	.000	.184	.000	.000		
	Other	49	20	.745	.000	.000	.255	.000	.000		

EXHIBIT 2-4
STATION MODE OF ARRIVAL PROPORTIONS - WEEKEND Page 2

Station	Period	-----Fare Gate Arrivals-----								-Bus Arrivals-	
		Weighted Entering Volume	Completed Responses	Walk	Bike	Drop	Bus	Taxi	Auto	Weighted Entering Bus Load	by Bus
West End	Daytime	350	87	.368	.000	.054	.037	.000	.028	368	.513
	Other	117	49	.280	.000	.026	.000	.000	.006	259	.689
Oakland City	Daytime	106	47	.168	.000	.073	.000	.007	.057	241	.695
	Other	60	29	.080	.000	.123	.000	.000	.049	178	.748
Lakewood/Ft. McPherson	Daytime	54	20	.092	.000	.055	.000	.000	.021	266	.831
	Other	53	27	.041	.000	.114	.000	.000	.069	184	.776
East Point	Daytime	118	49	.206	.000	.044	.000	.000	.130	192	.619
	Other	72	41	.240	.000	.109	.000	.012	.109	81	.529
College Park	Daytime	204	82	.076	.000	.094	.019	.019	.167	342	.626
	Other	98	46	.060	.000	.139	.016	.000	.078	236	.707
Airport	Daytime	580	162	.301	.000	.256	.369	.006	.068		
	Other	151	65	.337	.000	.021	.596	.000	.045		
Five Points	Daytime	2729	136	.192	.000	.017	.791	.000	.000		
	Other	586	170	.595	.000	.000	.405	.000	.000		
Hightower	Daytime	406	135	.095	.000	.104	.022	.004	.204	537	.569
	Other	179	77	.029	.007	.086	.000	.015	.174	396	.689
West Lake	Daytime	180	104	.287	.000	.020	.686	.000	.008		
	Other	275	148	.106	.003	.024	.856	.003	.008		
Ashby	Daytime	207	64	.763	.000	.000	.237	.000	.000		
	Other	357	100	.746	.000	.000	.254	.000	.000		

EXHIBIT 2-4
STATION MODE OF ARRIVAL PROPORTIONS - WEEKEND Page 3

Station	Period	-----Fare Gate Arrivals-----								-Bus Arrivals-	
		Weighted Entering Volume	Completed Responses	Proportion by						Weighted Entering Bus Load	by Bus
				Walk	Bike	Drop	Bus	Taxi	Auto		
Vine City	Daytime	119	34	.570	.000	.037	.393	.000	.000		
	Other	122	40	.776	.000	.000	.224	.000	.000		
Orr	Daytime	396	271	1.000	.000	.000	.000	.000	.000		
	Other	72	16	.150	.000	.000	.313	.000	.537		
Georgia State	Daytime	135	63	.845	.017	.000	.088	.000	.051		
	Other	69	26	.970	.000	.000	.030	.000	.000		
King Memorial	Daytime	104	69	.800	.021	.102	.077	.000	.000		
	Other	40	42	.824	.000	.044	.132	.000	.000		
Inman Park/Reynoldstown	Daytime	300	133	.776	.000	.005	.188	.000	.030		
	Other	97	92	.633	.037	.034	.283	.000	.012		
Edgewood/Candler Park	Daytime	173	145	.378	.000	.050	.529	.000	.043		
	Other	98	97	.283	.022	.058	.549	.000	.089		
East Lake	Daytime	155	140	.213	.000	.062	.578	.000	.146		
	Other	140	81	.393	.000	.144	.296	.017	.150		
Decatur	Daytime	472	122	.283	.000	.143	.536	.012	.025		
	Other	187	86	.209	.000	.036	.725	.000	.030		
Avondale	Daytime	406	115	.057	.000	.122	.179	.017	.405	115	.221
	Other	427	180	.037	.013	.063	.166	.016	.575	64	.130

SECTION 3

SPECIAL ATTITUDINAL SURVEY

This section of the report contains information on the sample design, survey procedures and analysis of the survey results from the service quality/cost attitude survey. Section 3.1 provides an overview of the procedures employed in conducting the attitudinal survey, including the sampling plan. Section 3.2 details the data collection procedures, data analysis, weighting and validation of survey results. Section 3.3 presents a summary of the results and discusses the reliability of these results. The accuracy analysis is based on the worst case proportion (.5) at the 95% confidence interval.

3.1 SURVEY DESIGN AND PREPARATION

A special attitudinal survey was conducted over a one week period to gather data on the riderships' attitudes regarding service quality and cost. The objective of this survey was to provide data to MARTA policy makers as they deliberated tariff and schedule changes.

3.1.1 Sampling Plan

The special attitude survey also required a separate sampling plan. Data were collected via personal interviews on trains and representative bus platforms over a four day time frame. The rail sample was designed at 1,152 responses ($\pm 2.9\%$ reliability at the 95% confidence interval) and the bus sample at 288 responses ($\pm 5.8\%$ reliability at the 95% confidence interval). Overall, this would result in a $\pm 2.6\%$ reliability at the 95% confidence interval. The sample sizes were based on the assumption that the train surveyors were able to collect 12 responses per hour and platform surveyors were able to collect 6 responses per hour.

3.1.2 Procedures Development

The administration of the attitudinal survey was similar to that used in the mode

of arrival survey. Therefore, the procedures used to implement and analyze the data were similar.

3.1.2.1 Surveyor Training

Due to the nature of the service quality/cost survey, a special classroom training sessions was required for personnel who were going to administer the survey. Individuals were trained in how to properly "choose" the respondents so as to not introduce bias in the selection process and how to collect the necessary demographic data.

3.1.2.2 Sample Selection

Sampling for the service cost/quality attitude survey was accomplished by stationing surveyors on-board representative trains and at representative bus platforms. Trains were selected to provide complete coverage of the system. Bus platforms were selected to provide the maximum opportunity for locating bus-only passengers, and included platforms on all rail lines and at Five Points. In all, six bus platforms were included in the survey. On-board and platform interviews were scheduled from 6 AM to 9 PM on three weekdays and one Saturday.

3.1.2.3 Survey Instrument Design

Examples of the survey instruments used for the special attitudinal study are shown in Exhibits 3-1 and 3-2. The basic form was successfully used by MARTA research staff previously and was not pretested for this study. Response bias control was handled in the same fashion as for the mode of arrival survey.

3.1.3 Survey Preparation

GH&A recruited surveyor personnel from the pool of surveyors who worked on the on-board and mode of arrival surveys. Questionnaires were printed by GH&A and supplies from the on-board survey were used for this survey.

EXHIBIT 3-1
SPECIAL ATTITUDINAL SURVEY FORM - BUS

Time : AM/PM Platform:

HELLO, I'M TAKING A SHORT SURVEY FOR MARTA. DID YOU ARRIVE HERE ON THE TRAIN?

If the respondent says YES, say THANK YOU and stop here.
Reuse this page for the next respondent.

By observation, the respondent is:

☐1 Male ☐2 Female
☐1 Black ☐2 White ☐3 Asian ☐4 Other

I'D LIKE YOUR OPINION ON SOME IMPORTANT TOPICS.

If the respondent refuses to answer check here ☐ and say THANK YOU.
Use a new page for the next respondent.

- ▶ HOW LONG HAVE YOU BEEN USING MARTA?
☐1 Under 1 month ☐2 1 - 6 months ☐3 7 - 12 months ☐4 Over 12 months
- ▶ HOW MANY DAYS A WEEK DO YOU USUALLY RIDE MARTA?
☐1 One ☐3 Three ☐5 Five ☐7 Seven
☐2 Two ☐4 Four ☐6 Six
- ▶ WHERE ARE YOU GOING NOW? (If the answer is HOME ask WHERE ARE YOU COMING FROM?)
☐1 Work ☐2 School ☐3 Shopping ☐4 Other
- ▶ WHAT KIND OF TRIP DO YOU MAKE MOST OFTEN ON MARTA?
☐1 Work ☐2 School ☐3 Shopping ☐4 Other
- ▶ PLEASE RATE MARTA ON THE FOLLOWING:
- | | Very
Good | Good | OK | Poor | Very
Poor |
|--------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Security | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| Cost of Service | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Cleanliness | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Time Between Buses | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
- ▶ IF YOU HAD TO WAIT A FEW MINUTES MORE FOR A BUS, WOULD YOU USE IT LESS OFTEN?
☐1 No
If YES, Would you: ☐2 Stop riding ☐3 Ride much less often ☐4 Ride a little less often
- ▶ HOW DO YOU NORMALLY PAY TO RIDE MARTA? (Check only one)
☐1 Cash/Token ☐3 Weekly Transcard
☐2 Senior or Handicapped Pass ☐4 Monthly Transcard
- ▶ If the response is Cash/Token: say, BASED ON 85 CENTS
 S/H Pass: 40 CENTS
 Weekly TC: 8 DOLLARS
 Monthly TC: 32 DOLLARS
- HOW MUCH MORE WOULD YOU PAY FOR MARTA SERVICE WITHOUT CHANGING HOW OFTEN YOU RIDE? \$.

▶ THANK YOU FOR YOUR HELP

EXHIBIT 3-2

SPECIAL ATTITUDINAL SURVEY FORM - RAIL

Time : AM/PM Boarding Station: _____

By observation, the respondent is:

- ☐1 Male ☐2 Female
☐1 Black ☐2 White ☐3 Asian ☐4 Other

HELLO, I'M TAKING A SHORT SURVEY FOR MARTA AND WOULD LIKE YOUR OPINION ON SOME IMPORTANT TOPICS.

If the respondent refuses to answer check here ☐ and say THANK YOU.
 Use a new page for the next respondent.

- HOW LONG HAVE YOU BEEN USING MARTA?
☐1 Under 1 month ☐2 1 - 6 months ☐3 7 - 12 months ☐4 Over 12 months
- HOW MANY DAYS A WEEK DO YOU USUALLY RIDE MARTA?
☐1 One ☐3 Three ☐5 Five ☐7 Seven
☐2 Two ☐4 Four ☐6 Six
- WHERE ARE YOU GOING NOW? (If the answer is HOME ask WHERE ARE YOU COMING FROM?)
☐1 Work ☐2 School ☐3 Shopping ☐4 Other
- WHAT KIND OF TRIP DO YOU MAKE MOST OFTEN ON MARTA?
☐1 Work ☐2 School ☐3 Shopping ☐4 Other
- DO YOU ALSO RIDE MARTA BUSES?
☐1 No ☐2 Yes
- PLEASE RATE MARTA ON THE FOLLOWING:
- | | Very Good | Good | OK | Poor | Very Poor |
|---------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Security | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| Cost of Service | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Cleanliness | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Time Between Trains | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
- If the respondent also rides the bus ask:
 Time Between Buses ☐ ☐ ☐ ☐ ☐

- IF YOU HAD TO WAIT A FEW MINUTES MORE FOR A TRAIN, WOULD YOU RIDE LESS OFTEN?
☐1 No
 If YES, Would you: ☐2 Stop riding ☐3 Ride much less often ☐4 Ride a little less often

- If the respondent also rides the bus ask:
 ► IF YOU HAD TO WAIT A FEW MINUTES MORE FOR A BUS, WOULD YOU USE IT LESS OFTEN?
☐1 No
 If YES, Would you: ☐2 Stop riding ☐3 Ride much less often ☐4 Ride a little less often

- HOW DO YOU NORMALLY PAY TO RIDE MARTA? (Check only one)
☐1 Cash/Token ☐3 Weekly Transcard
☐2 Senior or Handicapped Pass ☐4 Monthly Transcard

- If the response is Cash/Token: say, BASED ON 85 CENTS
 S/H Pass: 40 CENTS
 Weekly TC: 8 DOLLARS
 Monthly TC: 32 DOLLARS

HOW MUCH MORE WOULD YOU PAY FOR MARTA SERVICE WITHOUT CHANGING HOW OFTEN YOU RIDE? \$ _____

- THANK YOU FOR YOUR HELP

3.2 DATA COLLECTION AND ANALYSIS

The attitudinal survey was conducted over a four day period at the end of January 1990. GH&A staff arrived in Atlanta a few days early to hire and train staff.

3.2.1 Data Collection Activities

Like the mode of arrival survey, the special attitudinal survey was also a personal interview. Surveyors enumerated all candidate respondents (including refusals) by gender and race. No control logs were necessary for this survey.

3.2.2 Data Editing

All data for the survey were edited and machine entered at the end of the survey period. All the data were 100% key verified.

3.2.3 Sample Weighting and Validation

Once all data inconsistencies were resolved, sample data were weighted to represent all target MARTA patrons. The method used to weight the survey is described below.

This survey was designed to produce only system-wide estimates of attitudes. Therefore, only response bias adjustments were performed. These were based on data enumerated during the survey and applied to the aggregate survey results.

No independent comprehensive data on service quality/cost attitudes were available for validation.

3.3 SURVEY RESULTS

Data for Exhibit 3-3 came from the service quality/cost attitude survey. Many other tabulations of the attitudinal survey data providing more detailed, cross sectional analysis were delivered to MARTA research staff separately.

Survey respondents were asked how much more they would pay for MARTA service and still continue to use MARTA with the same amount of frequency (tolerable fare increase). The data in Exhibit 3-3 shows the results of this analysis by fare type and by bus only, rail only and bus & rail riders. On the average, bus only riders indicated they would tolerate an 8.59% increase in fare. Patrons using a senior-handicapped card responded they would tolerate a 12.50% increase, cash and token riders indicated a 10% increase was acceptable, while monthly transcard users indicated an average of 5% increase.

Rail only riders indicated they would tolerate a higher average fare increase and still maintain their current level of usage. The average fare increase for all fare types is 14.64%. Whereas cash and token riders indicated a 15% increase was acceptable, the average percent increase for monthly transcard users was 8.61%.

These basic observations remain constant for the respondents who rode both the bus and the rail. The average acceptable fare increase for this group of riders is 10.68%, slightly higher than bus only riders, but lower than rail only riders.

EXHIBIT 3-3
RESULTS OF THE ATTITUDINAL SURVEY

TOLERABLE FARE INCREASE FOR BUS ONLY RIDERS

Payment Method	Samples	Mean Percent Increase	Standard Error of the Mean	95% CI Accuracy
Cash-Token	131	10.01	1.14	2.23%
SR-HCP Card	4	12.50	7.22	14.15%
Weekly TransCard	232	8.20	1.04	2.04%
Monthly transCard	31	4.93	1.42	2.78%
All Types	398	8.59	.72	1.41%

TOLERABLE FARE INCREASE FOR RAIL ONLY RIDERS

Payment Method	Samples	Mean Percent Increase	Standard Error of the Mean	95% CI Accuracy
Cash-Token	207	15.03	1.08	2.12%
SR-HCP Card	4	25.00	8.82	17.29%
Weekly TransCard	58	14.34	1.43	2.80%
Monthly transCard	17	8.61	1.16	2.27%
All Types	286	14.64	.85	1.67%

TOLERABLE FARE INCREASE FOR BUS & RAIL RIDERS

Payment Method	Samples	Mean Percent Increase	Standard Error of the Mean	95% CI Accuracy
Cash-Token	306	13.62	1.26	2.46%
SR-HCP Card	9	20.07	4.20	8.23%
Weekly TransCard	424	8.94	.50	0.98%
Monthly transCard	70	7.15	.95	1.86%
All Types	810	10.68	.56	1.10%

APPENDIX A
ACCURACY OF SURVEY ESTIMATED PROPORTIONS

Generally, the accuracy (precision) values cited in the main sections of this report are based on the worst case; a proportion of .5 (50 percent). The precision of smaller and larger proportions will always be less (better) than this value. This appendix provides a more detailed discussion of precision.

Precision of estimated proportions is computed using the following formula.

$$e = 100 * Z * \sqrt{\frac{N - n}{N - 1}} * \sqrt{\frac{pq}{n}} \quad (1)$$

where:

e is the precision of the proportion stated as a percent,
Z is the value of the normal deviate for the desired confidence interval
(Z = 1.96 for 95 percent confidence and 1.65 for 90 percent confidence),
N is the estimated total population of the analysis frame,
n is the sampled population from the analysis frame,
p is the estimated proportion, and
q is 1-p.

The following sections demonstrate the application of this formula and provide a detailed discussion of precision, by survey.

A.1 On-board Survey

Exhibit A-1 shows the 95 percent confidence interval precision for each analysis frame (day type/mode) of the On-board Survey for proportions ranging from 0.1 (10%) to 0.9 (90%). The following example describes how this exhibit may be used.

Exhibit 1-5 indicates that 20 percent of the Sunday system patrons pay for their trip on MARTA with a token. This result is based on 1,051 samples from a population of 68,070. Using the Sunday/Use System row and the 0.2 (20 percent) proportion column of Exhibit A-1, indicate that this result has a precision of 2.40 percent.

The confidence range describes the region within which estimates from independent samples will fall. With 95 percent confidence, 95 out of 100 estimates will

be in the range. The upper and lower limits of the confidence range are computed by adding and subtracting the precision from the point estimate. Therefore, our point estimate of 20 percent Sunday/System token users implies the following confidence ranges:

$$\begin{aligned}\text{Lower limit} &= 20.00 - 2.40 = 17.60\% \\ \text{Upper limit} &= 20.00 + 2.40 = 22.40\%\end{aligned}$$

Exhibit A-1 shows precision at .1 (10 percent) intervals for values from .1 to .9. Precision for intermediate values can be determine reasonably accurately from the exhibit by interpolation between values. Precision for very rare or common attribute proportions (less than 0.10 or greater than 0.90) should always be computed using the formula shown in Equation 1. Linear extrapolation from the exhibit for these proportions will not produce correct results.

A.2 Mode of Arrival Survey

Exhibit A-2 provides accuracy information for each analysis frame (day type/station/time period) of the Mode of Arrival survey. The format and usage of this exhibit are similar to Exhibit A-1. Only 90% confidence interval precision is appropriate for this survey.

EXHIBIT A-1
PRECISION OF ESTIMATED PROPORTIONS FOR ON-BOARD SURVEY ANALYSIS FRAMES

Analysis Frame		Populations:		Precision at 95% Confidence Interval for Proportions of:								
		Sample (n)	Total (N)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Weekday	Rail Only	2,401	73,616	1.18%	1.57%	1.80%	1.93%	1.97%	1.93%	1.80%	1.57%	1.18%
	Rail-Bus	1,152	41,751	1.71%	2.28%	2.61%	2.79%	2.85%	2.79%	2.61%	2.28%	1.71%
	Bus Only	200	47,410	4.15%	5.53%	6.34%	6.78%	6.92%	6.78%	6.34%	5.53%	4.15%
	Bus-Rail	1,236	42,109	1.65%	2.20%	2.52%	2.69%	2.75%	2.69%	2.52%	2.20%	1.65%
	Bus-Rail-Bus	1,394	41,129	1.55%	2.06%	2.36%	2.53%	2.58%	2.53%	2.36%	2.06%	1.55%
	All System	6,383	246,016	0.73%	0.97%	1.11%	1.19%	1.21%	1.19%	1.11%	0.97%	0.73%
	Initial Rail	3,553	115,367	0.97%	1.29%	1.48%	1.59%	1.62%	1.59%	1.48%	1.29%	0.97%
	All Rail	6,183	198,606	0.74%	0.98%	1.12%	1.20%	1.23%	1.20%	1.12%	0.98%	0.74%
	Initial Bus	2,830	130,648	1.09%	1.46%	1.67%	1.79%	1.82%	1.79%	1.67%	1.46%	1.09%
	All Bus	4,001	172,400	0.92%	1.22%	1.40%	1.50%	1.53%	1.50%	1.40%	1.22%	0.92%
Saturday	Rail Only	606	40,811	2.37%	3.16%	3.62%	3.87%	3.95%	3.87%	3.62%	3.16%	2.37%
	Rail-Bus	194	21,019	4.20%	5.60%	6.42%	6.86%	7.00%	6.86%	6.42%	5.60%	4.20%
	Bus Only	76	44,343	6.74%	8.99%	10.29%	11.00%	11.23%	11.00%	10.29%	8.99%	6.74%
	Bus-Rail	242	19,869	3.76%	5.01%	5.74%	6.13%	6.26%	6.13%	5.74%	5.01%	3.76%
	Bus-Rail-Bus	254	18,972	3.66%	4.89%	5.60%	5.98%	6.11%	5.98%	5.60%	4.89%	3.66%
	All System	1,372	145,014	1.58%	2.11%	2.41%	2.58%	2.63%	2.58%	2.41%	2.11%	1.58%
	Initial Rail	800	61,830	2.07%	2.75%	3.15%	3.37%	3.44%	3.37%	3.15%	2.75%	2.07%
	All Rail	1,296	100,671	1.62%	2.16%	2.48%	2.65%	2.70%	2.65%	2.48%	2.16%	1.62%
	Initial Bus	572	83,184	2.45%	3.27%	3.74%	4.00%	4.08%	4.00%	3.74%	3.27%	2.45%
	All Bus	769	104,203	2.11%	2.82%	3.23%	3.45%	3.52%	3.45%	3.23%	2.82%	2.11%
Sunday	Rail Only	495	22,034	2.61%	3.48%	3.99%	4.27%	4.36%	4.27%	3.99%	3.48%	2.61%
	Rail-Bus	154	8,852	4.70%	6.26%	7.17%	7.67%	7.83%	7.67%	7.17%	6.26%	4.70%
	Bus Only	37	20,727	9.66%	12.88%	14.75%	15.77%	16.10%	15.77%	14.75%	12.88%	9.66%
	Bus-Rail	179	8,757	4.35%	5.80%	6.64%	7.10%	7.25%	7.10%	6.64%	5.80%	4.35%
	Bus-Rail-Bus	186	7,700	4.26%	5.68%	6.51%	6.96%	7.10%	6.96%	6.51%	5.68%	4.26%
	All System	1,051	68,070	1.80%	2.40%	2.75%	2.94%	3.00%	2.94%	2.75%	2.40%	1.80%
	Initial Rail	649	30,886	2.28%	3.05%	3.49%	3.73%	3.81%	3.73%	3.49%	3.05%	2.28%
	All Rail	1,014	47,343	1.83%	2.44%	2.79%	2.98%	3.04%	2.98%	2.79%	2.44%	1.83%
	Initial Bus	402	37,184	2.92%	3.89%	4.46%	4.76%	4.86%	4.76%	4.46%	3.89%	2.92%
	All Bus	557	46,036	2.48%	3.30%	3.78%	4.04%	4.13%	4.04%	3.78%	3.30%	2.48%

EXHIBIT A-2
PRECISION OF ESTIMATED PROPORTIONS FOR MODE OF ARRIVAL SURVEY ANALYSIS FRAMES

WEEKDAY - Page 1

Station/Period Frame		Populations:		Precision at 90% Confidence Interval for Proportions of:								
		Sample (n)	Total (N)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Chamblee	AM Peak	63	631	5.92%	7.90%	9.05%	9.67%	9.87%	9.67%	9.05%	7.90%	5.92%
	Midday	64	251	5.35%	7.14%	8.17%	8.74%	8.92%	8.74%	8.17%	7.14%	5.35%
	PM Peak	77	378	5.04%	6.72%	7.70%	8.23%	8.40%	8.23%	7.70%	6.72%	5.04%
	Other	16	81	11.15%	14.87%	17.04%	18.22%	18.59%	18.22%	17.04%	14.87%	11.15%
Brookhaven	AM Peak	155	369	3.03%	4.04%	4.63%	4.95%	5.05%	4.95%	4.63%	4.04%	3.03%
	Midday	98	142	2.79%	3.72%	4.27%	4.56%	4.66%	4.56%	4.27%	3.72%	2.79%
	PM Peak	109	275	3.69%	4.92%	5.64%	6.03%	6.15%	6.03%	5.64%	4.92%	3.69%
	Other	94	146	3.06%	4.08%	4.67%	4.99%	5.10%	4.99%	4.67%	4.08%	3.06%
Lenox	AM Peak	132	364	3.44%	4.59%	5.26%	5.62%	5.74%	5.62%	5.26%	4.59%	3.44%
	Midday	91	404	4.57%	6.10%	6.99%	7.47%	7.62%	7.47%	6.99%	6.10%	4.57%
	PM Peak	155	1,183	3.71%	4.94%	5.66%	6.05%	6.18%	6.05%	5.66%	4.94%	3.71%
	Other	60	304	5.73%	7.65%	8.76%	9.36%	9.56%	9.36%	8.76%	7.65%	5.73%
Lindbergh Ctr	AM Peak	134	555	3.73%	4.97%	5.69%	6.09%	6.21%	6.09%	5.69%	4.97%	3.73%
	Midday	85	387	4.75%	6.33%	7.25%	7.76%	7.92%	7.76%	7.25%	6.33%	4.75%
	PM Peak	126	755	4.03%	5.37%	6.15%	6.58%	6.71%	6.58%	6.15%	5.37%	4.03%
	Other	120	248	3.25%	4.34%	4.97%	5.31%	5.42%	5.31%	4.97%	4.34%	3.25%
Arts Center	AM Peak	85	286	4.51%	6.01%	6.89%	7.36%	7.51%	7.36%	6.89%	6.01%	4.51%
	Midday	132	480	3.67%	4.90%	5.61%	6.00%	6.12%	6.00%	5.61%	4.90%	3.67%
	PM Peak	220	932	2.92%	3.89%	4.46%	4.77%	4.86%	4.77%	4.46%	3.89%	2.92%
	Other	22	113	9.51%	12.68%	14.53%	15.53%	15.85%	15.53%	14.53%	12.68%	9.51%
Midtown	AM Peak	110	364	3.95%	5.26%	6.03%	6.45%	6.58%	6.45%	6.03%	5.26%	3.95%
	Midday	47	194	6.30%	8.40%	9.63%	10.29%	10.50%	10.29%	9.63%	8.40%	6.30%
	PM Peak	98	630	4.60%	6.13%	7.02%	7.51%	7.66%	7.51%	7.02%	6.13%	4.60%
	Other	31	75	6.86%	9.14%	10.47%	11.19%	11.43%	11.19%	10.47%	9.14%	6.86%

EXHIBIT A-2
PRECISION OF ESTIMATED PROPORTIONS FOR MODE OF ARRIVAL SURVEY ANALYSIS FRAMES

WEEKDAY - Page 2

Station/Period Frame		Populations:		Precision at 90% Confidence Interval for Proportions of:								
		Sample (n)	Total (N)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
North Avenue	AM Peak	108	566	4.29%	5.72%	6.55%	7.00%	7.15%	7.00%	6.55%	5.72%	4.29%
	Midday	172	893	3.39%	4.52%	5.18%	5.54%	5.66%	5.54%	5.18%	4.52%	3.39%
	PM Peak	225	1,274	3.00%	3.99%	4.58%	4.89%	4.99%	4.89%	4.58%	3.99%	3.00%
	Other	80	288	4.71%	6.28%	7.20%	7.69%	7.85%	7.69%	7.20%	6.28%	4.71%
Civic Center	AM Peak	15	69	11.39%	15.19%	17.40%	18.60%	18.98%	18.60%	17.40%	15.19%	11.39%
	Midday	32	167	7.89%	10.52%	12.05%	12.89%	13.15%	12.89%	12.05%	10.52%	7.89%
	PM Peak	77	298	4.87%	6.49%	7.43%	7.95%	8.11%	7.95%	7.43%	6.49%	4.87%
	Other	6	17	16.76%	22.34%	25.59%	27.36%	27.93%	27.36%	25.59%	22.34%	16.76%
Peachtree Ctr	AM Peak	88	421	4.70%	6.26%	7.18%	7.67%	7.83%	7.67%	7.18%	6.26%	4.70%
	Midday	137	1,212	3.98%	5.31%	6.09%	6.51%	6.64%	6.51%	6.09%	5.31%	3.98%
	PM Peak	195	4,557	3.47%	4.62%	5.30%	5.66%	5.78%	5.66%	5.30%	4.62%	3.47%
	Other	87	416	4.73%	6.30%	7.22%	7.72%	7.88%	7.72%	7.22%	6.30%	4.73%
Garnett	AM Peak	64	181	4.99%	6.65%	7.62%	8.15%	8.31%	8.15%	7.62%	6.65%	4.99%
	Midday	34	88	6.69%	8.92%	10.22%	10.92%	11.15%	10.92%	10.22%	8.92%	6.69%
	PM Peak	72	231	4.85%	6.47%	7.41%	7.92%	8.08%	7.92%	7.41%	6.47%	4.85%
	Other	47	194	6.30%	8.40%	9.63%	10.29%	10.50%	10.29%	9.63%	8.40%	6.30%
West End	AM Peak	112	407	3.99%	5.32%	6.09%	6.51%	6.64%	6.51%	6.09%	5.32%	3.99%
	Midday	74	360	5.14%	6.85%	7.85%	8.39%	8.56%	8.39%	7.85%	6.85%	5.14%
	PM Peak	133	519	3.71%	4.94%	5.66%	6.05%	6.18%	6.05%	5.66%	4.94%	3.71%
	Other	73	419	5.27%	7.03%	8.05%	8.61%	8.79%	8.61%	8.05%	7.03%	5.27%
Oakland City	AM Peak	48	314	6.59%	8.78%	10.06%	10.76%	10.98%	10.76%	10.06%	8.78%	6.59%
	Midday	40	101	6.11%	8.15%	9.34%	9.98%	10.19%	9.98%	9.34%	8.15%	6.11%
	PM Peak	67	211	5.01%	6.68%	7.65%	8.18%	8.35%	8.18%	7.65%	6.68%	5.01%
	Other	45	135	6.05%	8.06%	9.24%	9.88%	10.08%	9.88%	9.24%	8.06%	6.05%

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EXHIBIT A-2
PRECISION OF ESTIMATED PROPORTIONS FOR MODE OF ARRIVAL SURVEY ANALYSIS FRAMES

WEEKDAY - Page 3

Station/Period Frame		Populations:		Precision at 90% Confidence Interval for Proportions of:								
		Sample (n)	Total (N)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Lakewood/FMc	AM Peak	68	287	5.25%	7.00%	8.02%	8.58%	8.75%	8.58%	8.02%	7.00%	5.25%
	Midday	23	77	8.70%	11.60%	13.29%	14.21%	14.50%	14.21%	13.29%	11.60%	8.70%
	PM Peak	66	173	4.81%	6.41%	7.34%	7.85%	8.01%	7.85%	7.34%	6.41%	4.81%
	Other	61	155	4.95%	6.60%	7.56%	8.09%	8.25%	8.09%	7.56%	6.60%	4.95%
East Point	AM Peak	55	202	5.71%	7.61%	8.72%	9.32%	9.51%	9.32%	8.72%	7.61%	5.71%
	Midday	59	142	4.94%	6.59%	7.55%	8.07%	8.24%	8.07%	7.55%	6.59%	4.94%
	PM Peak	47	147	5.98%	7.97%	9.13%	9.76%	9.96%	9.76%	9.13%	7.97%	5.98%
	Other	53	183	5.75%	7.66%	8.78%	9.38%	9.58%	9.38%	8.78%	7.66%	5.75%
College Park	AM Peak	108	729	4.40%	5.87%	6.72%	7.18%	7.33%	7.18%	6.72%	5.87%	4.40%
	Midday	48	145	5.86%	7.82%	8.96%	9.58%	9.77%	9.58%	8.96%	7.82%	5.86%
	PM Peak	98	301	4.11%	5.48%	6.28%	6.72%	6.86%	6.72%	6.28%	5.48%	4.11%
	Other	109	276	3.69%	4.93%	5.64%	6.03%	6.16%	6.03%	5.64%	4.93%	3.69%
Airport	AM Peak	187	487	2.84%	3.79%	4.34%	4.64%	4.74%	4.64%	4.34%	3.79%	2.84%
	Midday	120	374	3.73%	4.97%	5.70%	6.09%	6.21%	6.09%	5.70%	4.97%	3.73%
	PM Peak	245	947	2.72%	3.63%	4.16%	4.45%	4.54%	4.45%	4.16%	3.63%	2.72%
	Other	85	448	4.84%	6.45%	7.39%	7.90%	8.06%	7.90%	7.39%	6.45%	4.84%
Five Points	AM Peak	177	2,065	3.56%	4.74%	5.44%	5.81%	5.93%	5.81%	5.44%	4.74%	3.56%
	Midday	182	4,365	3.59%	4.79%	5.49%	5.87%	5.99%	5.87%	5.49%	4.79%	3.59%
	PM Peak	181	4,872	3.61%	4.81%	5.52%	5.90%	6.02%	5.90%	5.52%	4.81%	3.61%
	Other	181	2,260	3.53%	4.71%	5.39%	5.76%	5.88%	5.76%	5.39%	4.71%	3.53%

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EXHIBIT A-2
PRECISION OF ESTIMATED PROPORTIONS FOR MODE OF ARRIVAL SURVEY ANALYSIS FRAMES

WEEKDAY - Page 4

Station/Period Frame		Populations:		Precision at 90% Confidence Interval for Proportions of:									
		Sample (n)	Total (N)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
Hightower	AM Peak	107	743	4.43%	5.91%	6.77%	7.23%	7.38%	7.23%	6.77%	5.91%	4.43%	
	Midday	51	154	5.69%	7.58%	8.69%	9.29%	9.48%	9.29%	8.69%	7.58%	5.69%	
	PM Peak	164	471	3.12%	4.17%	4.77%	5.10%	5.21%	5.10%	4.77%	4.17%	3.12%	
	Other	100	305	4.06%	5.42%	6.21%	6.64%	6.77%	6.64%	6.21%	5.42%	4.06%	
West Lake	AM Peak	154	662	3.50%	4.66%	5.34%	5.71%	5.83%	5.71%	5.34%	4.66%	3.50%	
	Midday	94	223	3.89%	5.19%	5.94%	6.36%	6.49%	6.36%	5.94%	5.19%	3.89%	
	PM Peak	180	375	2.66%	3.55%	4.07%	4.35%	4.44%	4.35%	4.07%	3.55%	2.66%	
	Other	172	346	2.68%	3.57%	4.09%	4.38%	4.47%	4.38%	4.09%	3.57%	2.68%	
Ashby	AM Peak	111	586	4.23%	5.64%	6.47%	6.91%	7.06%	6.91%	6.47%	5.64%	4.23%	
	Midday	83	251	4.36%	5.81%	6.66%	7.12%	7.26%	7.12%	6.66%	5.81%	4.36%	
	PM Peak	144	513	3.50%	4.67%	5.35%	5.72%	5.84%	5.72%	5.35%	4.67%	3.50%	
	Other	140	310	3.10%	4.14%	4.74%	5.07%	5.17%	5.07%	4.74%	4.14%	3.10%	
Vine City	AM Peak	96	239	3.92%	5.22%	5.98%	6.39%	6.53%	6.39%	5.98%	5.22%	3.92%	
	Midday	86	191	3.97%	5.29%	6.06%	6.48%	6.61%	6.48%	6.06%	5.29%	3.97%	
	PM Peak	89	171	3.64%	4.86%	5.57%	5.95%	6.07%	5.95%	5.57%	4.86%	3.64%	
	Other	20	75	9.54%	12.72%	14.58%	15.58%	15.90%	15.58%	14.58%	12.72%	9.54%	
Omni	AM Peak	52	56	1.85%	2.47%	2.83%	3.02%	3.09%	3.02%	2.83%	2.47%	1.85%	
	Midday	127	159	1.98%	2.64%	3.02%	3.23%	3.29%	3.23%	3.02%	2.64%	1.98%	
	PM Peak	112	380	3.93%	5.24%	6.01%	6.42%	6.56%	6.42%	6.01%	5.24%	3.93%	
	Other	53	56	1.59%	2.12%	2.43%	2.59%	2.65%	2.59%	2.43%	2.12%	1.59%	
Georgia State	AM Peak	48	319	6.60%	8.79%	10.07%	10.77%	10.99%	10.77%	10.07%	8.79%	6.60%	
	Midday	102	657	4.51%	6.01%	6.89%	7.36%	7.51%	7.36%	6.89%	6.01%	4.51%	
	PM Peak	169	931	3.45%	4.60%	5.26%	5.63%	5.74%	5.63%	5.26%	4.60%	3.45%	
	Other	58	208	5.53%	7.38%	8.45%	9.04%	9.22%	9.04%	8.45%	7.38%	5.53%	

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EXHIBIT A-2
PRECISION OF ESTIMATED PROPORTIONS FOR MODE OF ARRIVAL SURVEY ANALYSIS FRAMES

WEEKDAY - Page 5

Station/Period Frame		Populations:		Precision at 90% Confidence Interval for Proportions of:								
		Sample (n)	Total (N)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
King Memorial	AM Peak	72	77	1.50%	2.00%	2.29%	2.44%	2.49%	2.44%	2.29%	2.00%	1.50%
	Midday	84	105	2.43%	3.24%	3.71%	3.96%	4.04%	3.96%	3.71%	3.24%	2.43%
	PM Peak	123	160	2.15%	2.87%	3.29%	3.52%	3.59%	3.52%	3.29%	2.87%	2.15%
	Other	32	59	5.97%	7.96%	9.12%	9.75%	9.95%	9.75%	9.12%	7.96%	5.97%
Inman Park/RT	AM Peak	177	379	2.72%	3.63%	4.15%	4.44%	4.53%	4.44%	4.15%	3.63%	2.72%
	Midday	44	56	3.49%	4.65%	5.32%	5.69%	5.81%	5.69%	5.32%	4.65%	3.49%
	PM Peak	140	210	2.42%	3.23%	3.70%	3.95%	4.04%	3.95%	3.70%	3.23%	2.42%
	Other	101	156	2.93%	3.91%	4.48%	4.79%	4.89%	4.79%	4.48%	3.91%	2.93%
Edgewood/CP	AM Peak	159	583	3.35%	4.47%	5.12%	5.47%	5.58%	5.47%	5.12%	4.47%	3.35%
	Midday	104	250	3.72%	4.96%	5.68%	6.07%	6.19%	6.07%	5.68%	4.96%	3.72%
	PM Peak	142	392	3.32%	4.43%	5.07%	5.42%	5.54%	5.42%	5.07%	4.43%	3.32%
	Other	175	273	2.25%	2.99%	3.43%	3.67%	3.74%	3.67%	3.43%	2.99%	2.25%
East Lake	AM Peak	136	390	3.43%	4.57%	5.24%	5.60%	5.72%	5.60%	5.24%	4.57%	3.43%
	Midday	191	201	0.80%	1.07%	1.22%	1.31%	1.33%	1.31%	1.22%	1.07%	0.80%
	PM Peak	164	213	1.86%	2.48%	2.84%	3.03%	3.10%	3.03%	2.84%	2.48%	1.86%
	Other	129	241	2.98%	3.97%	4.55%	4.86%	4.96%	4.86%	4.55%	3.97%	2.98%
Decatur	AM Peak	79	485	5.10%	6.80%	7.79%	8.33%	8.50%	8.33%	7.79%	6.80%	5.10%
	Midday	172	772	3.33%	4.44%	5.09%	5.44%	5.55%	5.44%	5.09%	4.44%	3.33%
	PM Peak	183	677	3.13%	4.17%	4.78%	5.11%	5.21%	5.11%	4.78%	4.17%	3.13%
	Other	93	351	4.41%	5.88%	6.73%	7.20%	7.34%	7.20%	6.73%	5.88%	4.41%
Avondale	AM Peak	117	762	4.21%	5.62%	6.44%	6.88%	7.02%	6.88%	6.44%	5.62%	4.21%
	Midday	94	303	4.25%	5.66%	6.49%	6.94%	7.08%	6.94%	6.49%	5.66%	4.25%
	PM Peak	253	970	2.68%	3.57%	4.09%	4.37%	4.46%	4.37%	4.09%	3.57%	2.68%
	Other	139	498	3.57%	4.76%	5.45%	5.83%	5.95%	5.83%	5.45%	4.76%	3.57%

EXHIBIT A-2
PRECISION OF ESTIMATED PROPORTIONS FOR MODE OF ARRIVAL SURVEY ANALYSIS FRAMES

WEEKEND - Page 1

Station/Period	Frame	Populations:		Precision at 90% Confidence Interval for Proportions of:									
		Sample (n)	Total (N)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
Chamblee	Daytime	71	675	5.56%	7.41%	8.49%	9.08%	9.27%	9.08%	8.49%	7.41%	5.56%	
	Other	24	174	9.41%	12.54%	14.37%	15.36%	15.68%	15.36%	14.37%	12.54%	9.41%	
Brookhaven	Daytime	146	682	3.63%	4.85%	5.55%	5.94%	6.06%	5.94%	5.55%	4.85%	3.63%	
	Other	107	108	0.46%	0.62%	0.71%	0.76%	0.77%	0.76%	0.71%	0.62%	0.46%	
Lenox	Daytime	135	831	3.90%	5.20%	5.96%	6.37%	6.50%	6.37%	5.96%	5.20%	3.90%	
	Other	23	79	8.75%	11.66%	13.36%	14.28%	14.58%	14.28%	13.36%	11.66%	8.75%	
Lindbergh Ctr	Daytime	80	190	4.22%	5.63%	6.45%	6.89%	7.04%	6.89%	6.45%	5.63%	4.22%	
	Other	110	327	3.85%	5.13%	5.88%	6.29%	6.42%	6.29%	5.88%	5.13%	3.85%	
Arts Center	Daytime	116	204	3.03%	4.03%	4.62%	4.94%	5.04%	4.94%	4.62%	4.03%	3.03%	
	Other	29	63	6.81%	9.08%	10.40%	11.12%	11.34%	11.12%	10.40%	9.08%	6.81%	
Midtown	Daytime	54	219	5.86%	7.81%	8.95%	9.57%	9.77%	9.57%	8.95%	7.81%	5.86%	
	Other	27	71	7.55%	10.07%	11.54%	12.33%	12.59%	12.33%	11.54%	10.07%	7.55%	
North Avenue	Daytime	73	236	4.83%	6.43%	7.37%	7.88%	8.04%	7.88%	7.37%	6.43%	4.83%	
	Other	60	173	5.18%	6.91%	7.91%	8.46%	8.63%	8.46%	7.91%	6.91%	5.18%	
Civic Center	Daytime	16	51	10.35%	13.80%	15.82%	16.91%	17.26%	16.91%	15.82%	13.80%	10.35%	
	Other	6	24	17.88%	23.84%	27.31%	29.19%	29.80%	29.19%	27.31%	23.84%	17.88%	
Peachtree Ctr	Daytime	103	487	4.34%	5.78%	6.62%	7.08%	7.23%	7.08%	6.62%	5.78%	4.34%	
	Other	60	648	6.09%	8.12%	9.31%	9.95%	10.15%	9.95%	9.31%	8.12%	6.09%	

EXHIBIT A-2
PRECISION OF ESTIMATED PROPORTIONS FOR MODE OF ARRIVAL SURVEY ANALYSIS FRAMES

WEEKEND - Page 2

Station/Period	Frame	Populations:		Precision at 90% Confidence Interval for Proportions of:								
		Sample (n)	Total (N)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Garnett	Daytime	37	79	5.97%	7.96%	9.12%	9.75%	9.95%	9.75%	9.12%	7.96%	5.97%
	Other	20	49	8.60%	11.47%	13.14%	14.05%	14.34%	14.05%	13.14%	11.47%	8.60%
West End	Daytime	87	350	4.61%	6.14%	7.04%	7.52%	7.68%	7.52%	7.04%	6.14%	4.61%
	Other	49	117	5.41%	7.22%	8.27%	8.84%	9.02%	8.84%	8.27%	7.22%	5.41%
Oakland City	Daytime	47	106	5.41%	7.22%	8.27%	8.84%	9.02%	8.84%	8.27%	7.22%	5.41%
	Other	29	60	6.66%	8.88%	10.18%	10.88%	11.10%	10.88%	10.18%	8.88%	6.66%
Lakewood/FMc	Daytime	20	54	8.87%	11.82%	13.54%	14.48%	14.78%	14.48%	13.54%	11.82%	8.87%
	Other	27	53	6.74%	8.98%	10.29%	11.00%	11.23%	11.00%	10.29%	8.98%	6.74%
East Point	Daytime	49	118	5.43%	7.24%	8.30%	8.87%	9.05%	8.87%	8.30%	7.24%	5.43%
	Other	41	72	5.11%	6.81%	7.80%	8.34%	8.51%	8.34%	7.80%	6.81%	5.11%
College Park	Daytime	82	204	4.24%	5.65%	6.47%	6.92%	7.06%	6.92%	6.47%	5.65%	4.24%
	Other	46	98	5.34%	7.12%	8.16%	8.73%	8.91%	8.73%	8.16%	7.12%	5.34%
Airport	Daytime	162	580	3.30%	4.41%	5.05%	5.40%	5.51%	5.40%	5.05%	4.41%	3.30%
	Other	65	151	4.65%	6.20%	7.10%	7.59%	7.75%	7.59%	7.10%	6.20%	4.65%
Five Points	Daytime	136	2,729	4.14%	5.52%	6.32%	6.76%	6.90%	6.76%	6.32%	5.52%	4.14%
	Other	170	586	3.20%	4.27%	4.89%	5.23%	5.34%	5.23%	4.89%	4.27%	3.20%
Hightower	Daytime	135	406	3.48%	4.65%	5.32%	5.69%	5.81%	5.69%	5.32%	4.65%	3.48%
	Other	77	179	4.27%	5.69%	6.52%	6.97%	7.12%	6.97%	6.52%	5.69%	4.27%
West Lake	Daytime	104	180	3.16%	4.22%	4.83%	5.16%	5.27%	5.16%	4.83%	4.22%	3.16%
	Other	148	275	2.77%	3.69%	4.23%	4.52%	4.62%	4.52%	4.23%	3.69%	2.77%
Ashby	Daytime	64	207	5.16%	6.87%	7.87%	8.42%	8.59%	8.42%	7.87%	6.87%	5.16%
	Other	100	357	4.21%	5.61%	6.42%	6.87%	7.01%	6.87%	6.42%	5.61%	4.21%

EXHIBIT A-2
PRECISION OF ESTIMATED PROPORTIONS FOR MODE OF ARRIVAL SURVEY ANALYSIS FRAMES

WEEKEND - Page 3

Station/Period Frame		Populations:		Precision at 90% Confidence Interval for Proportions of:								
		Sample (n)	Total (N)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Vine City	Daytime	34	119	7.21%	9.61%	11.01%	11.77%	12.01%	11.77%	11.01%	9.61%	7.21%
	Other	40	122	6.44%	8.59%	9.84%	10.52%	10.74%	10.52%	9.84%	8.59%	6.44%
Omni	Daytime	271	396	1.69%	2.26%	2.58%	2.76%	2.82%	2.76%	2.58%	2.26%	1.69%
	Other	16	72	10.99%	14.65%	16.79%	17.95%	18.32%	17.95%	16.79%	14.65%	10.99%
Georgia State	Daytime	63	135	4.57%	6.10%	6.98%	7.47%	7.62%	7.47%	6.98%	6.10%	4.57%
	Other	26	69	7.72%	10.29%	11.79%	12.61%	12.87%	12.61%	11.79%	10.29%	7.72%
King Memorial	Daytime	69	104	3.47%	4.63%	5.31%	5.67%	5.79%	5.67%	5.31%	4.63%	3.47%
	Other	42	42	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Inman Park/RT	Daytime	113	300	3.68%	4.91%	5.63%	6.01%	6.14%	6.01%	5.63%	4.91%	3.68%
	Other	92	97	1.18%	1.57%	1.80%	1.92%	1.96%	1.92%	1.80%	1.57%	1.18%
Edgewood/CP	Daytime	145	173	1.66%	2.21%	2.53%	2.71%	2.76%	2.71%	2.53%	2.21%	1.66%
	Other	97	98	0.51%	0.68%	0.78%	0.83%	0.85%	0.83%	0.78%	0.68%	0.51%
East Lake	Daytime	140	155	1.31%	1.74%	1.99%	2.13%	2.18%	2.13%	1.99%	1.74%	1.31%
	Other	81	140	3.58%	4.78%	5.47%	5.85%	5.97%	5.85%	5.47%	4.78%	3.58%
Decatur	Daytime	122	472	3.86%	5.15%	5.90%	6.31%	6.44%	6.31%	5.90%	5.15%	3.86%
	Other	86	187	3.93%	5.24%	6.01%	6.42%	6.56%	6.42%	6.01%	5.24%	3.93%
Avondale	Daytime	115	406	3.91%	5.22%	5.98%	6.39%	6.52%	6.39%	5.98%	5.22%	3.91%
	Other	180	427	2.81%	3.75%	4.29%	4.59%	4.68%	4.59%	4.29%	3.75%	2.81%

A-11

APPENDIX B
DOCUMENTATION FOR MACHINE READABLE FILES

The On-board surveys collected respondent information using the questionnaire shown in Exhibit 1-1. During computer processing of the resulting data, two separate records were created. One file, the Final Factored Short Response record, contains control, attribute, and weighting information. The other file contains address information.

B.1 FINAL FACTORED SHORT RESPONSE RECORD

A record layout and code definitions for the on-board survey short response file is provided in Exhibit B-1. Generally, the definition of fields is unambiguous and requires no additional explanation. Instructions pertaining to the use of five fields are provided below.

B.1.1 Entry Station and Exit Station

These fields were determined from analysis of the travel pattern of each respondent. These fields identify, by numeric code, the entry and exit stations for respondents using rail. They will be coded 0 for non-rail responses even if the respondent entered or exited rail stations (e.g., to use free intermodal bus service).

B.1.2 Rail Boardings, Bus Boardings and Trip Weight

These factors are all related. The Rail Boarding weight was determined by analysis of the travel pattern and counting the number of trains boarded. Then, this count was multiplied by the trip weight. The Bus Boarding weight was determined in a similar fashion, except only MARTA bus boardings were counted. Any Cobb County buses used in the travel pattern were ignored. The Trip factor (weight) reflects the combined results of both the rail and bus on-board surveys. It is recommended that this factor be used for most analysis. (Section 1 describes how this factor was determined.)

B.2 GEOCODED ADDRESS RECORD

A record layout and code definitions for the on-board survey geocoded address file is provided in Exhibit B-2. Generally, the definition of fields is unambiguous and

requires no additional explanation. Supplementary information for four fields is provided below.

B.2.1 Source Response Serial Number

The source response serial number is the primary field relating address records to response records (the serial number is in columns 27-31 of the short response record). There are at least four (4) records in the address file for each response record.

B.2.2 Source Response Address Number

This field relates an address record to a specific questionnaire address location. The nine possible questionnaire address locations are numbered sequentially from the top as follows:

- 1* Origin Address
- 2* 1st Boarding Address
- 3 2nd Boarding Address
- 4 3rd Boarding Address
- 5 4th Boarding Address
- 6 5th Boarding Address
- 7* Last Alighting Address
- 8* Destination Address
- 9 Home Address

Addresses shown with an asterisk (*) will always be present. In addition, nearly all responses have a home address.

B.2.3 Address Type and Address

The address type indicates the format of the address. The possible type codes and associated address formats are detailed in Exhibit B-2.

EXHIBIT B-1
FINAL FACTORED SHORT RESPONSE RECORD FORMAT

Columns	Format	Description	
1-1	I1	Issue Mode (1 = Rail, 2 = Bus)	>
2-2	I1	Issue Day (1 = Wkd, 2 = Sat, 3 = Sun)	> C
3-3	I1	Issue Direction (1 = Inbound, 2 = Outbound)	> O
4-5	I2	Issue Line (varies by day and mode, see list)	> N
6-6	I1	Issue Time Period (varies by day, see list)	> T
7-8	I2	Entry Station (0 or 1-29, see list)	> R
9-10	I2	Exit Station (0 or 1-29, see list)	> O
11-13	I3	Survey Assignment	> L
14-15	I2	Assignment Page	>
16-16	I1	Assignment Trip Sequence Number	> D
17-20	I4	Trip Number	> A
21-21	I1	Trip Segment Number	> T
22-22	I1	Segment Serial Range Sequence Number	> A
23-26	I4	Keyed Trip Number	>
27-31	I5	Response Serial Number	>
32-32	I1	Origin Purpose	> Q
33-33	I1	How Paid	> U
34-34	I1	Origin Mode	> E
35-35	I1	Destination Mode	> S
36-36	I1	Destination Purpose	> T
37-37	I1	How Often Ride	> I
38-39	I2	Household Size	> O
40-40	I1	Working Vehicles	> N
41-41	I1	Alternate Way	> N
42-42	I1	Gender	> A
43-43	I1	Race	> I
44-44	I1	Age Group	> R
45-45	I1	Income Group	> E
46-46	I1	MARTA Tenure	>
47-48	I2	1st Station	>
49-49	I1	Mode	> T
50-52	I3	Route	> R
53-54	I2	2nd Station	> A
55-55	I1	Mode	> V
56-58	I3	Route	> E
59-60	I2	3rd Station	> L
61-61	I1	Mode	>
62-64	I3	Route	> P
65-66	I2	4th Station	> A
67-67	I1	Mode	> T
68-70	I3	Route	> T
71-72	I2	5th Station	> E
73-73	I1	Mode	> R
74-76	I3	Route	> N
77-78	I2	6th Station	>
79-88	F10.5	Rail Boardings (Rail Boardings * Weight)	
89-98	F10.5	Bus Boardings (Surveyed Bus Boardings * Weight)	
99-108	F10.5	Trip Weight (Weight)	
109-112	F4.1	Entry Station to Exit Station Rail Miles	

Note: Codes are defined on the next page.

