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Intercity Passenger Rail: Implications for Urban, Regional, and National Mobility

Final Report

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16. Abstract

Recent policy and regulatory actions by the U.S. government have revived interest in intercity passenger rail among transportation planners, policymakers, and the general public. As part of a fully integrated multimodal intercity corridor, passenger rail can provide a number of measurable impacts on urban, regional, and national mobility. This research examines these impacts using the Milwaukee-Chicago *Hiawatha Service* intercity passenger rail route as a case study. In addition to providing competitive travel times with automobile travel and frequent daily service, rail passengers can also seamlessly connect to airline service via a station at the Milwaukee airport. Two data sources—an on-board survey of *Hiawatha Service* passengers and a more detailed survey of air-rail transfer passengers at the Milwaukee airport—were used to identify the mobility impacts of rail service. If the rail service did not exist, most *Hiawatha Service* passengers would travel via personal vehicle, which indicates that the *Hiawatha Service* is providing congestion relief for the highways parallel to the route. The airport link allows for sustainable ground access to the Milwaukee airport and also extends the market area for the airport into the Chicago region, providing those residents with greater choices in air travel. The findings of this project provide unique insight into the mobility impacts of intercity passenger rail and can be used by state department of transportation rail planners and other public agency staff to develop rail service plans and administer state passenger rail programs throughout the U.S.

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The research team also wishes to acknowledge the contribution of the Texas Transportation Institute's administrative staff that provided editing assistance in the production of this report and other invaluable assistance throughout the duration of the study.

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EXECUTIVE SUMMARY

Recent policy and regulatory actions by the U.S. government have signaled a new role for high-speed and other forms of passenger rail as a mobility solution for congested intercity travel corridors across the country. In high-demand intercity corridors, frequent, high-capacity intercity rail is thought to have a profound impact on personal mobility on all geographic levels. Intercity passenger rail can support urban and regional mobility by offering an alternative to automobile travel for long-distance commuting trips and inter-regional trips (out-of-town day trips for business as an example). Moving forward, a better understanding of how existing intercity rail services are being used to enhance mobility and implications for regional travel patterns if investments in passenger rail are not made is desired to support planning and decision-making. To expand the body of knowledge for high-speed intercity passenger rail planning in the U.S., researchers at the Texas Transportation Institute (TTI), with financial support from the University Transportation Center for Mobility (UTCM) and in-kind assistance from the Wisconsin Department of Transportation (WisDOT), initiated this research project to examine the urban, regional, and national mobility impacts of passenger rail in intercity corridors.

RESEARCH SETTING

The setting for this research project was the *Hiawatha Service*, an Amtrak intercity passenger rail route operating in the 86-mile corridor between Milwaukee, Wisconsin, and Chicago, Illinois. The endpoint-to-endpoint travel time is approximately 89 minutes, and there are seven round trips Monday through Saturday (six on Sundays). Ridership on the route has grown more than 40 percent over the last five years and exceeded 819,000 passengers over the 12-month period ending September 2011. The route had the highest ridership of any Amtrak route outside of the Northeast and West Coast. Both Wisconsin and Illinois contribute funds to support *Hiawatha Service* operations, and additional targeted investment by the State of Wisconsin has improved facilities and increased awareness of the route. The Milwaukee Airport Rail Station, one of the station stops along the route, allows *Hiawatha Service* passengers to connect from the rail service to commercial airline flights at Milwaukee General Mitchell International Airport. A circulating shuttle bus transports connecting passengers between the rail station and the airport terminal. This connection is unique in that it is one of only four such direct connections between passenger rail and airports in the U.S. Owing to the route's trip-time competitiveness with the automobile, frequent daily service, and an intermodal connection with the airport in Milwaukee, the *Hiawatha Service* was the ideal setting for this research project studying the impacts of intercity passenger rail on urban, regional, and national mobility.

DATA COLLECTION

To examine the mobility impacts of the *Hiawatha Service*, two separate data collection efforts were undertaken in this project. The first was an on-board survey of *Hiawatha Service* passengers conducted in the spring of 2011. The four-page survey, which consisted of 25 questions, identified information about the passenger's trip purpose on the day of the survey, alternatives to the *Hiawatha Service*, motivations for using the train instead of other modes, and demographic profile information. Across two days of data collection (a weekday and a weekend

day), a total of 2,298 completed surveys were obtained from *Hiawatha Service* passengers, achieving a participation rate of 58 percent. The second data collection effort was a more detailed study of passengers utilizing the shuttle bus connection between the Milwaukee Airport Rail Station and the airport terminal at Milwaukee General Mitchell International Airport. The shuttle passenger survey employed an innovative two-part data collection procedure consisting of an initial field interview conducted with shuttle passengers at the rail station and a follow-up Internet survey questionnaire. Using a two-part data collection procedure for this survey was inspired by past research on a survey technique known as "Foot in the Door," whereby compliance with a smaller task (in this case, shuttle passenger participation in the initial interview) results in greater compliance with a larger task (the follow-up Internet survey questionnaire). The follow-up survey contained 22 questions about the shuttle passenger's trip purpose, motivations for using the shuttle connection to access the Milwaukee airport, alternatives to rail access, and demographic profile information. A total of 848 initial interviews were conducted with passengers at the Milwaukee Airport Rail Station over a 15-day period in May and June 2011. From these initial interviews, a total of 155 follow-up Internet survey responses were obtained, resulting in a response rate of approximately 18 percent.

ON-BOARD PASSENGER SURVEY FINDINGS

The *Hiawatha Service* on-board passenger survey data revealed valuable insight into the travel behavior, decision-making, and demographic profile of the rail passengers. There were clear trends observed between the weekday and weekend passengers in terms of trip purpose. Figure ES-1 shows the *Hiawatha Service* passenger trip purpose by day type (see Table 5-6).

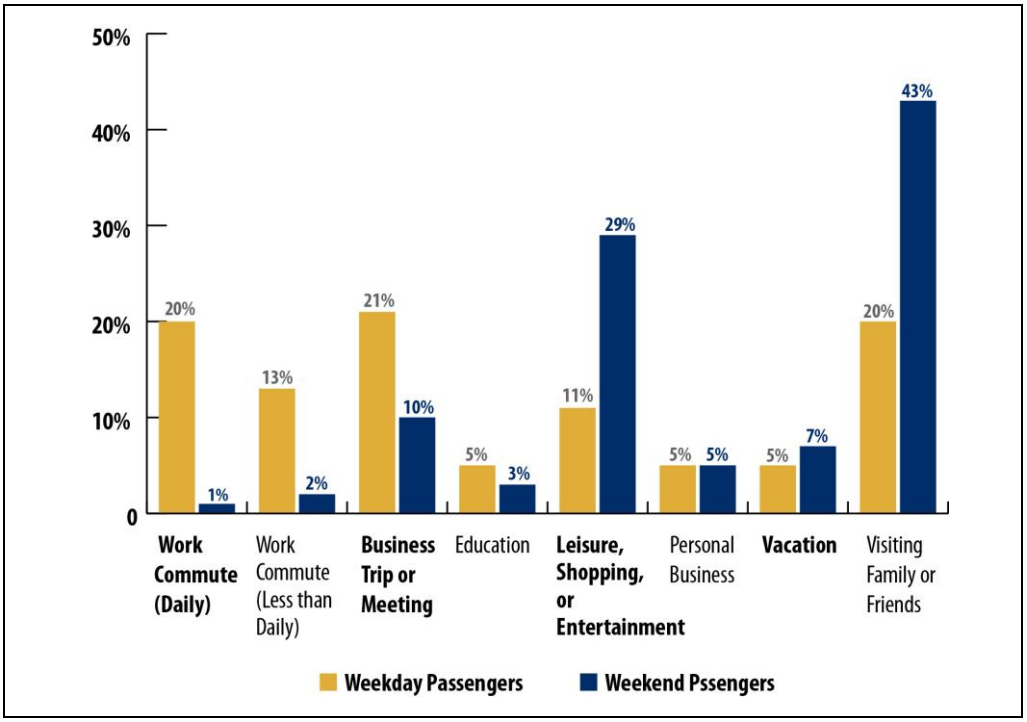


Figure ES-1: *Hiawatha Service* Passenger Trip Purpose by Day Type

On weekdays, a majority of passengers were traveling on the *Hiawatha Service* for business-related or work commute purposes. This included travelers commuting to or from work on a daily basis or on a less-than-daily basis. Conversely, almost 80 percent of weekend passengers were traveling for personal reasons, such as for visiting family or friends, for leisure or entertainment, as part of vacation, or for shopping. This contrast in trip purpose between weekday and weekend passengers was also evident in the demographic profile analysis, which reflected trends in age, employment status, educational attainment, and annual household income that would be expected between the business/work commute groups and the personal traveler groups. Another contrast between weekday and weekend passengers was noted in the passengers' reasons for choosing the *Hiawatha Service* for the trip. Weekday passengers tended to view the convenience aspects of the rail service as a greater influence on why they used the rail service instead of other modes, while weekend passengers rated the connections between the rail service and other Amtrak trains, intercity buses, or airlines as more influential.

One key finding from the on-board survey was that 86 percent of passengers would use other modes of travel if the *Hiawatha Service* were not available. Figure ES-2 reports the percentage of *Hiawatha Service* passengers that would select each alternative travel mode if the rail service were not available (see Table 5-11).

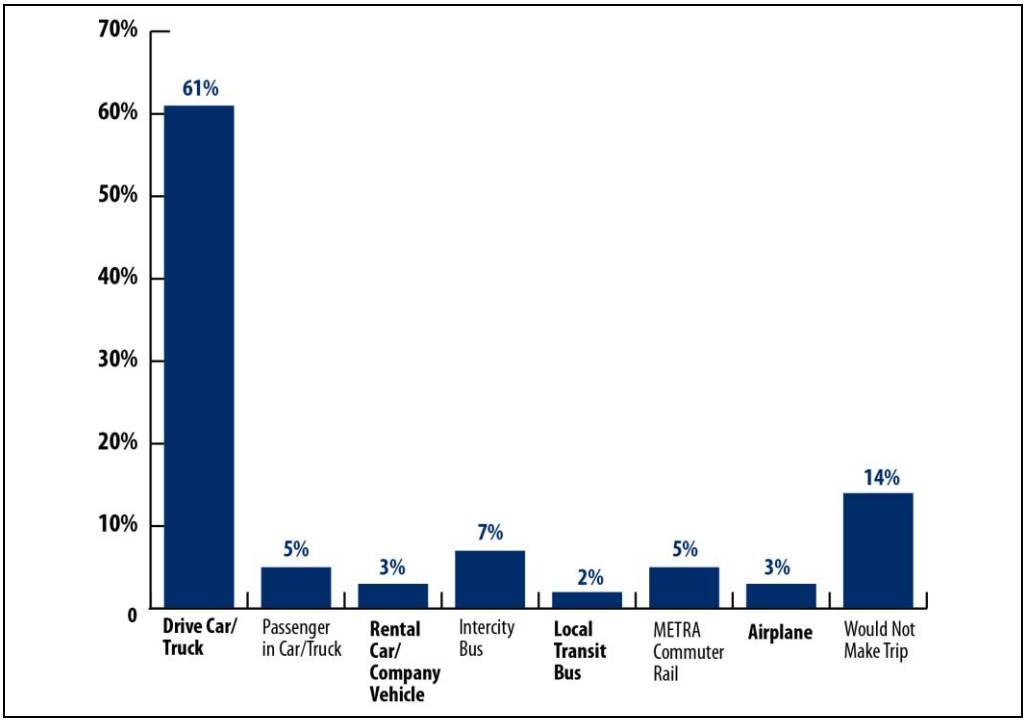


Figure ES-2: *Hiawatha Service* Passenger Alternative Travel Mode

Automobile was the primary alternative to rail service, with nearly 70 percent of passengers reporting that they would use an automobile if the rail service was not available. Other alternatives to the *Hiawatha Service* included intercity bus, METRA commuter rail, airplane, and local transit bus. The option "I Would Not Have Made This Trip" was selected by 14 percent of passengers, indicating a small amount of "induced" travel among the *Hiawatha Service* passengers. Commuter rail as an alternative to the *Hiawatha Service* was slightly higher

for weekday travelers, while intercity bus as an alternative to the rail service was higher for weekend travelers. Applying these findings to the overall *Hiawatha Service* ridership, researchers estimated that more than 521,000 annual vehicle trips are shifted from the region's highways onto the *Hiawatha Service*, resulting in an annual vehicle-miles traveled (VMT) savings in excess of 41.7 million miles. Diversion from other surface and air transportation modes also provides congestion relief in those networks, thus improving mobility for all travelers on the urban, regional, and national levels.

AIRPORT RAIL STATION SHUTTLE SURVEY FINDINGS

The Milwaukee airport shuttle passenger survey conducted in this project was unique in that it specifically focused on passengers utilizing an airport-intercity passenger rail connection in the U.S. Previous research on airport ground access mode choice defines four segments of airport ground access travelers based on trip purpose (business or non-business) and the residential status of the traveler (resident or non-resident of the airport's market area). The distribution of Milwaukee General Mitchell International Airport shuttle passengers in each market segment was as follows:

- Resident/Business (17 percent of shuttle passengers);
- Resident/Non-Business (24 percent);
- Non-Resident/Business (18 percent); and
- Non-Resident/Non-Business (41 percent).

Figure ES-3 shows the distribution of home residence location for all *Hiawatha Service* passengers and for the Milwaukee airport shuttle passengers (see Tables 5-19 and 6-9).

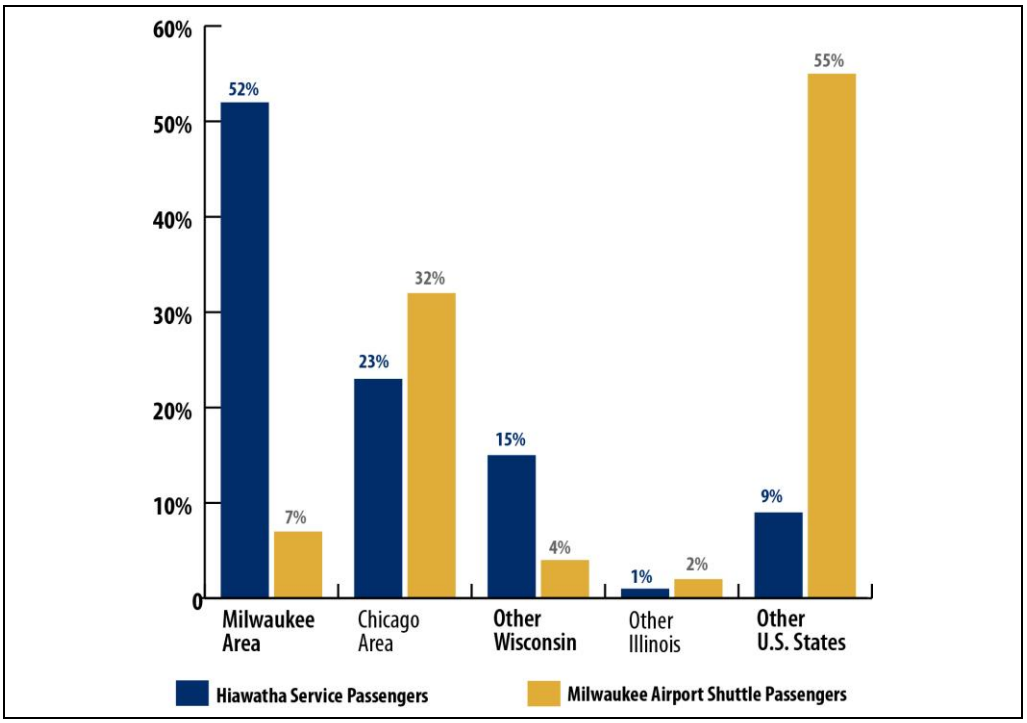


Figure ES-3: Home Residence of All Rail Passengers and Airport Shuttle Passengers

A majority of all *Hiawatha Service* passengers were from the Milwaukee area. However, Milwaukee-area residents comprised only 7 percent of the airport shuttle ridership. This was not surprising, as residents of the Milwaukee area were more likely than non-residents to have other options available for accessing the Milwaukee airport. Chicago-area residents accounted for 32 percent of shuttle passengers and 23 percent of the overall *Hiawatha Service* ridership. A majority of passengers on the Milwaukee airport shuttle (55 percent) were from U.S. states other than Wisconsin or Illinois. By contrast, only 9 percent of all *Hiawatha Service* passengers reported a home residence outside of Wisconsin or Illinois.

Convenience of schedule and train destinations and the desire to avoid highway congestion were among the key motivations for passengers to use the *Hiawatha Service* to access the Milwaukee airport instead of other options. One interesting finding from the shuttle survey was that not all passengers riding the shuttle were connecting between the *Hiawatha Service* and a flight at the Milwaukee airport. Rather, using the shuttle to "Connect to Other Transportation Options" was reported by 19 percent of shuttle passengers. Such transportation options included airport-based rental car facilities, which tend to be open longer and have more vehicle choices than off-airport offices.

Another interesting finding from the shuttle passenger survey was that if the airport-intercity passenger rail connection were not available, one-third of shuttle passengers would have used one of the two Chicago-area airports instead of Milwaukee for their flight. Figure ES-4 shows the alternative travel mode for the Milwaukee airport shuttle passengers (see Table 6-7). The success of the *Hiawatha Service* as an access mode for the Milwaukee airport is due, in large part, to the improved accessibility and convenience offered by the service. In turn, synergy between the Milwaukee airport and larger travel markets in the Chicago central business district is strengthened by the rail service, potentially allowing for the Milwaukee airport to evolve into a *de facto* third airport for the larger region as the connection becomes more fully integrated.

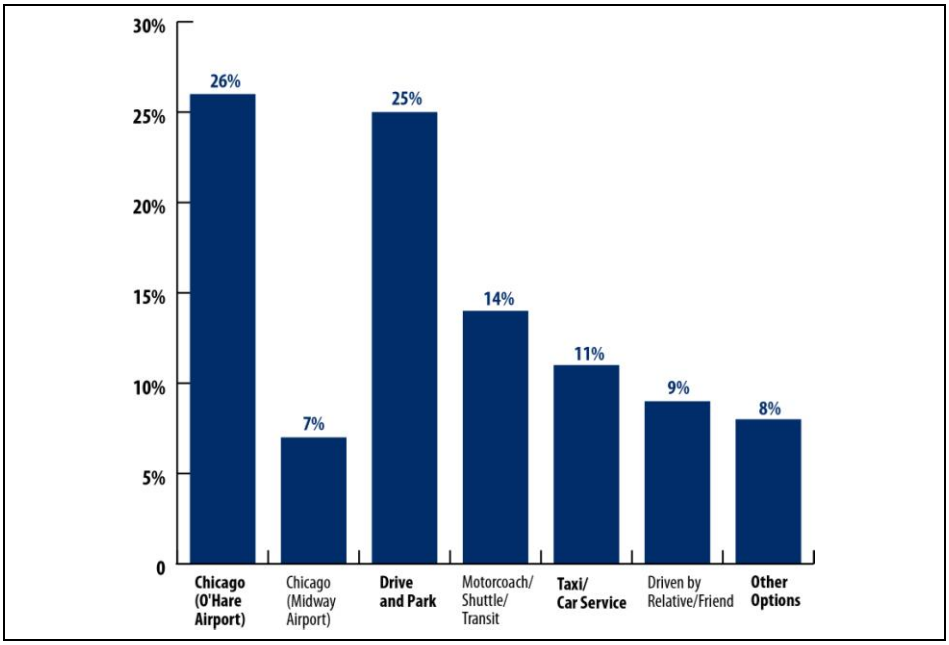


Figure ES-4: Milwaukee Airport Shuttle Passenger Alternative Travel Mode

CHAPTER 1: INTRODUCTION

Recent policy and regulatory directions by the U.S. government have signaled a new role for high-speed and other forms of passenger rail as a mobility solution for congested intercity travel corridors across the country. In April 2009, the Federal Railroad Administration (FRA) released its *Vision for High-Speed Rail in America*, which outlined the use of $8 billion in funding from the *American Recovery and Reinvestment Act of 2009* (ARRA, which was signed into law February 2009) to stimulate job growth by investing in the nation's passenger rail infrastructure (*1*). The funding provided in ARRA was appropriated to funding programs that were established in the *Passenger Rail Investment and Improvement Act of 2008* (PRIIA), which allowed for a substantial federal match for state investments in intercity passenger rail infrastructure (*2*). In January 2010, initial distribution of the $8 billion of ARRA funding for intercity passenger rail investment was announced, with 31 states receiving funds (*3*). As of November 2011, more than $8.1 billion had been awarded to 131 unique intercity passenger rail infrastructure, equipment, and planning projects across the U.S. (*4*). Collectively, these events have raised interest in intercity passenger rail as a mobility solution among transportation planners, policymakers, and the general public.

RESEARCH OVERVIEW

In high-demand intercity corridors, frequent, high-capacity intercity rail is thought to have a profound impact on personal mobility on all geographic levels. Intercity passenger rail can support urban and regional mobility by offering an alternative to automobile travel for long-distance commuting trips and inter-regional trips (out-of-town day trips for business as an example). For the latter, intercity passenger rail also offers an alternative to short-haul regional air carrier flights. In the context of national mobility, high-capacity intercity passenger rail service can serve to increase the efficiency of airport operations by reducing the number of regional flights and increasing airport capacity for longer-distance flights. Airport rail stations also help increase accessibility to intercity rail services for passengers living in the areas surrounding the airport, providing additional mobility options for these populations. Moving forward, a better understanding of how existing intercity rail services are being used to enhance mobility and implications for regional travel patterns if investments in passenger rail are not made is desired to support planning and decision-making.

To expand the body of knowledge for high-speed intercity passenger rail planning in the U.S., passenger rail researchers at the Texas Transportation Institute (TTI), with financial support from the University Transportation Center for Mobility (UTCM) and in-kind assistance from the Wisconsin Department of Transportation (WisDOT), initiated this research project to examine the urban, regional, and national mobility impacts of passenger rail as a travel alternative in intercity corridors. Due to a general lack of investment in passenger rail in the U.S. over the last several decades, however, there are very few corridors around the country where intercity passenger rail could truly be considered well-integrated into the multimodal transportation system. One such intercity corridor is between Milwaukee, Wisconsin, and Chicago, Illinois. Operating between the two cities (a distance of approximately 90 miles) is an intercity passenger rail route named the *Hiawatha Service*. Owing to the route's trip-time

competitiveness with the automobile, frequent daily service, and an intermodal connection with the airport in Milwaukee, the *Hiawatha Service* is the ideal setting for a research project studying the impacts of intercity passenger rail on urban, regional, and national mobility.

PROJECT TASKS

The primary objective of this research was to understand the impacts of intercity passenger rail connectivity on urban, regional, and national mobility, using the Milwaukee-Chicago *Hiawatha Service* rail corridor as a case study. To accomplish the research objective, seven tasks were proposed. A brief description of the project tasks is as follows:

- **Task 1, Literature Review:** The focus of the literature review included identifying existing research on the mobility impacts of passenger rail service and a review of research on the intermodal interface between intercity passenger rail and air travel.
- **Task 2, Survey Design:** This research project examined the mobility impacts of intercity passenger rail using two separate surveys of rail passengers. The first survey was an on-board survey of rail passengers on the *Hiawatha Service*, and the second was a survey targeted specifically to passengers transferring between the rail service and the airport terminal at the Milwaukee airport. This task consisted of the design of each survey.
- **Task 3, On-Board Passenger Survey:** This task consisted of the first wave of data collection, an on-board survey of *Hiawatha Service* passengers. TTI researchers collaborated with WisDOT staff members to collect data for this task.
- **Task 4, Airport Transfer Shuttle Survey:** This task consisted of the second wave of data collection, a survey of passengers riding a shuttle bus connecting the Milwaukee Airport Rail Station with the Milwaukee airport terminal. An innovative two-part data collection process that consisted of field interviews and a follow-up survey conducted via the Internet was developed and implemented for this task.
- **Task 5, Data Entry and Review:** This task consisted of entering the data obtained from the surveys in Tasks 3 and 4 into a database suitable for more detailed analysis and a thorough quality control process to check for invalid data. For the on-board passenger survey data from Task 3, data entry and quality control were led by WisDOT. TTI researchers oversaw the data entry and quality control process for the Task 4 data.
- **Task 6, Data Analysis:** This task consisted of a full analysis of the survey data obtained from the data collection efforts in Tasks 3 and 4.
- **Task 7, Final Report:** This task consisted of the development of this report.

REPORT ORGANIZATION

This report describes the study activities, findings, and recommendations. The remainder of this report is organized into six chapters, as follows. Chapter 2 reports the findings of the literature review task (Task 1) of the study. The literature review includes a brief overview of the U.S. intercity passenger rail network and the impacts of intercity passenger rail on personal mobility. The literature review also provides background information on airport ground access mode research and identifies the four U.S. airports where direct ground access via intercity passenger rail is provided. Chapter 3 describes the setting of the research, the *Hiawatha Service* intercity passenger rail route. The *Hiawatha Service* is operated by Amtrak and travels the

86-mile corridor between Milwaukee, Wisconsin, and Chicago, Illinois. Specific details on the Milwaukee Airport Rail Station and the intermodal interface between the rail service and the Milwaukee General Mitchell International Airport are also given. Chapter 4 provides the details of the data collection efforts for the *Hiawatha Service* on-board passenger survey and the Milwaukee airport shuttle passenger survey. Chapter 5 reports detailed analysis of the *Hiawatha Service* on-board passenger survey responses, including trip information, passenger behavior and decision-making, and demographic profile information. Chapter 6 reports similar analysis for the Milwaukee airport shuttle passenger survey. The final chapter, Chapter 7, summarizes the project findings, identifies the key mobility impacts of the rail service, discusses potential applications for planning and policy, and provides suggestions for future research.

CHAPTER 2: BACKGROUND LITERATURE

This chapter reports the findings of the literature review task of the study. A brief overview of intercity passenger rail service in the U.S. is provided for the purpose of background information. The overview also includes a summary of past research findings on the mobility impacts of passenger rail service in intercity corridors. The chapter also reports background literature on intercity passenger rail as a ground access mode for airport trips, including profiles of the four airports in the U.S. where a link between the airport and the Amtrak national intercity passenger rail network is provided.

OVERVIEW OF INTERCITY PASSENGER RAIL IN THE U.S.

Current U.S. Intercity Passenger Rail Network

Since 1971, intercity passenger rail in the U.S. has been operated by the National Railroad Passenger Corporation, better known as Amtrak. The Amtrak national intercity passenger rail network serves more than 500 destinations in 46 U.S. states and 3 Canadian provinces (*5*). The Amtrak system consists of three basic components: the Northeast Corridor component, which includes *Acela Express* premium high-speed service and Northeast Regional service; the state-supported and other short-distance component; and the long-distance routes component. Table 2-1 lists the components of the Amtrak national intercity passenger rail network and the federal fiscal year (FFY) 2011 ridership and ridership change from FFY 2010 for each. In FFY 2011, Amtrak's total system ridership exceeded 30 million passengers for the first time in history, realizing a 5.1 percent growth in ridership from FFY 2010 (*6*).

In terms of ridership volume, the largest segment of Amtrak's system is the state-supported short-distance routes segment. This segment of Amtrak's system consists of routes where an individual state (or group of states) contracts with Amtrak to operate passenger rail service in an intercity corridor in which Amtrak would not otherwise operate. Currently, 15 states contract with Amtrak to operate 21 separate routes. In FFY 2011, these 21 routes accounted for more than 12 million passengers, or more than 40 percent, of the total Amtrak

ridership. Ridership growth on these routes between FFY 2010 and FFY 2011 was 6.9 percent, higher than the Amtrak system-wide average of 5.1 percent growth.

Table 2-1: U.S. Intercity Passenger Rail Ridership, 2011

Amtrak System Component	FFY 2011 Ridership	Percent Change vs. FFY 2010
Northeast Corridor	10,899,889	+5.1
State-Supported Short Distance	12,167,617	+6.9
Other Short Distance	2,597,394	+4.6
Long Distance	4,524,833	+1.1
Total Amtrak System	**30,186,733**	**+5.1**
Source (*6*)		

Mobility Impacts of Intercity Passenger Rail

The availability of passenger rail service as a transportation alternative for intercity travel can support personal mobility in many different ways. By providing travelers with another option for intercity travel, passenger rail supplements highway, intercity bus, and airplane modes as available mode choices for city-to-city trips. In this context, rail service helps to relieve congestion on parallel surface and air transportation networks while also improving travel conditions for those travelers who remain on those networks. Some travelers, on the other hand, may not have any other transportation options. This could be because other modes are not available due to cost or convenience or because the community has no other options for travel.

One measure of the mobility impacts of intercity passenger rail is an evaluation of how current intercity rail passengers might travel if the rail service did not exist or were otherwise not available. Such information is typically obtained from passenger surveys. Table 2-2 summarizes passenger alternatives to rail service findings from passenger surveys conducted on six state-supported Amtrak routes in the last decade.

Table 2-2: Passenger Alternatives to Intercity Rail Service: Past Survey Findings

Corridor/Route	Date	Automobile (%)	Intercity Bus (%)	Airplane (%)	Would Not Make Trip (%)	Source
Heartland Flyer	2009	63	3	6	28	(*7*)
Capitol Corridor	2008	77	17	3	10	(*8*)
Downeaster	2005	51	26	4	18	(*9*)
Hiawatha Service	2005	70	12	5	14	(*10*)
Carolinian	2001	43	7	35	14	(*11*)
Piedmont	2001	59	7	12	20	(*11*)
Note: Columns may not sum to 100 percent due to rounding						

From the survey findings presented in Table 2-2, it is evident that the congestion-relieving effects of intercity passenger rail are felt most strongly on the highways adjacent to the rail corridor. Automobile as an alternative to rail service was the most frequently cited alternative for passengers in the six surveys reported in Table 2-2, ranging from 43 percent (*Carolinian*) to 77 percent (*Capitol Corridor*). The high percentage of rail passengers that would use an automobile if the rail service were not an option suggests that the availability of rail

service plays a critical role in relieving highway congestion in the corridors it serves. A study of the Oklahoma City, Oklahoma, to Fort Worth, Texas, *Heartland Flyer* route estimated that approximately 7.9 million annual vehicle-miles traveled (VMT) were diverted from the parallel highway (Interstate 35) onto the rail service.

The *Carolinian* is the longest state-supported Amtrak route, connecting New York City, New York, with Charlotte, North Carolina, a distance of 704 miles (*5*). It is not surprising, therefore, that 35 percent of *Carolinian* passengers surveyed would have used an airplane if the rail service were not available. The availability of rail service in an intercity corridor also has the effect of "inducing" some new intercity trips. The percentage of passengers that "Would Not Make Trip" in the absence of the rail service ranged from 10 percent (*Capitol Corridor*) to 28 percent (*Heartland Flyer*). While such trips do not have a direct effect on relieving congestion in the parallel transportation networks, they may have other economic and social (i.e., non-transportation) benefits.

INTERCITY PASSENGER RAIL ACCESS TO AIRPORTS

Intercity passenger rail provides several opportunities to support a seamless intermodal airport-surface travel interface. First, at a minimum, intercity rail complements other transit modes as part of a strategy to increase the overall share of public transportation in airport ground access trips while reducing the share of such trips made by private automobiles. Second, depending upon the distance, travel times, and frequencies of the service, intercity passenger rail can also expand the market area and improve the attractiveness of public transportation access to airports by increasing accessibility to the airport beyond traditional service areas. Finally, a fully mature relationship between an airport and intercity passenger rail incorporates the rail service as a feeder service to the airport, in conjunction with a major airline tenant, to replace certain short-haul flights and increase airport capacity.

Airport Ground Access by Public Transportation

While the focus of this research project was on intercity passenger rail as an airport ground access mode, an overview of the research on ground access by all public transportation modes is helpful to understand the context and factors that may influence the use of intercity passenger rail for airport ground access. Ground access to airport facilities via public transportation encompasses a variety of travel modes, ranging from public modes such as rail or bus transit to privately operated motorcoach bus or shared-ride vans that are available for public travel. The importance of increasing the share of airport ground access trips by public transportation is evident in the recent major research studies on the topic (*12-14*). Collectively, these studies provide a comprehensive examination of public transportation access to major U.S. airports and have established best practices for designing and implementing access strategies, gleaning insight from domestic and international experiences.

Ground access mode share data from the 27 most transit-oriented airports in the U.S. indicate that approximately 60 million access trips are made using public transportation annually (*14*). The highest share of rail transit access to U.S. airports is at Washington National Airport (13 percent) with San Francisco realizing the highest share for bus and van services (16 percent).

Attributes of successful rail transit service to U.S. airports include the proportion of air travelers with destinations along the rail line, travel times, overall accessibility, and service frequency.

Market Segmentation

One technique used by transit planners to better understand ridership and develop marketing strategies is known as market segmentation (*15*). Market segmentation is the identification of groups of customers, known as market segments, which have similar characteristics and are likely to exhibit similar purchase behavior and preferences. Market segmentation can be performed over a wide range of variable types including demographics, geography, attitudes, and other behavioral factors. The concepts of market segmentation can also be applied to understanding the market for airport ground access trips. Another major finding from the previously mentioned studies on public transportation access to airports was that two variables, trip purpose and the residential status of the traveler (resident or non-resident of the airport's market area), exerted the greatest influence on airport ground access mode choice. Four segments of the airport ground access market for air travelers are defined by the four-cell matrix shown in Figure 2-1.

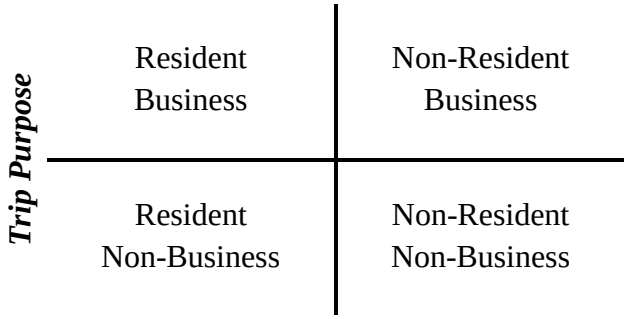


Figure 2-1: Four-Cell Matrix of Airport Ground Access Passengers (*14*)

Trends and patterns in the airport ground access mode choice behavior for each of the four market segments are as follows (*14*):

- **Resident Business:** Frequent air travelers who are likely to know the most efficient, reliable, and cost-effective access options. Typically have less baggage than other travelers. Would utilize public transportation if the services were extremely reliable.
- **Resident Non-Business:** Relatively infrequent air travelers who tend to select the least-expensive access mode. Likely to use options such as drop-off from friends or family and likely to have more baggage. Would utilize public transportation if the boarding location were along their normal route to the airport.
- **Non-Resident Business:** Typically begin their trips at a place of business or hotel. Likely to utilize access modes that deliver them as closely as possible to their desired destination with little sensitivity to cost. Would utilize public transportation if it provided convenient access to their final destination.
- **Non-Resident Non-Business:** Infrequent travelers from outside the airport's market area, meaning they are the least informed and most unfamiliar with the access options

available at a particular airport. Typically use the most readily available mode of ground access such as taxi or shuttle, or will be transported by local hosts (family, friends, or colleagues). Utilize public transportation only if their local hosts assure them it is convenient and reliable.

Current Intercity Rail Access to U.S. Airports

Linking intercity passenger rail systems with airports creates opportunities for seamless multimodal travel and improved efficiencies in the surface transportation network. The Amtrak national intercity passenger rail network includes more than 500 destinations across the U.S. (*5*). Many of these stations provide a link to local rail transit or bus services, allowing for an indirect connection between Amtrak services and airports (*5*). However, the focus of this research was on passengers transferring directly from Amtrak rail services to an airport. The following four U.S. airports currently have a direct link to the Amtrak intercity rail network:

- Baltimore/Washington International Thurgood Marshall Airport, Maryland (BWI);
- Bob Hope Airport, Burbank, California (BUR);
- Milwaukee General Mitchell International Airport, Wisconsin (MKE); and
- Newark Liberty International Airport, New Jersey (EWR).

The following sections provide an overview of the current status of intercity rail access to three of these four airports. Since the focus of this research was the Milwaukee General Mitchell International Airport, a more detailed description of this facility is provided in the next chapter.

Baltimore/Washington International Thurgood Marshall Airport, Maryland

The Baltimore/Washington International Thurgood Marshall Airport Rail Station connects the BWI airport to Amtrak's Northeast Corridor between Baltimore and Washington, D.C. Passengers can transfer between the rail station and the airport terminal using a dedicated shuttle bus that runs on a fixed schedule throughout the day (*16*). Amtrak services at the station include selected *Acela Express* high-speed trains, *Northeast Regional* service, and the *Vermonter* (*5*). The station is also served by the MARC commuter rail. A 2009 passenger survey (*17*) estimated that 191,000 originating passengers at BWI accessed the airport using Amtrak or MARC services, accounting for 2 percent of originating passengers at the airport. The mode share of rail was slightly higher among non-residents (3 percent) than residents (2 percent).

Bob Hope Airport, Burbank, California

The Bob Hope Airport Train Station is located in Burbank, California, adjacent to the Bob Hope Airport. The station is within walking distance of the airport terminal or accessible via the airport parking shuttle. Intercity passenger rail service is provided by Amtrak's *Pacific Surfliner*, which connects San Luis Obispo, Santa Barbara, Los Angeles, Orange County, and San Diego. *Pacific Surfliner* trains stop at the station five times daily in each direction. The once-daily *Coast Starlight* long-distance train and Metrolink commuter rail also serve the station (*5*). A Burbank airport customer service survey (*18*) found that rail accounted for a minor

(0.8 percent) share of ground access trips. The rail mode share among visitors to the region (1.1 percent) was higher than that of residents (0.4 percent).

Newark Liberty International Airport, New Jersey

The Newark Liberty International Airport Station connects the Newark airport with Amtrak intercity rail service along the Northeast Corridor between Newark and Trenton, New Jersey. Passengers wishing to transfer between the rail service and the airport terminals utilize the AirTrain people-mover system. Amtrak *Northeast Regional* trains stop at the station on an hourly basis throughout the day, but no *Acela Express* high-speed passenger trains stop (*5*). Two NJ Transit commuter routes also serve the station. A passenger survey conducted in 2005 (*19*) found that rail (Amtrak and NJ Transit) accounted for 3 percent of the overall mode split at EWR. Rail was the access mode for 3 percent of business travelers and 2 percent of personal travelers. Among international travelers, the share for rail services was 6 percent, higher than the 3 percent share among U.S. residents.

Airport-Intercity Rail Link: International Experience

At major airports in Europe and Asia, the share of public transportation in the overall ground access market is much higher than at U.S. airports (*14*). This is particularly true for rail, as nearly every major airport in Europe and Asia is served by urban, regional, and/or national rail systems. Rail systems serving certain European airports have matured to the point where trips on certain short-haul feeder flights are being replaced with trips on high-speed intercity passenger rail services to major hubs. In Germany, flights connecting Cologne and Stuttgart with the hub in Frankfurt have been reduced and substituted with an intercity rail segment (*14*). This program was implemented after the airport found that the costs of such feeder flights could not be justified from a capacity standpoint (*20*). Air passengers in Cologne and Stuttgart can purchase airline tickets originating at the rail station and connect through Frankfurt to their final destination on a single itinerary. A similar program implemented between Brussels and Paris-Charles de Gaulle Airport has eliminated all flights between the two cities (*14*). The substitution of short-haul flights with rail service has been found to result in an overall economic benefit, even if only a small number of flights are replaced (*21*). By contrast, experiences in Japan (*22*) and Spain (*23*) suggest that high-speed passenger rail lines are competitive, rather than complementary, with air travel in those countries.

CHAPTER 3: RESEARCH SETTING

The setting for this research was the *Hiawatha Service*, an 86-mile intercity passenger rail route between Milwaukee, Wisconsin, and Chicago, Illinois. The first section of this chapter describes the location and operational details of the *Hiawatha Service* route. One of the unique aspects of this route is that one of the station stops between Milwaukee and Chicago is the Milwaukee Airport Rail Station, adjacent to the Milwaukee General Mitchell International Airport. This station is one of only four such stations in the Amtrak national intercity passenger

rail system where a link between intercity passenger rail service and an airport is provided. The second section of this chapter provides more details of the Milwaukee Airport Rail Station.

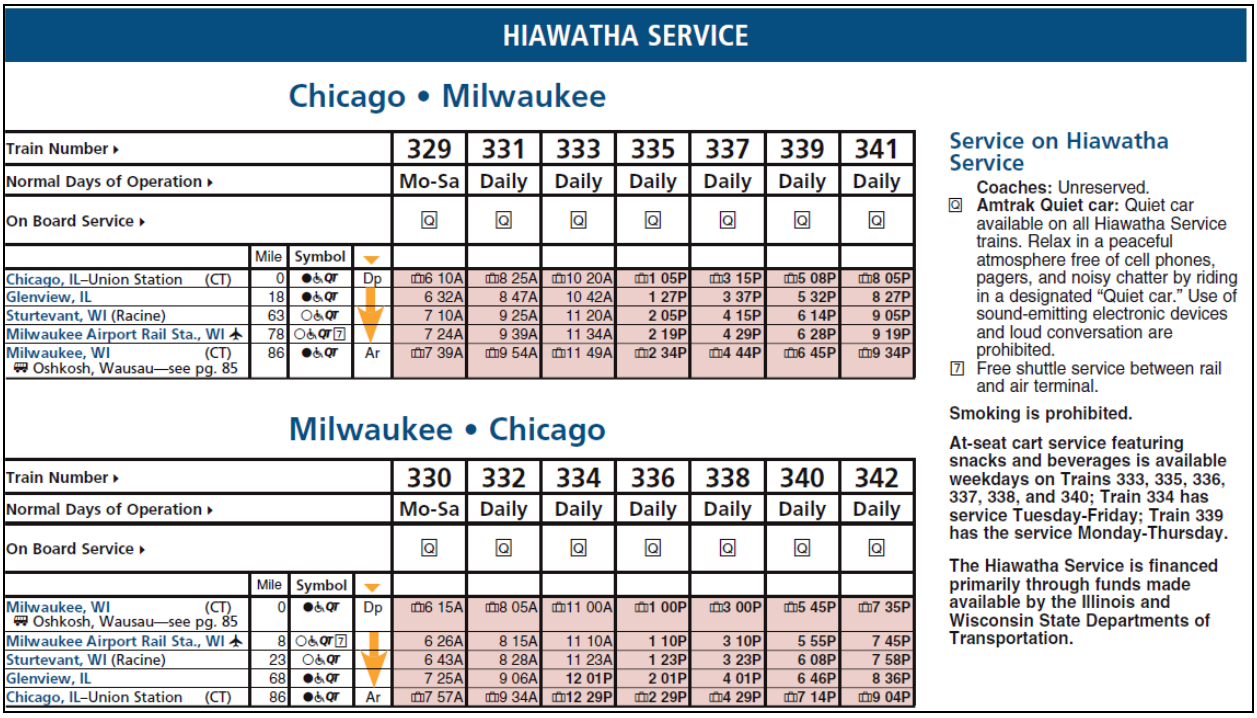
HIAWATHA SERVICE INTERCITY PASSENGER RAIL ROUTE

Figure 3-1 shows a map of the *Hiawatha Service* route. Between the Milwaukee Downtown Intermodal Station and Chicago Union Station, intermediate stops include the Milwaukee Airport Rail Station and Sturtevant in Wisconsin and Glenview in Illinois.

Figure 3-1: Location of the *Hiawatha Service* Intercity Passenger Rail Route

Figure 3-2 shows the operating schedule for the *Hiawatha Service*. Travel time across the entire length of the route is approximately 90 minutes. Service frequencies Monday through Saturday are seven trains in each direction, and there are six trains in each direction on Sundays. In Chicago, passengers can connect with other routes in the Amtrak national network, which

includes other short-distance routes to regional destinations including St. Louis, Missouri, or Detroit, Michigan, as well as long-distance routes to points in the east and west. In Milwaukee, passengers can connect via Amtrak's Thruway bus service to communities in western, central, and eastern Wisconsin, as well as communities in the upper peninsula of Michigan. Similar to most Amtrak routes outside of the northeast U.S., the *Hiawatha Service* operates over trackage that is not owned by Amtrak. Between Milwaukee and Rondout, Illinois, the *Hiawatha Service* operates over tracks owned by the Canadian Pacific Railway (CPR), while most of the remainder of the route is owned by METRA, the Chicago-area commuter rail service. Amtrak owns a short segment of track leading into Chicago Union Station (*7*).



HIAWATHA SERVICE

Chicago • Milwaukee

Train Number ▸				329	331	333	335	337	339	341
Normal Days of Operation ▸				Mo-Sa	Daily	Daily	Daily	Daily	Daily	Daily
On Board Service ▸				Q	Q	Q	Q	Q	Q	Q
	Mile	Symbol								
Chicago, IL–Union Station (CT)	0	●♿QR	Dp	6 10A	8 25A	10 20A	1 05P	3 15P	5 08P	8 05P
Glenview, IL	18	●♿QR		6 32A	8 47A	10 42A	1 27P	3 37P	5 32P	8 27P
Sturtevant, WI (Racine)	63	○♿QR		7 10A	9 25A	11 20A	2 05P	4 15P	6 14P	9 05P
Milwaukee Airport Rail Sta., WI ✈	78	○♿QR 7		7 24A	9 39A	11 34A	2 19P	4 29P	6 28P	9 19P
Milwaukee, WI (CT) 🚌 Oshkosh, Wausau—see pg. 85	86	●♿QR	Ar	7 39A	9 54A	11 49A	2 34P	4 44P	6 45P	9 34P

Milwaukee • Chicago

Train Number ▸				330	332	334	336	338	340	342
Normal Days of Operation ▸				Mo-Sa	Daily	Daily	Daily	Daily	Daily	Daily
On Board Service ▸				Q	Q	Q	Q	Q	Q	Q
	Mile	Symbol								
Milwaukee, WI (CT) 🚌 Oshkosh, Wausau—see pg. 85	0	●♿QR	Dp	6 15A	8 05A	11 00A	1 00P	3 00P	5 45P	7 35P
Milwaukee Airport Rail Sta., WI ✈	8	○♿QR 7		6 26A	8 15A	11 10A	1 10P	3 10P	5 55P	7 45P
Sturtevant, WI (Racine)	23	○♿QR		6 43A	8 28A	11 23A	1 23P	3 23P	6 08P	7 58P
Glenview, IL	68	●♿QR		7 25A	9 06A	12 01P	2 01P	4 01P	6 46P	8 36P
Chicago, IL–Union Station (CT)	86	●♿QR	Ar	7 57A	9 34A	12 29P	2 29P	4 29P	7 14P	9 04P

Service on Hiawatha Service

Coaches: Unreserved.

Q **Amtrak Quiet car:** Quiet car available on all Hiawatha Service trains. Relax in a peaceful atmosphere free of cell phones, pagers, and noisy chatter by riding in a designated "Quiet car." Use of sound-emitting electronic devices and loud conversation are prohibited.

7 Free shuttle service between rail and air terminal.

Smoking is prohibited.

At-seat cart service featuring snacks and beverages is available weekdays on Trains 333, 335, 336, 337, 338, and 340; Train 334 has service Tuesday-Friday; Train 339 has the service Monday-Thursday.

The Hiawatha Service is financed primarily through funds made available by the Illinois and Wisconsin State Departments of Transportation.

Figure 3-2: *Hiawatha Service* Operating Schedule (*5*)

The *Hiawatha Service* is one of more than 20 routes across the Amtrak system that are supported primarily through funding provided by states, which contract with Amtrak to operate the service. The *Hiawatha Service* is jointly funded by the states of Illinois and Wisconsin (*5*). WisDOT reports that the total amount of state support for the *Hiawatha Service* for the state fiscal year ending June 30, 2011, was approximately $6.9 million. The state support was split 75/25 between the two states, with Wisconsin contributing $5.2 million and Illinois contributing $1.7 million. In addition to supporting the *Hiawatha Service*, the State of Illinois also supports other routes extending south from Chicago to St. Louis, Carbondale, and Quincy (*5*). The *Hiawatha Service* is unique among Amtrak's state-supported routes segment in that the funding support for the route is provided by two states. Only one other Amtrak state-supported route, the *Heartland Flyer* (funding provided by Oklahoma and Texas), is supported by two states (*5*).

Recent *Hiawatha Service* Improvements

In recent years, WisDOT has completed or helped to fund a number of projects intended to improve the *Hiawatha Service*. In 2004, an advertising campaign promoting the service was initiated. Leveraging an 80 percent federal CMAQ program grant with a 20 percent local match, more than $1.1 million has been spent on this campaign to date. Two new station facilities were constructed in 2005, one at Milwaukee's General Mitchell International Airport (new station stop) and another in the Village of Sturtevant (replacement of the existing station). In 2007, the station in downtown Milwaukee was remodeled from a rail-only facility into an intermodal terminal. The new Milwaukee Intermodal Station was completed as a public-private venture at a total cost of $15.8 million. In 2009, the last sections of jointed rail were replaced with continuously welded rail along CPR right-of-way at a cost of more than $10 million (split 50/50 between an FRA grant and the CPR. Additionally, the state funded the addition of two coach cars to each train set to accommodate growing ridership.

Planned *Hiawatha Service* Improvements

The Chicago-Milwaukee corridor is a segment of the Chicago-Minneapolis/St. Paul spoke on the Chicago Hub Network's emerging high-speed passenger rail corridor (*1*). This corridor, along with other corridors in the Midwestern U.S., is being developed as part of a proposed multi-state rail system known as the Midwest Regional Rail System (MWRRS). The first implementation phase of the MWRRS called for the *Hiawatha Service* to increase to 10 round trips daily between Milwaukee and Chicago, with 6 round trips extending to the state capital of Madison, Wisconsin, at speeds up to 110 miles per hour on the Madison-Milwaukee route segment. When the MWRRS is fully implemented, service plans call for 17 daily high-speed passenger trains in each direction on the Chicago-Milwaukee corridor segment with projected top speeds of 110 miles per hour (*24*). An extension of the *Hiawatha Service* to Madison was included as part of the ARRA-funded grants for high-speed and intercity passenger rail service. The grant awarded more than $800 million for investments in the Chicago-Milwaukee-Madison route, including funds to prepare the corridor for service speeds of up to 110 miles per hour along with some funds granted to Minnesota to complete an environmental and engineering study of extending the route to Minneapolis/St. Paul. However, the FRA withdrew most of the ARRA funds designated for the extension to Madison following the election of a new governor in Wisconsin in November of 2010 and the announcement that the funds would be rejected and the project stopped. The FRA then redistributed the funds to other states (*25*). ARRA grant awards for improvements to the existing *Hiawatha Service* route were retained by the state. These grants included more than $11 million to construct a crossover on the CPR near Truesdell, Wisconsin, and more than $675,000 to lengthen the existing passenger platform at the Milwaukee Airport Rail Station to accommodate longer *Hiawatha Service* trains (*4*). Forthcoming state-funded improvements to the *Hiawatha Service* also include two new train sets to be used on the route and construction of a new train concourse and platforms at the Milwaukee Intermodal Station. The train sets, which will enter service in 2012, will be manufactured by Talgo, Inc. in Spain, with final assembly to take place in Milwaukee. Construction of the train concourse will commence in 2012 and be completed in 2013.

Hiawatha Service Ridership

During FFY 2011 (October 1, 2010, through September 30, 2011), a total of 819,493 passenger trips were taken on the *Hiawatha Service*. In FFY 2011, ridership on the *Hiawatha Service* was the sixth highest among Amtrak's 21 state-supported routes segment (*6*). FFY 2011, ridership on the *Hiawatha Service* represented a 4.7 percent increase in ridership over FFY 2010, slightly lower than the Amtrak system-wide growth in ridership (5.1 percent). Figure 3-3 shows the growth in monthly ridership on the *Hiawatha Service* between April 1989 and September 2011. Also shown in Figure 3-3 is the total number of daily train frequencies for the service during the same time period. Since FFY 2006, ridership on the *Hiawatha Service* has grown more than 40 percent. On-time performance for the *Hiawatha Service* during FFY 2011 was 88.3 percent, higher than the Amtrak system average of approximately 78 percent (*26*).

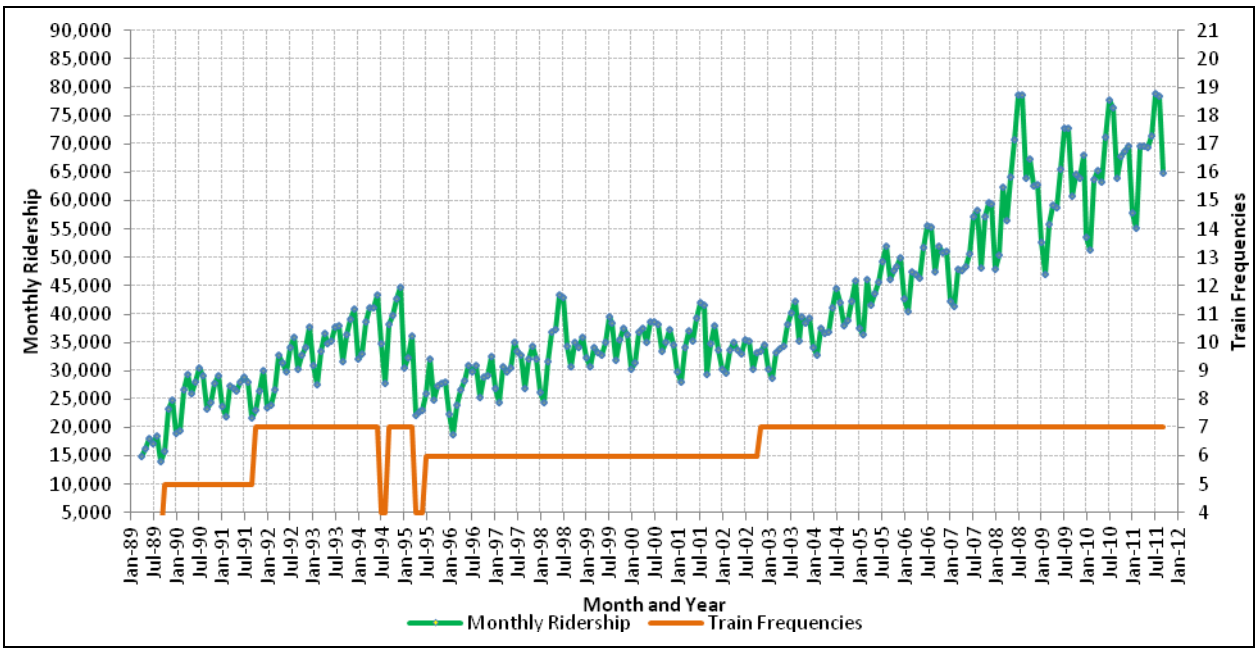
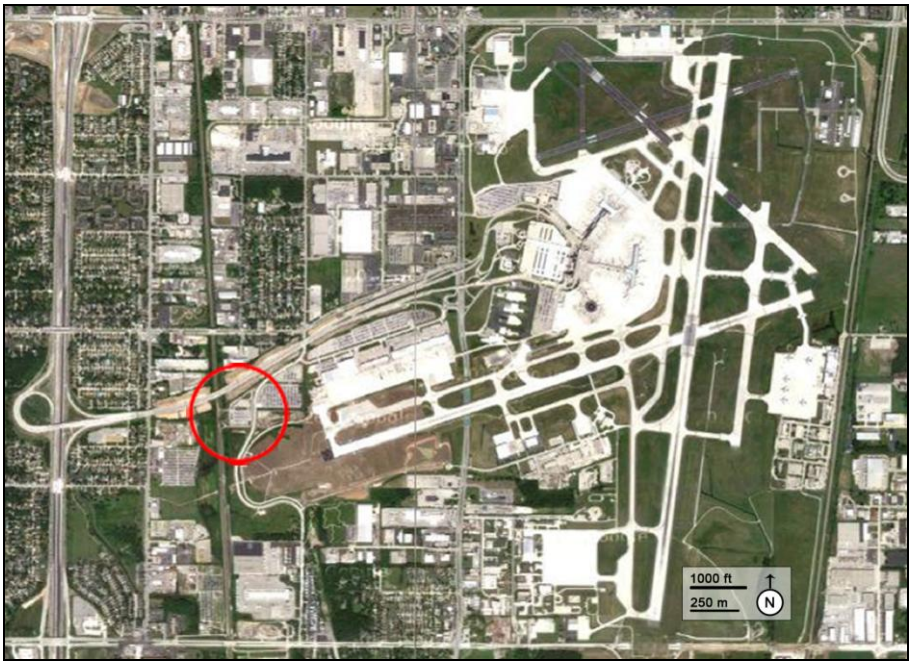


Figure 3-3: *Hiawatha Service* Monthly Ridership, 1989-2011

MILWAUKEE AIRPORT RAIL STATION

One of the five stations served by the *Hiawatha Service* is the Milwaukee Airport Rail Station. This station, which opened in January 2005, has the distinction of being one of four stations in the Amtrak national intercity passenger rail network where direct access to an airport is provided. Figure 3-4 shows the location of the Milwaukee Airport Rail Station facility on the western edge of the Milwaukee General Mitchell International Airport, adjacent to the airport's long-term parking lots and aircraft maintenance facilities.



(a)

(b)

Figure 3-4: Location of Milwaukee Airport Rail Station Facility
(a) Location of rail station relative to airport terminal
(b) Detailed view of station building, platform, and parking area
Aerial photos from Google Earth

Figure 3-5(a) shows an exterior view of the Milwaukee Airport Rail Station building. The station facilities include a long driveway for passenger pick-up/drop-off and a parking lot containing 282 parking spaces. The daily cost for parking is $5 per vehicle. The station is not staffed with an Amtrak ticket agent but does have two automated ticket vending machines for purchasing tickets. The station building also includes limited indoor seating, drink and snack vending machines, and restrooms. Two television screens display arrival and departure information for airline flights as well as the *Hiawatha Service* train arrivals and departures. Monitors inside the airport terminal also report the train information. The train platform is accessible from the parking area either through the station building or via exterior sidewalks. The train platform is fully compliant with current Americans with Disabilities Act (ADA) accessibility requirements, including a manually operated wheelchair lift.

Passengers wishing to connect between the rail station and the airport terminal do so by way of a circulating shuttle bus. This arrangement is similar in nature to the rail-air interfaces at Baltimore/Washington International Thurgood Marshall Airport in Maryland and Bob Hope Airport in Burbank, California. A typical shuttle bus is shown in Figure 3-5(b). Since there are only seven daily trains in each direction, the rail station is not included on the normal circulating route between the remote parking lots and the airport terminal. Instead, a shuttle is scheduled to meet each arriving train and take passengers directly to the airport terminal. Passengers arriving at the station when the shuttle is not present can use a courtesy phone located near the main entrance to call for the shuttle (Figure 3-5[c]). Since the daily parking rate at the station is lower than the nearby airport lots, passengers boarding the shuttle at the station are required to present their Amtrak ticket stub to ensure that the parking lot is utilized only for Amtrak passengers. Air passengers arriving at the airport terminal and desiring to transfer to the rail station follow overhead wayfinding signs inside the terminal (Figure 3-5[d]) to a boarding area in the airport driveway. This arrangement is different from the connections available at the other three airport rail stations on the Amtrak system, which are served on a fixed schedule. However, at those airports, a fixed schedule for the connection between the rail station and the airport terminal makes more sense, as those stations are served by more Amtrak trains and also local commuter rail services.

(a) (b)

(c) (d)

Figure 3-5: Milwaukee Airport Rail Station and Airport Terminal Shuttle Photos
(a) Exterior view of the Milwaukee Airport Rail Station, Wisconsin
(b) Typical circulating shuttle bus used in rail-air connection
(c) Courtesy phone located near main entrance of station building
(d) Wayfinding sign located inside Milwaukee airport main terminal
Photos from Texas Transportation Institute

Unpublished data from WisDOT and Central Parking System (CPS), the airport parking contractor, provide insight into the level of activity at the Milwaukee Airport Rail Station, both in terms of total passengers as well as passengers utilizing the shuttle connecting the rail station with the airport terminal. From the station's opening in January 2005 through September 2011, a total of 63,415 passengers utilized the shuttle connecting the rail station with the airport terminal, or approximately 800 passengers per month over the 81-month period. Figure 3-6 shows the trend in average daily shuttle ridership for the 81 months between January 2005 and September 2011. Since 2005, a steady growth in shuttle ridership has been achieved as the station and airport connection has become more integrated into the overall travel marketplace. Average daily shuttle ridership has more than doubled from 15 riders per day in 2005 to 33 riders per day

in 2011. Shuttle ridership is generally higher during the summer months (June, July, and August) and is lower during the months of January and February.

Also shown in Figure 3-6 is the percentage of all train passengers at the Milwaukee Airport Rail Station that used the parking shuttle to connect between the rail station and the MKE airport terminal, by month, from January 2005 through September 2011. In FFY 2011, total passenger activity (boarding plus alighting) at the Milwaukee Airport Rail Station was 162,825 passengers, representing an increase of 4.6 percent over FFY 2010 passenger activity at the station. Shuttle activity during the same time period (FFY 2011) showed that 12,091 passengers, or 7.4 percent of all station passengers, transferred between the rail station and the airport terminal on the shuttle. The total shuttle passenger activity in FFY 2011 represented a decrease from FFY 2010, both in total passengers (-10.4 percent) as well as in the percentage of station passengers using the shuttle (-14.3 percent). In the first nine months that the station was open (January through September 2005), the percentage of station passengers using the shuttle connection was relatively high, as the overall station ridership was starting to grow. During the six-year period between October 2005 and September 2011, patronage of both the shuttle and the station as a whole grew more than 20 percent annually. Consequently, the percentage of station passengers using the shuttle ranged between 7 and 8 percent of total station ridership during this same period. It is noted that Milwaukee Airport Rail Station activity includes passengers that are drawn from the surrounding area in addition to airport travelers.

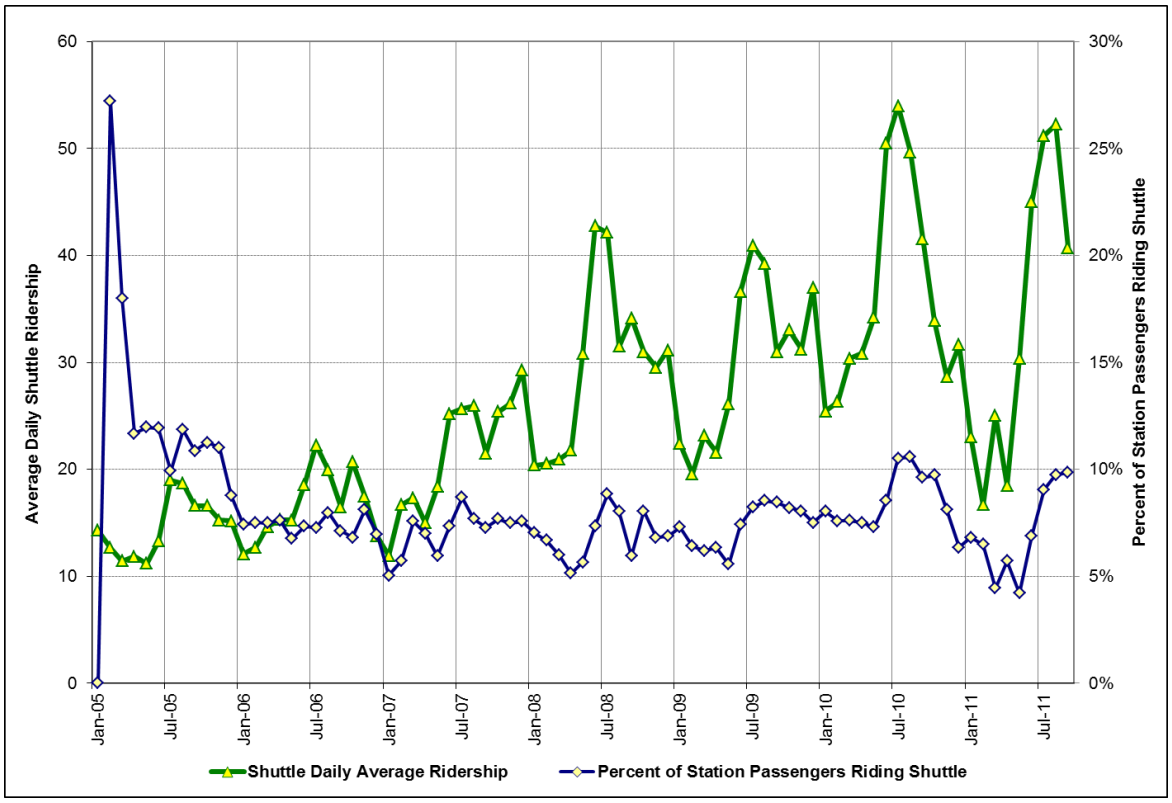


Figure 3-6: Historical Milwaukee Airport Shuttle Ridership Data

CHAPTER 4: DATA COLLECTION

The primary objective of this research was to better understand the impacts of intercity passenger rail on urban, regional, and national mobility. The *Hiawatha Service* intercity passenger rail route and the Milwaukee Airport Rail Station, described in the previous chapter, provided the ideal setting for this research project. This chapter describes the design and implementation of the data collection activities associated with this project. Data collection activities for this project were divided into two separate tasks. The first, Task 3, was an on-board survey of *Hiawatha Service* passengers. The second, Task 4, was a two-part survey of passengers utilizing the transfer shuttle connecting the Milwaukee Airport Rail Station and the Milwaukee General Mitchell International Airport terminal.

RAIL PASSENGER ON-BOARD SURVEY

Task 3 of the project was an on-board survey of *Hiawatha Service* passengers. The purpose of the on-board survey was to assess how current *Hiawatha Service* passengers use the rail service for personal mobility. The questions and content of the survey questionnaire were developed by the project researchers with input from WisDOT, the Illinois Department of Transportation (IDOT), and a form that was used for a similar survey of *Hiawatha Service* passengers in 2005. The final survey questionnaire, which was designed in the paper and pencil survey format, consisted of 25 questions across 4 letter-sized pages. Questions on the survey included detailed trip origin and destination information, passenger trip purpose, passenger alternative travel mode if the *Hiawatha Service* were not available, passenger motivation for choosing the rail service, evaluation of on-board services and amenities, potential service changes that would increase the passengers' rail trip frequency, and passenger demographics. The survey also included two questions that assessed the passengers' use of the Milwaukee Airport Rail Station. Appendix A contains a copy of the on-board passenger survey questionnaire used in this task.

Surveys were distributed to passengers on all 14 *Hiawatha Service* trains on a weekday (Thursday, March 31, 2011) and a weekend day (Saturday, April 2, 2011). An announcement was made by participating WisDOT staff on the train's public address (PA) system informing passengers of the survey as the trains were departing the origin station (Milwaukee or Chicago). Survey staff (consisting of TTI researchers and WisDOT staff) then passed through the train and distributed blank survey forms and pencils (if needed) to adult passengers shortly after the PA announcement. Survey staff offered each adult passenger the opportunity to participate in the study. Passengers boarding at intermediate stations were asked to participate as well. Completed surveys were collected by the survey staff directly from the passenger; after the train reached its final destination, staff passed through the train to collect any completed surveys that were left around the seating areas.

Table 4-1 reports the total number of surveys, the total passengers, and the percent surveyed for each train and survey date (March 31, April 2, and both days combined). A total of 2,298 valid and completed survey questionnaires were obtained from passengers during the two days of data collection. For Thursday, March 31, 2011, a total of 1,251 valid surveys were obtained from 2,100 passengers riding the *Hiawatha Service* that day, resulting in a participation

rate of approximately 60 percent. For Saturday, April 2, 2011, a total of 1,047 valid surveys were obtained from 1,892 passengers, resulting in a participation rate of approximately 55 percent. On a per-train basis, the participation rates varied from as low as 25 percent to as high as 86 percent of all passengers. The overall participation rate, 58 percent, was slightly lower than the 62 percent participation rate achieved for a similar survey conducted by WisDOT in 2005 (*10*) and lower than the participation rates achieved in surveys on other routes (*7*). It should be noted that no tabulations of ineligible passengers (i.e., passengers under age 18) were maintained during the data collection. Since both eligible and ineligible passengers are included in the total passenger count for a particular train (as reported in Table 4-1), the participation rate among *eligible* passengers would be higher than what is reported here.

Table 4-1: On-Board Passenger Survey Data Collection Summary

Train Number	March 31, 2011			April 2, 2011			Total 2 Days		
	Surveys	Passengers	Percent Surveyed	Surveys	Passengers	Percent Surveyed	Surveys	Passengers	Percent Surveyed
329	54	65	83	18	21	86	72	86	84
330	217	251	86	43	68	63	260	319	82
331	17	51	33	29	54	54	46	105	44
332	190	268	71	171	229	75	361	497	73
333	54	79	68	96	143	67	150	222	68
334	96	154	62	114	238	48	210	392	54
335	85	149	57	99	232	43	184	381	48
336	58	85	68	135	207	65	193	292	66
337	69	211	33	79	147	54	148	358	41
338	142	201	71	79	108	73	221	309	72
339	154	279	55	71	201	35	225	480	47
340	52	139	37	48	95	51	100	234	43
341	33	131	25	41	99	41	74	230	32
342	30	37	81	24	50	48	54	87	62
Total	**1,251**	**2,100**	**60**	**1,047**	**1,892**	**55**	**2,298**	**3,992**	**58**

While no formal tabulations on passenger non-participation were maintained, survey staff noted that many passengers on afternoon or evening train runs declined to participate in the survey, frequently citing that they had already completed the survey on a morning train. Other barriers to participation included passengers that were sleeping or working during the train ride.

MILWAUKEE AIRPORT SHUTTLE PASSENGER SURVEY

Task 4 of the project was a survey of passengers utilizing the shuttle connecting the Milwaukee Airport Rail Station with the airport terminal of Milwaukee General Mitchell International Airport. This section describes the challenges encountered by researchers in the process of developing this survey and provides the details of a two-part data collection procedure that was ultimately used in this task.

Data Collection Design

The target population for this survey was shuttle passengers connecting between the rail station and the airport terminal. The goal of the survey was to better understand the decision-making process and other characteristics of these passengers. The target population and the setting of the research presented researchers with three unique challenges for the design of this survey. First and foremost, the target population was not easily isolated. Shuttle bus passengers were not exclusive users of the Milwaukee Airport Rail Station (there is an adjacent parking lot with ridership drawn from the surrounding community), nor were they necessarily exclusive users of the shuttle bus (shuttle buses also circulated between the airport terminal and the long-term parking lots around the airport). This ruled out the possibility of a static advertising display promoting the study located in the station (shuttle passengers accounted for approximately 10 percent of station activity) or an interview taking place on board the shuttle. Second, the target population included passengers that were connecting from the rail service to the airport (probably trying to catch a flight) as well as passengers that were connecting from the airport to the rail station. This presented a challenge, as the survey design needed to be adaptable to trips in both directions. Finally, the survey design needed to be flexible enough to account for passengers with a limited amount of time (alighting the rail service with a shuttle waiting approximately 200 feet away) or passengers with a greater amount of time (e.g., arriving at the rail station an hour before the next scheduled train departure).

Given these issues, it was determined that an Internet-based traveler survey questionnaire containing the questions of interest was the most optimal choice for the shuttle passenger survey. An Internet survey was preferred over other survey options (paper survey), as it would not systematically exclude shuttle riders who did not have the time to respond to a paper survey. As such, the objective for the research design was to develop a data collection procedure that recruited shuttle passengers to visit a website and provide responses to various questions related to their travel behavior and personal characteristics. Initially, the data collection design called for a researcher to identify and distribute postcards to adult shuttle passengers inviting them to visit a website and provide responses to the survey. Ultimately, the data collection plan consisted of two parts: an initial interview of shuttle passengers, conducted at the Milwaukee Airport Rail Station, and a follow-up Internet survey, which included all of the questions of interest to the underlying research project.

Foot-in-the-Door Compliance Technique

The impetus for adding the initial interview portion of the data collection plan was motivated by two factors. First, given that the response rate for the Internet survey as a standalone product was unknown, the use of an initial interview would allow for the collection of a minimal amount of data in the field, in turn providing some information about shuttle passengers in the event that response to the Internet survey was low. Second, researchers felt that the use of the initial interview in conjunction with the request to complete the Internet survey (request via postcard invitation) would serve to improve response to the Internet survey by establishing the legitimacy of the Internet survey in the mind of the shuttle passenger being interviewed.

The second factor mentioned above resembles a concept known as the foot-in-the-door compliance technique for surveys. The foot-in-the-door technique, which can trace its roots to Freedman and Fraser's 1966 study of Palo Alto, California, housewives (*27*), is a survey method whereby an individual who has agreed to comply with a smaller request is more likely to comply with a larger request (which also happens to be the request of interest to the researcher). In the decades following Freedman and Fraser's study, a number of meta-analyses (*28-31*) have consistently proven this, demonstrating higher compliance rates with the larger request given compliance with a smaller request. For the purposes of the present study, researchers felt that shuttle passengers' compliance with a smaller request (agreeing to provide responses to a short interview) would improve overall response to the larger request, the Internet survey.

While the foot-in-the-door technique appears to have been used extensively in other subject areas, instances of its use are surprisingly rare in the transportation literature. A 1982 article by Sheskin and Stopher (*32*) describes the design and implementation of a two-part on-board transit passenger survey. The survey featured a shorter portion to be completed by the passenger during the bus ride and a longer questionnaire to be detached from the shorter portion, completed by the passenger at a later time, and returned via mail. They noted that using the short form made it easier for the respondent to recall the bus ride and thus made it easier to complete the longer form. However, case studies provided no comparison between the response rates of the two-part form and response rates with the mail-back portion used as a standalone approach. Other examples of the use of the foot-in-the-door technique in transportation include the use of a pre-intervention gift of a "green" bag prior to requests to participate in a voluntary travel behavior change program (*33*), public commitment to comply with speed limits in the rehabilitation of the most serious speed violators (*34*), and the use of safe ride home programs for intoxicated bar patrons who had previously signed a petition against drunk driving (*35*).

Initial Field Interviews

Given the evidence in support of a greater compliance rate for the desired activity (in this case, shuttle passengers participating in an Internet survey about their travel), a short interview (called the initial interview throughout this report) was designed to accompany the request for participation in the Internet survey. In addition to effectively placing a "foot in the door" with the target population, the initial interview also allowed for the collection of basic data about the shuttle passengers. The initial interview contained observational elements as well as two interview questions and the request to participate in the Internet survey (referred to here as the follow-up Internet survey to distinguish it as coming after the initial interview). For each adult traveler passing through the Milwaukee Airport Rail Station identified as either boarding or alighting the airport terminal shuttle, the following items were observed: direction of travel (to airport or to rail station), train number, party size (adults and children), and gender. Researchers approached as many shuttle passengers as possible, identified themselves and the purpose of the study, and asked two interview questions. The two interview questions asked the shuttle passenger about the purpose of his or her travels (business or personal) and for the zip code of his or her home residence. These two questions were selected based on prior research on airport ground access mode choice, which found that trip purpose and residential status (resident or non-resident of the airport's market area) exert the greatest influence on ground access mode choice (*14*). The two interview questions were fairly quick, taking a maximum of 15-20 seconds per

passenger, and of a discreet nature, allowing for the passenger to be more comfortable answering in a public setting. Due to the overall smaller size of the target population (expected average of 40 to 50 passengers per day spread out across 14 hours of train activity), sampling was not used to select passengers for the initial interview. Rather, researchers attempted to gather initial interviews from as many shuttle passengers as possible during a given day of data collection.

Following the two interview questions, the researcher provided the passenger with a recruitment postcard describing the study and prominently displaying the survey website URL, requesting that he or she visit the website and complete a short follow-up survey containing more details about the trip. The postcard included a heading title, logos of the sponsoring agencies, a short description of the research study, the survey URL, a unique access code, a reminder about an incentive for participation, and the deadline for completion. Shuttle passengers traveling from the rail station to the airport received a recruitment postcard printed on yellow card stock paper, while passengers traveling from the airport to the rail station received a blue-colored card. The rationale for having different colors was two-fold. First, researchers believed that distributing the brighter color card to passengers going to the airport would improve the visibility of the postcard among other travel documents (many more documents are associated with air travel than rail travel) after having been shuffled amongst these documents during a multiple-hour airplane flight. Second, having two different color cards made the distribution of postcards easier for researchers; the importance of giving the proper card to a passenger traveling in a certain direction is discussed in the next section. Appendix B contains materials used in the initial field interviews of passengers at the Milwaukee Airport Rail Station, including the interview form and a sample follow-up Internet survey recruitment postcard.

Follow-Up Internet Survey Questionnaire

After the initial interview, researchers recruited shuttle passengers to visit a website and complete a follow-up Internet survey, which was the original objective of the task. The follow-up survey, which contained 22 questions across 7 website pages, included the following topics:

- More detailed classification of the passenger's purpose of travel;
- Details of the rail segment of the passenger's trip;
- Passenger's preferred airport ground access mode if the rail service were not an option;
- Passenger's motivations for using the rail service to access the Milwaukee airport;
- How the passenger heard that rail service was an option for airport access;
- Details of the airline flight segment related to the passenger's rail trip; and
- Demographics of the passenger.

Appendix C contains a copy of the follow-up Internet survey questionnaire. The use of a unique access code on each postcard allowed for this survey to benefit from two unique features of Internet surveys. First, the survey software used by the researchers allowed for a closed-access survey, that is to say, only individuals with a valid access code could enter the survey and provide responses. This allowed researchers to control access to the survey and limit access only to passengers who received a recruitment postcard. Second, the structure of the access code allowed for certain aspects of questions to be customized to the passenger's experiences. Each unique access code was associated with a particular date of travel and travel either to the airport

or to the rail station. Questions were then customized with the date of travel, and the to/from element of the question wording was automatically selected. Figure 4-1 shows an example of a question that was customized using information associated with each access code, with customized wording circled. Customization of the questions aided respondent recall by reminding the respondent which day the interview took place and that the questions on the survey were about the trip that he or she made on that day.

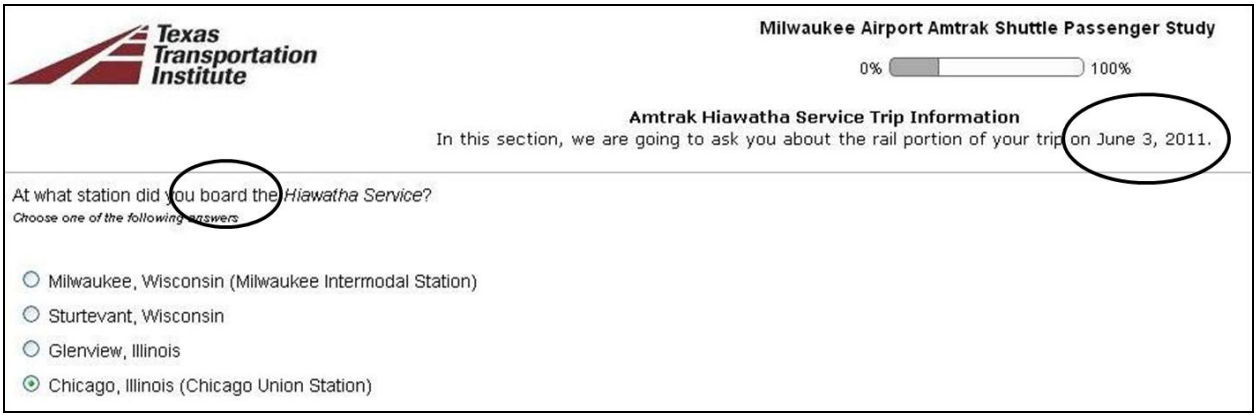


Figure 4-1: Screen Shot of Survey Question Showing Customized Wording

Shuttle Survey Administration

Prior to implementing the shuttle passenger survey, researchers coordinated with Milwaukee County (airport owner) and CPS Parking (shuttle operator) to obtain assistance and cooperation during the field work, including the appropriate security clearances. Initial field interviews of shuttle passengers were conducted at the Milwaukee Airport Rail Station on 15 days, specifically on May 25 and June 13 through June 26, 2011. Table 4-2 summarizes the results of the data collection activities. During the 15-day effort, a total of 961 shuttle passengers were observed, of which 848 (88 percent) participated in the initial interview and received the postcard invitation to participate in the follow-up Internet survey. Following the field data collection, the follow-up Internet survey remained open for responses until July 17, 2011, providing approximately three weeks from the distribution of the final recruitment postcard for shuttle passengers to visit the website and participate in the survey.

To increase passenger response to the follow-up Internet survey, participants were given the opportunity to enter into a random drawing for a gift card valued at $250. Upon completion of the survey questionnaire, participants were provided with a link to a separate Internet survey for the entry into the gift card drawing. Entry into this drawing was optional, and the information collected included the respondent's name and telephone number. Collecting the information for the gift card drawing as a separate survey allowed the respondents' identities to remain separate from their responses to the survey questionnaire. On July 28, 2011, study researchers randomly selected a name from the list of entries into the gift card drawing and mailed the $250 Visa gift card to the selected individual.

Out of 848 recruitment postcards distributed to shuttle passengers during the 15 days of initial interviews, a total of 155 valid follow-up survey responses were collected, resulting in an

overall survey response rate of 18.3 percent (see Table 4-2). The survey response rates by day ranged from 7 percent to 28 percent.

Table 4-2: Milwaukee Airport Rail Station Shuttle Survey Data Collection Summary

Date	Shuttle Riders Observed	Cards Distributed	Percent Contacted	Follow-Up Completed	Percent Follow-Up
May 25	114	109	96	16	14.7
June 13	98	98	100	13	13.3
June 14	60	54	90	13	24.1
June 15	71	57	80	14	24.6
June 16	66	59	89	13	22.0
June 17	65	61	94	13	21.3
June 18	38	35	92	4	11.4
June 19	50	48	96	11	22.9
June 20	45	43	96	12	27.9
June 21	47	40	85	8	20.0
June 22	71	66	93	8	12.1
June 23	53	43	81	3	7.0
June 24	73	57	78	12	21.1
June 25	56	43	77	9	20.9
June 26	54	35	65	6	17.1
Total 15 Days	**961**	**848**	**88**	**155**	**18.3**

Shuttle Survey Response Analysis

Given the innovative design of the two-part data collection procedure used in the Milwaukee airport shuttle passenger survey, researchers conducted a more in-depth analysis of the survey response patterns. It is possible, for example, to implement a similar two-part data collection approach in a variety of applications where the goal is to intercept travelers while they are traveling and recruit them to participate in a survey. Therefore, to guide future studies, a more detailed analysis of the approach used in this project is given in this section. As previously reported, the overall response rate for the follow-up Internet survey was 18.3 percent. A second metric used to evaluate the response to the follow-up Internet survey is the response time, defined here as the time (in days) between the initial interview and the completion of the follow-up survey. For the 155 completed follow-up surveys, the average response time was 6.75 days, or nearly one full week, between the time the respondent received the recruitment postcard and completed the survey.

From the initial interview, researchers examined several variables to determine if any trends in the response characteristics of the follow-up survey were present. Table 4-3 shows the follow-up survey response rate and response times by day type (travel on weekday or weekend), time of day (morning, afternoon, or evening), travel direction (to the airport or to the rail station), gender, trip purpose (business or personal), residential status (Milwaukee metropolitan statistical area [MSA], Chicago MSA, or Non-Resident). Also shown in Table 4-3 is the response rate and response times by the four air traveler market segments, which are defined by a combination of residential status and trip purpose—the two variables that are most influential in airport ground access mode choice (*14*).

Table 4-3: Comparison of Response Rate and Response Time for Follow-Up Survey

Initial Interview	Variables	Response Rate (%)	Response Time (Days)
Overall	All Responses	18.3	6.75
Day Type	Weekday	18.2	7.06
	Weekend	18.6	5.50
Time of Day	Morning (7:00 AM to 11:00 AM)	20.7	5.66
	Afternoon (11:00 AM to 3:00 PM)	18.3	6.35
	Evening (3:00 PM to 8:00 PM)	17.3	7.64
Travel Direction[1]	To Airport	15.9	7.13
	To Rail Station	21.8	6.36
Gender[2]	Male	19.0	5.84
	Female	19.4	8.14
Trip Purpose	Business	20.1	6.63
	Personal	18.3	6.83
Home Residence[1]	Milwaukee MSA	18.2	7.33
	Chicago MSA	24.4	6.53
	Non-Resident (All Others)	15.5	6.95
Market Segment[1]	Resident/Business	24.6	7.36
	Resident/Non-Business	22.7	6.13
	Non-Resident/Business	16.2	5.63
	Non-Resident/Non-Business	15.5	7.56
[1]Pearson's chi-square test for equal response rates rejected for $\alpha = 0.05$			
[2]Analysis of Variance (ANOVA) test for equality of mean response time rejected for $\alpha = 0.10$			

Examining the response rates reported in Table 4-3 reveals that the response rates for four out of seven initial interview variables considered (day type, time of day, gender, and trip purpose) did not significantly vary from the average response rate of 18.3 percent. While not significant, it is interesting to note that the response rate among business travelers (20.1 percent) was higher than the rate for personal or non-business travelers (18.3 percent). This is a surprising finding, as one may not expect business travelers to have sufficient time to comply with a follow-up request resulting from an intercept interview during the course of a business-related trip. The response rates for three variables (travel direction, home residence, and market segment) were significantly different than average. Specifically, a significantly lower percentage of shuttle passengers that were interviewed going to the airport from the rail station complied with the follow-up survey request (15.9 percent), as compared to 21.8 percent of shuttle passengers interviewed going to the rail station from the airport ($\chi^2 = 4.81$, $p = 0.0283$). The low response rate among travelers going to the airport is not surprising, as one might expect that the process of air travel (ticketing/check-in, security screening, boarding, flight time, and collection of baggage once arrived at the destination) presents a number of opportunities to lose or misplace the follow-up survey recruitment postcard. In anticipation of this possibility, a brighter color for the recruitment postcard (yellow) was used for shuttle passengers connecting to the airport. However, even with the brighter-colored postcard, a significantly lower response rate was realized among these passengers.

The follow-up survey response rate also varied with the residential location of the traveler. Response rates among shuttle passengers from the Chicago MSA (24.4 percent) was significantly higher than average, while the response from non-residents was lower than average

at 15.5 percent ($\chi^2 = 9.02$, $p = 0.0110$). The response rate among Milwaukee-area residents was approximately average. The high response among Chicago-area residents may be indicative of how highly these residents value the rail service and its accessibility to the Milwaukee airport—they have the most to gain by providing responses to the follow-up survey and any improvements to the service that may result. Conversely, it is not surprising that non-residents of the area had a low response, as their collective stake is much lower. The difference in response rate among the three residential groups is reflected in the response rate by market segment, which was significantly higher for the two residential segments ($\chi^2 = 8.03$, $p = 0.0453$).

Also given in Table 4-3 is the response time to the follow-up survey, measured as the number of days between the initial interview and completion of the follow-up survey. The average response time for all responses was slightly less than one week (6.75 days). ANOVA tests for differences in average response time among the seven initial interview variables were not significant for all variables except for gender ($F = 3.0407$, $p = 0.0832$). The response time for females (8.13 days) was significantly longer than the response time for males (5.84 days).

Figure 4-2 shows a frequency histogram of the response time for the 155 follow-up surveys. As expected, the general shape of the frequency histogram reflects diminishing participation in the survey as the number of days after the initial interview increases. Interestingly, exactly 20 percent of the completed surveys (31 out of 155) were taken on the same day the respondent received the postcard. In some respects, this finding is somewhat surprising, given that respondents were in the process of connecting between two intercity travel modes when the initial interview and follow-up survey request occurred. However, with the rapid adoption of handheld devices capable of running Internet-based survey questionnaires, it is not surprising that some respondents completed the survey within hours of receiving the invitation to participate. It is also reasonable to assume that the interaction with the researchers during the initial interview made the follow-up request more relevant in the mind of the traveler, and in turn the traveler may have prioritized taking the follow-up survey as soon as practical.

Figure 4-2 also shows a cumulative frequency curve relating the cumulative percentage of valid follow-up surveys received in each successive day after the initial interviews and postcard distribution. More than half of the surveys (54.8 percent) were completed within five days of the respondent's initial interview. After three weeks, approximately 95 percent of all responses had been obtained. A trendline describing the cumulative frequency curve is given as follows:

$$\textit{Cumulative Response (\%)} = 0.265 * \ln(\textit{Number of Days}) + 0.132$$

The R-squared value for this equation is 0.985, indicating that the equation is an excellent predictor of the cumulative response after a certain number of days.

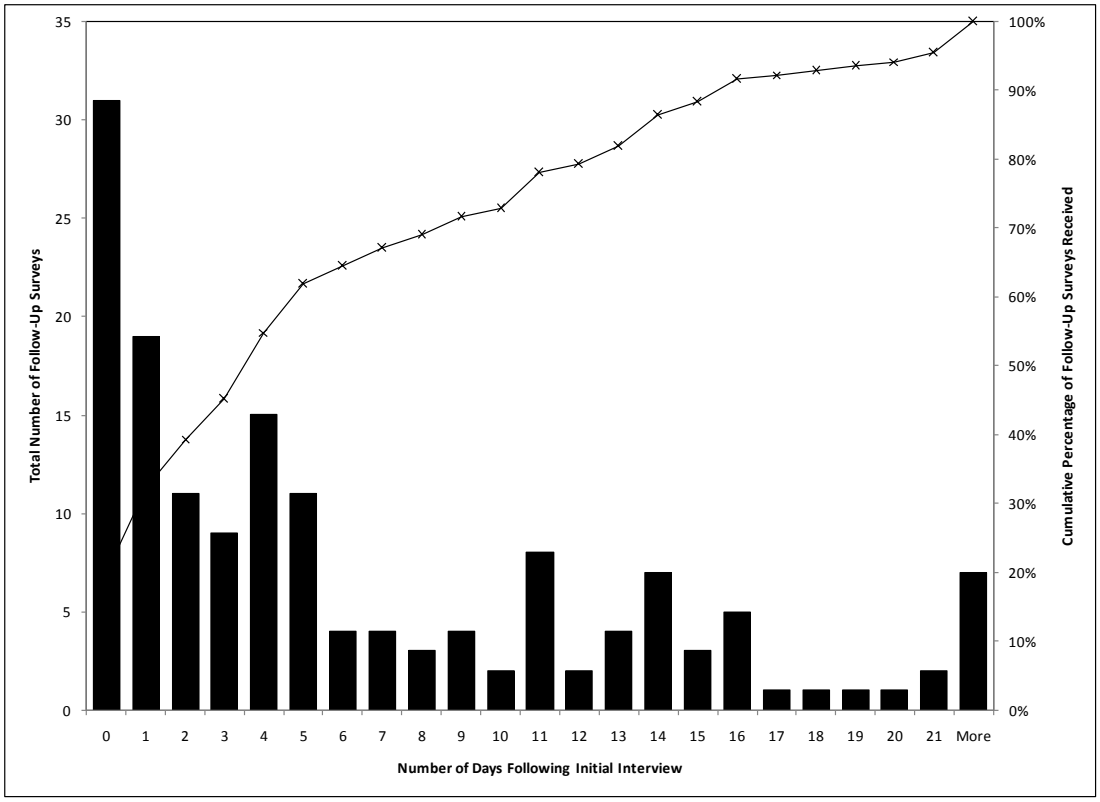


Figure 4-2: Frequency Histogram of Response Time for Follow-Up Internet Survey

INSTITUTIONAL REVIEW BOARD APPROVAL

Since this research project involved interaction with human subjects, researchers were required to receive approval from the Texas A&M University Office of Research Compliance's Institutional Review Board (IRB) before undertaking any data collection. Due to limitations with the project schedule, it was necessary for researchers to develop and submit for approval separate IRB protocol for each data collection task. For Task 3, the *Hiawatha Service* on-board passenger survey, researchers submitted an initial protocol application to the IRB on December 20, 2010. The IRB protocol (#2010-1016) was ruled "Exempt from IRB Review" and approved on January 11, 2011. For Task 4, the Milwaukee airport shuttle passenger survey, researchers submitted an initial protocol application to the IRB on April 20, 2011. The IRB protocol (#2011-0312) was also ruled "Exempt from IRB Review" and approved on May 5, 2011. Appendix D of this report contains documentation of IRB approval for the initial protocol and amendment.

CHAPTER 5: ON-BOARD PASSENGER SURVEY ANALYSIS

This chapter reports the findings from the analysis of the *Hiawatha Service* on-board passenger survey data collected in Task 3 of this research project. Nearly 2,300 valid and completed surveys were obtained over two days, a Thursday (weekday) and a Saturday (weekend). The analysis will be divided into three sections, as follows:

- Rail passenger trip information;
- Rail passenger behavior and decision-making; and
- Rail passenger demographic profile.

In order to capture the differences between the two days of survey data, each analysis presented in this chapter will provide a comparison between weekday and weekend survey responses. Furthermore, selected analyses provide a segmentation of the data by three passenger trip purposes: business, commute, and personal trips.

RAIL PASSENGER TRIP INFORMATION

Boarding and Alighting Station

Table 5-1 shows the station boarding (i.e., getting on the train) and alighting (i.e., getting off the train) percentages for the *Hiawatha Service* passengers. Unsurprisingly, Chicago Union Station and Milwaukee Downtown Intermodal Station were the two most active stations during the time of the survey. More passengers reported boarding at Milwaukee Downtown Intermodal Station than Chicago Union Station, while more alighting was reported at Chicago Union Station than in Milwaukee Downtown Intermodal Station. Both Milwaukee airport and Sturtevant stations reported slightly greater boarding activity on the weekday as opposed to the weekend, but the alighting patterns were similar. Beyond those two stations, few differences in boarding and alighting patterns were detected between the weekday and weekend passengers.

Table 5-1: Rail Passenger Boarding and Alighting Stations

Station	Weekday		Weekend	
	Boarding	Alighting	Boarding	Alighting
Milwaukee (Downtown, %)	44	27	46	33
Milwaukee (Airport, %)	14	7	11	7
Sturtevant (%)	6	4	3	3
Glenview (%)	4	4	2	4
Chicago (Union Station, %)	33	58	37	53
Note: Columns may not sum to 100 percent due to rounding				
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey				

Travel Mode to/from Rail Station

Table 5-2 shows mode split for passenger trips from the passengers' point of origin to the boarding station, segmented by boarding station. Table 5-3 shows the mode split for passenger

trips from the alighting station to the passengers' final destination, segmented by alighting station. In general, the mode split for access and egress trips for a particular station is a function of the availability of a certain mode as an option for that station, as well as the various attributes of each available mode, such as the cost and frequency, in the case of public transit options.

Table 5-2: Rail Passenger Mode of Access to Boarding Station

Travel Mode (Weekday/Weekend)	Milwaukee (Downtown)	Milwaukee (Airport)	Sturtevant	Glenview	Chicago
Drive Car/Truck (%)	46/39	73/60	73/72	51/33	5/3
Be Dropped Off in Car/Truck (%)	30/36	14/17	21/24	38/50	7/14
Local Transit (Bus, %)	5/8	0/0	0/0	4/0	6/6
CTA Rapid Transit (%)	<1/0	0/0	0/0	0/0	10/17
Commuter Train METRA (%)	<1/0	0/0	0/0	4/4	3/3
Hotel Courtesy Car/Shuttle (%)	1/<1	5/6	0/3	0/0	1/<1
Taxi (%)	5/5	1/2	0/0	2/13	22/35
Walk/Bicycle (%)	8/9	1/1	3/0	0/0	34/11
Transfer from Amtrak Train (%)	1/<1	0/0	1/0	0/0	14/12
Transfer from Intercity Bus (%)	2/2	0/0	1/0	0/0	1/1
Transfer from Plane (%)	1/1	7/14	0/0	0/0	<1/0
Note: Columns may not sum to 100 percent due to rounding					
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey					

Table 5-3: Rail Passenger Mode of Egress from Alighting Station

Travel Mode (Weekday/Weekend)	Milwaukee (Downtown)	Milwaukee (Airport)	Sturtevant	Glenview	Chicago
Drive Car/Truck (%)	47/34	68/57	71/64	49/33	4/7
Be Dropped Off in Car/Truck (%)	22/35	14/28	21/21	31/45	3/11
Local Transit (Bus, %)	3/8	1/1	2/0	0/0	4/3
CTA Rapid Transit (%)	0/1	0/0	0/0	0/0	7/10
Commuter Train METRA (%)	0/<1	0/0	0/0	2/3	3/6
Hotel Courtesy Car/Shuttle (%)	0/<1	1/3	0/11	4/0	1/<1
Taxi (%)	12/8	2/4	5/4	9/18	30/37
Walk/Bicycle (%)	14/10	2/1	0/0	4/3	36/16
Transfer to Amtrak Train (%)	0/<1	0/0	0/0	0/0	10/9
Transfer to Intercity Bus (%)	1/4	0/0	0/0	0/0	1/1
Transfer to Plane (%)	0/0	11/4	0/0	0/0	<1/0
Note: Columns may not sum to 100 percent due to rounding					
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey					

Closer examination of Tables 5-2 and 5-3 reveals several notable patterns of passenger mode choice for the trip to or from the station. In general, the mode split was consistent for access and egress by station and day type (weekday or weekend). With the exception of passenger boarding or alighting at Chicago Union Station, the primary mode of transportation to or from the station was an automobile, either driving/parking at the station or being dropped off/picked up at the station. Automobile as the access/egress mode was highest at Sturtevant, where other modal options are limited.

In terms of non-personal vehicle access or egress modes, Chicago Union Station was the most diverse. In contrast to the other four stations, taxi or walk/bicycle was the preferred option for station access or egress. The high share for walking/bicycling and corresponding low share of personal vehicle access or egress at Chicago Union Station was probably due to a combination of high parking costs in garages around the station and an extremely dense and diverse urban form that is found in the proximity of Chicago Union Station. Other noteworthy patterns in station access and egress mode choices were detected. Approximately 10 to 15 percent of passengers boarding or departing the *Hiawatha Service* at Chicago Union Station were transferring to or from one of the many other Amtrak trains that were available at that station. The Milwaukee Airport Rail Station had a higher percentage of "Transfer to/from Plane" and "Hotel Courtesy Car/Shuttle" than the other four stations. Finally, the highest share of passengers transferring between the *Hiawatha Service* and an intercity bus service was reported at the Milwaukee Downtown Intermodal Station. This finding was not surprising, given that Amtrak shares the Milwaukee Downtown Intermodal Station with several intercity bus companies that provide connections from Milwaukee to areas across Wisconsin and beyond.

Origin and Destination Location Type

Table 5-4 reports the location type of the origin of the passenger's trip prior to boarding the *Hiawatha Service*. For both weekday and weekend trips, approximately 60 percent of passengers reported originating at the passenger's home prior to boarding the train. Differences between weekday and weekend trips did not yield surprising results. More passengers originated from a "Place of Work" on the weekday (17 percent) than on the weekend (3 percent), while the home of a friend or relative and a tourist/entertainment site were more common on weekends than on weekdays. "School/University" was a trip origin for approximately 5 percent of both weekday and weekend trips.

Table 5-4: Origin of Trip Prior to Boarding *Hiawatha Service*

Location Type	Weekday	Weekend
Home (Yours, %)	61	62
Home (Friend or Relative's, %)	8	14
Hotel (%)	2	3
Meeting/Conference Site (%)	3	3
Place of Personal Business (%)	2	1
Place of Work (%)	17	3
School/University (%)	5	6
Shopping Center/Store (%)	<1	1
Tourist/Entertainment Site (%)	2	7
Note: Columns may not sum to 100 percent due to rounding		
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey		

Table 5-5 reports the location type of the destination of the passenger's trip after departing the *Hiawatha Service*. In general, the destination location type patterns were similar to the origin location type patterns. Similar to the trip origin information, the passenger's home was the most frequently cited destination for both weekday and weekend passengers, although the percentage was lower than for trip origin. Common destinations for weekday passengers

were primarily business related, including "Place of Work" (24 percent) and "Meeting/Conference Site" (10 percent). For weekend passengers, frequent destinations included the home of a friend/relative (30 percent) or a tourist/entertainment site (16 percent).

Table 5-5: Destination of Trip after Alighting *Hiawatha Service*

Location Type	Weekday	Weekend
Home (Yours, %)	33	33
Home (Friend or Relative's, %)	15	30
Hotel (%)	2	6
Meeting/Conference Site (%)	10	5
Place of Personal Business (%)	3	3
Place of Work (%)	24	2
School/University (%)	4	4
Shopping Center/Store (%)	1	2
Tourist/Entertainment Site (%)	7	16
Note: Columns may not sum to 100 percent due to rounding		
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey		

Trip Purpose

Table 5-6 reports the passengers' trip purpose by day type and also for the two days combined. Examining passenger trip purpose data provides insight into how the *Hiawatha Service* supports personal mobility by revealing the types of activities the passengers are participating in before or after the train trip. There was a clear delineation of passenger trip purposes across weekday and weekend trains. Specifically, trips for work commuting or business-related matters were more prevalent on weekdays, while personal trips, such as visiting family or friends, riding for leisure/entertainment, or going shopping, were more common on weekends.

Table 5-6: Rail Passenger Trip Purpose by Day Type

Trip Purpose	Weekday	Weekend	All Passengers
Daily Commute to/from Work (%)	20	1	12
Commute to/from Work (Less than Daily, %)	13	2	8
Going to/from a Business Trip/Meeting	21	10	16
Going to/from School (University/College, %)	5	3	4
Personal Business (%)	5	5	5
Visiting Family or Friends (%)	20	43	30
Shopping (%)	2	4	3
Leisure/Entertainment (%)	9	25	17
Vacation (%)	5	7	6
Note: Columns may not sum to 100 percent due to rounding			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

Business or commute trips accounted for a majority (54 percent) of weekday trips. One interesting finding was that among weekday trips, 33 percent of passengers reported a purpose of work commute. Of those, almost 40 percent reported that the work commute was on a less-than-

daily basis. This finding suggests that these passengers might be telecommuters that work from their residence for a portion of the week and commute to an office location, using the *Hiawatha Service*, for the remaining portion of the week. Personal trips accounted for a large majority (72 percent) of weekend trips, as compared to 31 percent of weekday trips.

The remainder of this chapter will continue to analyze the *Hiawatha Service* on-board passenger survey data by day type (weekday or weekend trips). Additionally, parallel analyses will be reported with the passengers segmented into three categories of trip purpose as follows:

- Business trips (going to/from a Business Trip/Meeting, 16 percent of all passengers).
- Commute trips (daily/less-than-daily work commute, 20 percent).
- Personal trips (all other purposes, 64 percent).

Segmentation of passenger survey data by these trip purpose categories may offer additional insight into the mobility impacts of the rail service beyond the day type analysis.

Additional Rail Trip Information

Table 5-7 summarizes the round-trip today status and the details of the passengers' travel party by day type. The percentage of passengers making a round trip on the day of the survey was higher on the weekday than on the weekend, as was the percentage of passengers that reported traveling alone. A majority of weekend passengers also reported traveling alone, although the percentage of families and groups was higher on the weekend than on the weekday.

Table 5-7: Rail Passenger Round Trip Today and Party Information by Day Type

Trip Characteristic	Weekday	Weekend	All Passengers
Round Trip Today (%)	53	33	44
Traveling Alone (%)	73	53	64
Traveling with Family (%)	18	33	25
Traveling with Group (%)	9	14	11
Average Party Size (Families)	2.4	2.2	2.3
Average Party Size (Groups)	3.0	3.6	3.3
Average Party Size (All)	1.4	1.7	1.6
Note: Columns may not sum to 100 percent due to rounding			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

Table 5-8 reports the round-trip today status and party information by passenger trip purpose. Among work commuters, 80 percent reported making a round trip on the day of the survey, and 92 percent reported traveling alone. Approximately half of business travelers were making a day trip, and more than one-quarter (26 percent) were traveling with a group. The percentage of personal travelers that were traveling with family was highest among the three trip purposes at 35 percent.

Table 5-8: Rail Passenger Round Trip Today and Party Information by Trip Purpose

Trip Characteristic	Business	Commute	Personal
Round Trip Today (%)	48	80	32
Traveling Alone (%)	67	92	55
Traveling With Family (%)	8	4	35
Traveling With Group (%)	26	4	10
Average Party Size (Families)	1.9	2.2	2.3
Average Party Size (Groups)	3.0	3.1	3.5
Average Party Size (All)	1.6	1.1	1.7
Note: Columns may not sum to 100 percent due to rounding			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

RAIL PASSENGER BEHAVIOR AND DECISION-MAKING

The first phase of the *Hiawatha Service* on-board passenger survey analysis examined the rail passengers' trip details, such as origin and destination information, station access/egress mode choice, and trip purpose. In this section, the focus of the analysis shifts from examining the trip at the time of the survey to overall passenger behavior and decision-making.

Rail Travel Frequency

Table 5-9 reports the frequency of travel on the *Hiawatha Service* by day type. Trip frequency was divided into seven categories ranging from "First Time Riding" to "20 or More Times Each Month" as options. Note that while the categories were not mutually exclusive, researchers felt that the categories with varying time units were more relevant to the respondent.

Table 5-9: Rail Passenger *Hiawatha Service* Trip Frequency by Day Type

Trip Frequency	Weekday	Weekend	Total
First Time Riding (%)	19	28	23
Once per Year or Less (%)	11	18	14
Once Every Few Months (%)	23	33	27
1-4 Times Each Month (%)	16	17	16
5-9 Times Each Month (%)	7	3	5
10-19 Times Each Month (%)	6	1	4
20 or More Times Each Month (%)	18	1	10
Note: Columns may not sum to 100 percent due to rounding			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

On both weekday and weekend trains, the most commonly reported trip frequency was "Once Every Few Months," accounting for 23 percent of weekday passengers and 33 percent of weekend passengers. On weekdays, the distribution of rail passenger trip frequency was fairly uniform, with a mix of infrequent and regular riders observed. For 19 percent of weekday passengers, the surveyed trip was the first time riding the *Hiawatha Service*, while 18 percent of weekday passengers reported riding 20 or more times each month. More than 30 percent of weekday passengers rode the *Hiawatha Service* "5-9 Times Each Month" or more. On the other hand, the distribution of rail trip frequency among weekend passengers was skewed toward the more infrequent end of the scale. On weekend trains, 28 percent of passengers reported that the

surveyed trip was the first time riding the train. Nearly 80 percent of weekend passengers reported a trip frequency of "Once Every Few Months" or less.

Table 5-10 reports the passengers' rail trip frequency by trip purpose. Not surprisingly, passengers reporting a trip purpose of "Commute" patronized the *Hiawatha Service* more frequently than the other two purposes, with 50 percent of such passengers riding the train 20 or more times each month. Among business travelers, 40 percent reported riding the *Hiawatha Service* once every few months. Additionally, 21 percent of business travelers reported riding the *Hiawatha Service* for the first time on the trip when the surveys were conducted. A similar pattern was noted for personal travelers, of which approximately 30 percent reported riding the *Hiawatha Service* once every few months or were riding the *Hiawatha Service* for the first time when the on-board passenger surveys were being conducted.

Table 5-10: Rail Passenger *Hiawatha Service* Trip Frequency by Trip Purpose

Trip Frequency	Business	Commute	Personal
First Time Riding (%)	21	2	30
Once per Year or Less (%)	17	<1	18
Once Every Few Months (%)	40	5	31
1-4 Times Each Month (%)	16	13	17
5-9 Times Each Month (%)	4	13	3
10-19 Times Each Month (%)	1	17	<1
20 or More Times Each Month (%)	<1	50	1
Note: Columns may not sum to 100 percent due to rounding			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

Alternative Travel Mode

One of the key mobility impacts of the rail service that was measured by the *Hiawatha Service* on-board passenger survey was the passengers' self-reported alternative travel option if the rail service were not available. These data provide insight into how the rail service supports personal mobility and offer a look at how regional travel patterns might be affected if investments in intercity passenger rail services are not made. The intercity corridor in which the *Hiawatha Service* operates, the Milwaukee-Chicago corridor, is a diverse and almost fully integrated multimodal corridor with many travel alternatives available. In addition to the *Hiawatha Service* intercity rail route, travelers can drive an automobile, ride an intercity bus, or fly on a commercial airline to connect between Milwaukee and Chicago. For certain trips between intermediate stations, local transit bus or METRA (the Chicago-area commuter rail service) are also options. Finally, a non-mode alternative to the rail service would be that, in the absence of the rail service, passengers might simply forgo the trip.

Table 5-11 reports the percentage of *Hiawatha Service* passengers that would select each alternative travel mode if the rail service were not available. The most frequently cited alternative to the rail service among both weekday and weekend passengers was the automobile. Driving or riding as a passenger in a personal or rental/company vehicle was the reported alternative for almost 70 percent of *Hiawatha Service* passengers.

Table 5-11: Rail Passenger Alternative Travel Mode by Day Type

Alternative Travel Mode	Weekday	Weekend	Total
Drive Car/Truck (%)	61	61	61
Passenger in Car/Truck (%)	4	5	5
Rental Car/Company Vehicle (%)	3	3	3
Intercity Bus (%)	6	9	7
Local Transit Bus (%)	1	2	2
METRA Commuter Rail (%)	6	4	5
Airplane (%)	4	3	3
I Would Not Have Made This Trip (%)	15	13	14
Note: Columns may not sum to 100 percent due to rounding			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

The second most frequently cited passenger alternative to the rail service was the "I Would Not Have Made This Trip" option, reported by 14 percent of all passengers. Local transit as an alternative to the rail service, either bus or commuter rail, was cited by 7 percent of respondents, as was the intercity motorcoach bus alternative. Airplane was the preferred alternative for 3 percent of passengers. Few differences were detected in alternative travel mode between the weekday and weekend passenger groups. Commuter rail as an alternative to the *Hiawatha Service* was slightly higher for weekday travelers, while intercity bus as an alternative to the rail service was higher for weekend travelers.

Table 5-12 displays the passenger alternative travel mode responses by trip purpose. Among business travelers, more than 80 percent reported the use of an automobile (personal or company vehicle) as an alternative to the rail service. The finding that just 5 percent of business travelers would have not made the trip (and thus 95 percent of such travelers would have used alternative modes) in the absence of the rail service confirms the high utility nature of business travel. METRA commuter rail was reported as an alternative more frequently by commute travelers (12 percent) than the other two purposes. Interestingly, the most commonly cited alternative to the *Hiawatha Service* among commute travelers was the "I Would Not Have Made This Trip" alternative, at 24 percent. This is an interesting finding because one might expect, *a priori*, that commute trips would have a high utility and thus other modes would be used if the rail service were not an option. Among personal travelers, a higher percentage of intercity bus as an alternative was detected (9 percent) as compared with the other two purposes.

Table 5-12: Rail Passenger Alternative Travel Mode by Trip Purpose

Alternative Travel Mode	Business	Commute	Personal
Drive Car/Truck (%)	74	56	59
Passenger in Car/Truck (%)	5	1	6
Rental Car/Company Vehicle (%)	3	3	3
Intercity Bus (%)	4	2	9
Local Transit Bus (%)	1	0	2
METRA Commuter Rail (%)	5	12	3
Airplane (%)	3	2	4
I Would Not Have Made This Trip (%)	5	24	13
Note: Columns may not sum to 100 percent due to rounding			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

Reasons for Choosing the *Hiawatha Service*

On the survey, passengers were asked to respond to a series of statements on the reasons why they chose to use the *Hiawatha Service* for their trip instead of another mode. A total of 25 reasons for choosing the rail service were provided, and the respondent was asked to rate his or her level of agreement with each statement using a five-point Likert item ranging from strongly disagree (1) to strongly agree (5). Table 5-13 reports the average scores for each of the 25 items by weekday and weekend passengers, as well as the average score and the standard deviation from the average for all passengers. A higher score for a particular item, therefore, indicates that the item was more important in the decision to use the *Hiawatha Service*.

Table 5-13: Rail Passenger Reasons for Choosing *Hiawatha Service* by Day Type

Reason for Choosing *Hiawatha Service*	Weekday	Weekend	All Passengers
Convenient to My Final Destination	4.38	4.24	4.32 (0.83)
Avoid Highway Congestion	4.35	4.18	4.28 (0.95)
More Comfortable than Other Options	4.05	4.00	4.03 (0.91)
More Reliable than Other Options	3.90	3.89	3.89 (0.93)
Avoid Snow/Winter Driving	3.86	3.76	3.81 (1.09)
Faster than Other Options	3.83	3.76	3.80 (0.99)
Schedule Matched My Schedule Needs	3.79	3.74	3.77 (0.98)
Opportunity to Sleep/Relax while Traveling	3.63	3.69	3.66 (1.04)
More Environmentally Friendly than Other Options	3.60	3.60	3.60 (1.08)
Convenient to My Residence	3.48	3.54	3.51 (1.03)
Less Expensive than Other Options	3.51	3.48	3.49 (1.08)
Safer than Other Options	3.47	3.47	3.47 (1.04)
Price of Gasoline	3.41	3.50	3.45 (1.14)
Avoid Parking Problems at Destination	3.43	3.42	3.43 (1.30)
Opportunity to Work while Traveling	3.62	3.15	3.41 (1.23)
I Would Rather Not Drive	3.37	3.32	3.35 (1.29)
Opportunity to Read or Socialize	3.27	3.27	3.28 (1.19)
Parking Availability at Station	3.30	3.11	3.22 (1.27)
Connections with Other Amtrak Trains	2.64	2.81	2.71 (1.29)
No Other Form of Transportation Available	2.66	2.65	2.66 (1.25)
Drink/Snack Cart Service on-board Train	2.62	2.68	2.65 (1.20)
Connections with Intercity Buses	2.58	2.71	2.64 (1.26)
Connections with Airline Service	2.49	2.65	2.56 (1.24)
I Would Rather Not Fly	2.49	2.63	2.55 (1.26)
I Cannot Drive	1.95	2.13	2.03 (1.27)
Scale: (1) Strongly Disagree to (5) Strongly Agree			
Rows in italics indicate items with ANOVA test for equality of mean scores rejected for $\alpha = 0.05$			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

Three reasons—"Convenient to My Final Destination," "Avoid Highway Congestion," and "More Comfortable than Other Options"—were the three highest-rated items for both weekday and weekend travelers, each having an average score greater than 4.0/5. These items also had three of the four lowest standard deviations among the 25 items considered, suggesting that there was a strong level of agreement among passengers as to the importance of those items in the decision to use the rail service. By contrast, the items with the least amount of agreement

among passengers (i.e., highest standard deviation) were "Avoid Parking Problems at Destination," "I Would Rather Not Drive," and "Connections with Other Amtrak Trains." Among the 25 items reported in Table 5-13, the average scores between weekday and weekend passengers were significantly different ($\alpha = 0.05$) for 10 items. These items are noted in italics in Table 5-13. Weekday travelers rated the convenience items related to rail travel—"Convenient to My Final Destination," "Avoid Highway Congestion," "Avoid Snow/Winter Driving," "Opportunity to Work while Traveling," and "Parking Availability at the Station"—significantly higher than weekend travelers. Conversely, weekend passengers rated the connections between the *Hiawatha Service* and other Amtrak trains, intercity buses, and airlines, as well as "I Would Rather Not Fly" and "I Cannot Drive," significantly higher than weekday passengers.

Table 5-14 shows the average scores for the 25 reasons why passengers chose the *Hiawatha Service* for their trip, segmented into three trip purpose categories.

Table 5-14: Rail Passenger Reasons for Choosing *Hiawatha Service* by Trip Purpose

Reason for Choosing *Hiawatha Service*	Business	Commute	Personal
Avoid Highway Congestion	4.38	4.58	4.17
Avoid Parking Problems at Destination	3.64	3.42	3.37
Avoid Snow/Winter Driving	3.61	4.20	3.75
Connections with Airline Service	2.32	2.30	2.69
Connections with Intercity Buses	2.31	2.40	2.79
Connections with Other Amtrak Trains	2.40	2.22	2.94
Convenient to My Final Destination	4.35	4.53	4.25
Convenient to My Residence	3.21	3.74	3.51
Drink/Snack Cart Service onboard Train	2.40	2.72	2.69
Faster than Other Options	3.80	3.97	3.75
I Cannot Drive	1.70	1.85	2.16
I Would Rather Not Drive	3.18	3.59	3.32
I Would Rather Not Fly	2.29	2.35	2.68
Less Expensive than Other Options	3.39	3.56	3.50
More Comfortable than Other Options	3.98	4.14	4.01
More Environmentally Friendly than Other Options	3.41	3.63	3.63
More Reliable than Other Options	3.90	3.98	3.88
No Other Form of Transportation Available	2.29	2.82	2.70
Opportunity to Read or Socialize	3.17	3.37	3.28
Opportunity to Sleep/Relax while Traveling	3.37	3.77	3.70
Opportunity to Work while Traveling	3.69	4.08	3.13
Parking Availability at Station	3.27	3.51	3.11
Price of Gasoline	3.19	3.49	3.50
Safer than Other Options	3.29	3.60	3.48
Schedule Matched My Schedule Needs	3.85	3.83	3.72
Scale: (1) Strongly Disagree to (5) Strongly Agree			
Rows in italics indicate items with ANOVA test for equality of mean scores rejected for $\alpha = 0.05$			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

Avoiding highway congestion and convenience of the *Hiawatha Service* to the passengers' final destination were rated as the two highest reasons across the three trip purposes. Comfort was the

third most important reason for choosing rail among business and personal travelers, while avoiding snow or winter driving was the third most important among commuters.

Potential Service Changes to Increase Rail Travel Frequency

Passengers were also asked to respond to a series of 17 statements related to changes or improvements that could be made to the *Hiawatha Service* and if such changes would encourage the passenger to ride more often. The types of changes considered ranged from new on-board amenities to operational changes such as new service frequencies or expanded destination choices. A five-point Likert item similar to the one used in the previous questions on reasons why the passenger chose the *Hiawatha Service* was used in these questions.

Table 5-15 shows the average scores for each of the 17 service changes to increase ridership by day type as well as the average and standard deviation for both days combined. Two items, Wi-Fi Internet access and lower fares, had an average score higher than 4.0/5 for both weekday and weekend passengers. Significant differences in the average scores between weekday and weekend travelers, noted in italics in Table 5-15, did not demonstrate a clear pattern of passenger preferences between the two days. Weekday travelers rated amenities such as on-board Wi-Fi Internet access and new passenger coach cars significantly higher than weekend travelers, while weekend travelers rated amenities such as on-board café service, expanded quiet car seating, on-board bicycle racks, and coordinated baggage service from the rail boarding station to airline higher than weekday travelers. Operationally, weekday travelers rated faster travel times and more departures higher, while weekend travelers rated expansion to other cities and coordinated schedules with flights at the Milwaukee airport more favorably.

Table 5-15: Rail Passenger Service Changes to Increase Ridership by Day Type

Potential Service Change	Weekday	Weekend	All Passengers
Wi-Fi Internet Access	4.22	3.98	4.11 (0.93)
Lower Fares	4.06	4.05	4.06 (0.89)
More Daily Departures/Arrivals	4.09	3.86	3.99 (0.90)
Faster Travel Times	4.05	3.80	3.94 (0.94)
Additional Early Evening Departure from Chicago	3.95	3.75	3.86 (0.94)
Additional Late Evening Departure from Chicago	3.83	3.83	3.83 (0.97)
Additional Morning Departure from Milwaukee	3.87	3.68	3.78 (0.96)
New, Modern Passenger Coach Cars	3.80	3.70	3.75 (0.95)
Extend Passenger Rail Service to Other Cities	3.65	3.81	3.72 (1.02)
Increasing Gasoline Prices	3.63	3.61	3.62 (1.02)
Full On-Board Café Car Service	3.17	3.33	3.24 (0.94)
Expanded Quiet Car Seating	3.20	3.29	3.24 (0.91)
Coordinated Schedules with Flights from Milwaukee Airport	3.15	3.31	3.22 (0.91)
Improved Parking at Stations	3.20	3.22	3.21 (0.81)
Reserved Seating Availability	3.15	3.20	3.17 (0.96)
Racks for Carry-On Bicycles Inside Train	3.03	3.19	3.10 (0.94)
Checked Bag Service from Boarding Station to Airline	2.99	3.12	3.04 (0.88)
Scale: (1) Strongly Disagree to (5) Strongly Agree			
Rows in italics indicate items with ANOVA test for equality of mean scores rejected for $\alpha = 0.05$			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

Two other items from Table 5-15 are worth additional discussion. The *Hiawatha Service* is somewhat unique among its peers (that is, other state-supported Amtrak routes) in that the service operates without requiring passengers to obtain advance reservations (seating is provided on a first come, first served basis) and that no full on-board café service is available. Neither of these items was scored in the upper half of the 17 items analyzed in Table 5-15. The item "Full On-Board Café Service" had an average score of (3.24/5) and was ranked 11 out of 17 items, while "Reserved Seating Availability" was ranked 15 out of 17 items with an average score of (3.17/5). Based on the data presented in Table 5-15, there is limited evidence to suggest that changes to these two areas of operation would substantially increase the frequency of rail travel, at least among current *Hiawatha Service* passengers.

Table 5-16 shows the average scores for the potential service changes to increase ridership by trip purpose. The potential service change with the highest average score was different for each of the three trip purpose categories.

Table 5-16: Rail Passenger Service Changes to Increase Ridership by Trip Purpose

Potential Service Change	Business	Commute	Personal
Additional Early Evening Departure from Chicago	3.79	4.28	3.74
Additional Late Evening Departure from Chicago	3.75	4.01	3.78
Additional Morning Departure from Milwaukee	3.72	4.17	3.67
Checked Bag Service from Boarding Station to Airline	3.03	2.74	3.14
Coordinated Schedules with Flights from Milwaukee Airport	3.18	2.90	3.32
Expanded Quiet Car Seating	3.09	3.27	3.27
Extend Passenger Rail Service to Other Cities	3.68	3.44	3.82
Faster Travel Times	3.79	4.49	3.81
Full On-Board Café Car Service	3.14	3.11	3.31
Improved Parking at Stations	3.13	3.26	3.22
Increasing Gasoline Prices	3.63	3.67	3.61
Lower Fares	3.82	4.19	4.08
More Daily Departures/Arrivals	3.85	4.52	3.85
New, Modern Passenger Coach Cars	3.63	4.00	3.70
Racks for Carry-On Bicycles Inside Train	2.92	2.94	3.19
Reserved Seating Availability	3.04	3.16	3.21
Wi-Fi Internet Access	4.16	4.50	3.98
Scale: (1) Strongly Disagree to (5) Strongly Agree			
Rows in italics indicate items with ANOVA test for equality of mean scores rejected for $\alpha = 0.05$			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

Among business travelers, "Wi-Fi Internet Access" had the highest average score (4.16/5). Among commuters, "More Daily Departures or Arrivals" had the highest average score (4.52/5). However, "Wi-Fi Internet Access" also scored high among commuters (4.5/5). Among personal travelers, "Lower Fares" had the highest average score (4.08/5). In general, these findings reflected the priorities of the various trip purpose groups. Wi-Fi Internet access is a high priority among business travelers and work commuters likely because those travelers would desire the productivity gains that would be realized with available on-board Internet access. Personal travelers, on the other hand, are likely more cost-sensitive and value the possibility of lower fares more than other potential changes.

Another aspect of the *Hiawatha Service* that makes the route unique in the Amtrak national intercity passenger rail system is the route's direct connection to an airport, in this case, the Milwaukee General Mitchell International Airport via the Milwaukee Airport Rail Station. Additional service frequencies notwithstanding, enhancing the connectivity between the *Hiawatha Service* and the Milwaukee airport would not appear to motivate additional rail travel by current *Hiawatha Service* passengers. Two items in Table 5-15, "Coordinated Schedules with Flights from Milwaukee Airport" and "Checked Bag Service from Boarding Station to Airline," received relatively low scores among the passengers (3.22/5 and 3.04/5, respectively).

Use of Milwaukee Airport Rail Station

In FFY 2011, more than 160,000 passengers boarded or departed the *Hiawatha Service* at the Milwaukee Airport Rail Station. Although this figure represents approximately 10 percent of the total *Hiawatha Service* ridership, the station is the third busiest station on the route, behind Chicago Union Station and the Milwaukee Downtown Intermodal Station. In addition to facilitating a nearly seamless connection between the Amtrak rail network and the Milwaukee airport, the Milwaukee Airport Rail Station provides more convenient access to the *Hiawatha Service* for residents of the south Milwaukee city and immediate suburbs. To capture the influence of the Milwaukee Airport Rail Station on the behavior of current *Hiawatha Service* passengers, the on-board survey included two questions about the passengers' current use of the station. The first question asked the passenger to "check all that apply" to a series of five items related to his or her use of the station. The second question listed five potential uses of the station and asked the passenger how often he or she used the station for each activity. Table 5-17 shows the results of these two questions by day type and for all passengers. A majority of passengers surveyed (60 percent) reported that they do not use the airport rail station. Approximately 13 percent of passengers reported that they started using the *Hiawatha Service* after the station's opening in January 2005 primarily because of the station. This finding suggests that there was a small induced travel effect of the new station opening. Use of the airport rail station instead of the Milwaukee Downtown Intermodal Station was reported by approximately 11 percent of passengers, with this percentage being higher for weekday passengers than weekend passengers. Use of the airport rail station to transfer to airline service was minimal, reported by 6 percent of current *Hiawatha Service* passengers.

Passengers were also asked to rate their frequency of use of the Milwaukee Airport Rail Station for five possible uses of the station. The five uses included three related to airport access and two related to the use of the station in general. A vast majority of *Hiawatha Service* passengers do not use the airport rail station to access the Milwaukee General Mitchell International Airport, or use the airport instead of the two Chicago-area airports (O'Hare and Midway). Approximately 10 percent of passengers reported using the rail service occasionally for these activities, while a minor percentage (2 to 3 percent) of passengers reported using the *Hiawatha Service* frequently for these activities. These percentages did not differ markedly between weekday and weekend passengers. On the other hand, the use of the Milwaukee Airport Rail Station for park and ride or for drop-off/pick-up from the *Hiawatha Service* was more frequent than for airport access among rail passengers. Notably, weekday passengers reported using the airport rail station frequently to park and ride the *Hiawatha Service* more than weekend passengers (11 versus 4 percent).

Table 5-17: Rail Passenger Use of Milwaukee Airport Rail Station by Day Type

Passenger Use of Milwaukee Airport Rail Station		Weekday	Weekend	All Passengers
Use to Transfer to/from Airline Service (%)		6	6	6
Use Instead of Milwaukee Intermodal Station (%)		13	9	11
Use Instead of Sturtevant Station (%)		2	1	2
Starting Using *Hiawatha Service* Because of MARS (%)		13	12	13
I Do Not Use the Milwaukee Airport Rail Station (%)		59	62	60
Use to Access Milwaukee Airport Instead of Driving	Never (%)	88	88	88
	Occasionally (%)	10	10	10
	Frequently (%)	2	3	2
Use to Fly to Milwaukee Airport Instead of Chicago O'Hare (ORD)	Never (%)	86	85	85
	Occasionally (%)	12	12	12
	Frequently (%)	3	3	3
Use to Fly to Milwaukee Airport Instead of Chicago Midway (MDW)	Never (%)	90	88	89
	Occasionally (%)	8	9	8
	Frequently (%)	2	2	2
Use to Park and Ride Amtrak *Hiawatha Service*	Never (%)	72	79	75
	Occasionally (%)	17	17	17
	Frequently (%)	11	4	8
Use to Be Dropped Off/Picked Up to/from Amtrak *Hiawatha Service*	Never (%)	74	73	74
	Occasionally (%)	19	19	19
	Frequently (%)	7	8	7
Note: Columns may not sum to 100 percent due to rounding				
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey				

Table 5-18 reports similar data on the use of the Milwaukee Airport Rail Station by *Hiawatha Service* passengers by trip purpose. Business and commute passengers reported using the airport rail station instead of the Milwaukee Downtown Intermodal Station more than personal travelers. Passengers that reported a trip purpose of commuting reported using the airport rail station to access the Milwaukee airport more often than passengers in the other two trip purpose groups. Not surprisingly, commuters had the highest percentage of frequent park and ride use of the rail station among the three trip purpose groups at 19 percent. Almost one-quarter of *Hiawatha Service* passengers traveling for business purposes reported using the airport rail station occasionally to park and ride. It is important to note when interpreting the analysis presented in Tables 5-17 and 5-18 that the responses were provided by passengers based upon the passengers' overall experiences and use of the Milwaukee Airport Rail Station, and not necessarily use of the rail station during the surveyed trip. For example, it is unlikely that 10 percent of *Hiawatha Service* passengers who reported "Commute" as a trip purpose transferred from airline service at the Milwaukee Airport Rail Station as part of a commute trip.

Table 5-18: Rail Passenger Use of Milwaukee Airport Rail Station by Trip Purpose

Passenger Use of Milwaukee Airport Rail Station		Business	Commute	Personal
Use to Transfer to/from Airline Service (%)		4	10	5
Use Instead of Milwaukee Intermodal Station (%)		15	14	9
Use Instead of Sturtevant Station (%)		3	4	1
Starting Using *Hiawatha Service* Because of MARS (%)		15	15	12
I Do Not Use the Milwaukee Airport Rail Station (%)		56	54	64
Use to Access Milwaukee Airport Instead of Driving	Never (%)	92	80	89
	Occasionally (%)	8	17	8
	Frequently (%)	<1	3	2
Use to Fly to Milwaukee Airport Instead of Chicago O'Hare (ORD)	Never (%)	86	78	88
	Occasionally (%)	12	17	10
	Frequently (%)	2	5	2
Use to Fly to Milwaukee Airport Instead of Chicago Midway (MDW)	Never (%)	92	86	90
	Occasionally (%)	6	11	8
	Frequently (%)	2	4	2
Use to Park and Ride Amtrak *Hiawatha Service*	Never (%)	68	62	81
	Occasionally (%)	23	18	15
	Frequently (%)	9	19	4
Use to Be Dropped Off/Picked Up to/from Amtrak *Hiawatha Service*	Never (%)	73	72	74
	Occasionally (%)	20	21	18
	Frequently (%)	6	7	8
Note: Columns may not sum to 100 percent due to rounding				
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey				

RAIL PASSENGER DEMOGRAPHIC PROFILE

This section of the *Hiawatha Service* on-board passenger survey analysis focuses on the passengers' demographic profile. On the survey, passengers were asked to provide the five-digit zip code of their home residence. Researchers used these responses to identify a county of residence for each passenger. The county information was then used to classify the passengers by residential location, defined as the following locations:

- Milwaukee, Wisconsin MSA, comprising Milwaukee, Ozaukee, Washington, and Waukesha Counties (*36*);
- Racine County, Wisconsin;
- Kenosha County, Wisconsin;
- All remaining Wisconsin (all other Wisconsin counties not mentioned above);
- Chicago, Illinois Metropolitan Division, comprising Cook, DeKalb, DuPage, Grundy, Kane, Kendall, McHenry, and Will Counties (*36*);
- Lake County, Illinois;
- All remaining Illinois (all other Illinois counties not mentioned above); and
- Other U.S. states (states other than Wisconsin and Illinois).

Racine County, Kenosha County, and Lake County are the three intermediate counties between Milwaukee County and Cook County through which the *Hiawatha Service* route operates. Table 5-19 displays the percentage of passengers from each residential location by day type and total for all passengers. A majority of *Hiawatha Service* passengers (52 percent) were from the Milwaukee MSA. Residents from other areas of Wisconsin comprised 9 percent of the overall ridership. Racine County residents comprised 5 percent of the ridership, and Kenosha County residents were a very small percentage. Chicago-area residents represented approximately 23 percent of the ridership, while a small percentage of *Hiawatha Service* passengers were from Lake County or other areas of Illinois.

Table 5-19: Rail Passenger Residential Location by Day Type

Residential Location	Weekday	Weekend	All Passengers
Wisconsin (%)	**70**	**64**	**67**
• Milwaukee MSA (%)	54	50	52
• Racine County (%)	6	4	5
• Kenosha County (%)	1	<1	<1
• All Remaining Wisconsin (%)	9	10	9
Illinois (%)	**22**	**26**	**24**
• Chicago Metropolitan Division (%)	20	25	23
• Lake County (%)	<1	<1	<1
• All Remaining Illinois (%)	1	1	1
Other U.S. States (%)	**8**	**10**	**9**
Note: Columns may not sum to 100 percent due to rounding			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

Also shown in Table 5-19 is the percentage of residents from Wisconsin, Illinois, and other U.S. states obtained from a sum of the appropriate categories. Approximately two-thirds of *Hiawatha Service* passengers were from Wisconsin, one-quarter were from Illinois, and the rest were from other U.S. states. Wisconsin residents comprised a slightly greater share of weekday passengers, while Illinois and other U.S. states were higher on weekends.

Table 5-20 reports the percentage of *Hiawatha Service* passengers from each residential location by trip purpose. For comparison, the distribution of residential location for all surveyed passengers is also given in Table 5-20. Several trends in passenger residential location by trip purpose are evident. The primary residential location for business travelers was the Milwaukee area (63 percent as compared with 52 percent of all passengers). Among commute travelers, 11 percent reported a residence in Racine County, but only 1 percent reported a residence in Kenosha County. The substantial difference between the two counties is due to the location of the Sturtevant station in Racine County and also the availability of frequent METRA commuter rail service from Kenosha to Chicago. The distribution of residential location for passengers traveling for personal reasons varied slightly from the residential location for all *Hiawatha Service* passengers, with more personal travelers having residential locations in other areas of Wisconsin, the Chicago area, and other U.S. states than average.

Table 5-20: Rail Passenger Residential Location by Trip Purpose

Residential Location	Business	Commute	Personal	All Passengers
Wisconsin (%)	**78**	**77**	**61**	**67**
• Milwaukee MSA (%)	63	64	46	52
• Racine County (%)	5	11	3	5
• Kenosha County (%)	0	1	<1	<1
• All Remaining Wisconsin (%)	10	2	12	9
Illinois (%)	**14**	**20**	**27**	**24**
• Chicago Metropolitan Division (%)	13	20	26	23
• Lake County (%)	0	0	<1	<1
• All Remaining Illinois (%)	1	0	1	1
Other U.S. States (%)	**9**	**1**	**12**	**9**
Note: Columns may not sum to 100 percent due to rounding				
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey				

The final section of the *Hiawatha Service* on-board passenger survey form gathered typical demographic profile information about the passenger. Demographic profile information gathered included gender, number of vehicles in household, age group, employment status, highest level of education, and total annual household income.

Table 5-21 reports the demographic profile characteristics for *Hiawatha Service* passengers by day type and both day types combined. Females comprised a majority of passengers across both days (54 percent), with a higher percentage of females on weekends (56 percent) than weekdays (52 percent). Vehicle access did not appear to be an issue for *Hiawatha Service* passengers, as only 9 percent of passengers surveyed reported having zero vehicles in their household. The average number of vehicles per household was slightly less than two vehicles per household. Weekday passengers were older than weekend passengers by approximately 3 years, with the median age for weekday passenger estimated at 40.9 and for weekend passengers at 37.6 years old. The proportion of younger passengers (ages 18 to 24 years) was higher on weekends (21 percent) than on weekdays (13 percent). The proportion of elderly passengers aged 65 years or older was consistent across the two days, covering approximately 6 percent of all passengers. A majority of passengers surveyed reported full-time employment status. The share of passengers reporting full-time employment was higher on weekdays (71 percent) than on weekends (60 percent). Conversely, the weekend passenger profile was comprised of larger percentages of part-time employees, retired individuals, and university/college students. In general, the passengers on the *Hiawatha Service* were well educated. A majority of passengers (65 percent) reported possession of a bachelor's degree or more advanced graduate degree. The median income among *Hiawatha Service* passengers was estimated at $84,000, suggesting a relative level of affluence among the ridership. Estimated median income on weekday trains was higher than weekend trains, likely a reflection of the business and work commute passengers, which represented a majority of weekday passengers.

Table 5-21: Rail Passenger Demographic Characteristics by Day Type

Characteristic	Weekday	Weekend	All Passengers
Gender (% Female)	52	56	54
Household Vehicles			
• Average Vehicles per Household	2.0	1.8	1.9
• None (%)	7	13	9
• One (%)	25	28	26
• Two (%)	47	37	42
• Three (%)	14	13	14
• Four or More (%)	8	10	9
Age Group			
• Median Age	40.9	37.6	39.7
• 18 to 24 years (%)	13	21	17
• 25 to 34 years (%)	23	25	24
• 35 to 44 years (%)	23	17	20
• 45 to 54 years (%)	21	17	19
• 55 to 64 years (%)	14	14	14
• 65 years and over (%)	6	6	6
Current Employment Status			
• Employed Full-Time (%)	71	60	66
• Employed Part-Time (%)	6	11	9
• Unemployed (%)	3	4	3
• Retired (%)	7	9	8
• University/College Student (%)	10	14	12
• Homemaker (%)	2	2	2
Educational Attainment			
• Some High School or Less (%)	2	2	2
• High School Graduate or GED (%)	8	12	10
• Some College (%)	14	18	16
• Associate or Technical Degree (%)	5	8	7
• Bachelor's Degree (%)	36	33	35
• Graduate Degree (%)	34	26	30
Annual Household Income			
• Median Household Income	$95,000	$70,900	$84,000
• Less than $10,000 (%)	4	7	6
• $10,000 to $19,999 (%)	4	4	4
• $20,000 to $29,999 (%)	3	6	4
• $30,000 to $39,999 (%)	5	8	7
• $40,000 to $49,999 (%)	7	9	8
• $50,000 to $74,999 (%)	14	18	16
• $75,000 to $99,999 (%)	15	15	15
• $100,000 to $149,999 (%)	19	14	17
• $150,000 to $199,999 (%)	11	8	10
• $200,000 or More (%)	17	10	14
Note: Columns may not sum to 100 percent due to rounding			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

Table 5-22 reports the demographic profile information for *Hiawatha Service* passengers by the three trip purpose categories. A majority of commute passengers were male (58 percent), while passengers traveling for personal reasons were mostly female (59 percent). The female/male split among business travelers was nearly equal. The proportion of zero-vehicle households was higher among personal travelers (12 percent) than the other two purposes. The estimated median age was oldest for business travelers (44.2 years) and youngest for personal travelers (37.8 years). The personal trip purpose segment had the highest percentage of younger passengers (23 percent reported age 18 to 24 years) and elderly passengers (8 percent reported age 65 and older). Not surprisingly, very high percentages of business and commute travelers reported full-time employment status. Conversely, slightly more than half of personal travelers reported full-time employment status. The second-largest group of personal travelers consisted of university/college students, representing 17 percent of such travelers. Educational attainment reported among business and commute passengers also followed an expected pattern, with the percentage of passengers holding a graduate degree nearly twice as high as the same percentage for personal travelers. However, the share of passengers with possession of a bachelor's degree was approximately equal across the three trip purpose categories. Across the three trip purpose segments, the work commuter segment had the highest estimated median household income at $125,500 annually. This was almost twice the estimated median income of personal travelers ($66,700) and approximately 10 percent more than the median income for business travelers ($113,700). In addition to having the lowest median income among the three trip purpose groups, the personal traveler segment had the highest percentage of low-income passengers (defined as income less than $20,000), with 13 percent of passengers falling into this group.

Table 5-22: Rail Passenger Demographic Characteristics by Trip Purpose

Characteristic	Business	Commute	Personal
Gender (% Female)	49	42	59
Household Vehicles			
• Average Vehicles per Household	2.0	2.0	1.8
• None (%)	5	3	12
• One (%)	23	25	28
• Two (%)	49	54	37
• Three (%)	17	10	14
• Four or More (%)	6	9	10
Age Group			
• Median Age	44.2	41.1	37.8
• 18 to 24 years (%)	6	4	23
• 25 to 34 years (%)	28	27	22
• 35 to 44 years (%)	18	31	18
• 45 to 54 years (%)	29	24	15
• 55 to 64 years (%)	17	12	14
• 65 years and over (%)	3	1	8
Current Employment Status			
• Employed Full-Time (%)	87	94	52
• Employed Part-Time (%)	7	3	11
• Unemployed (%)	<1	<1	5
• Retired (%)	3	<1	11
• University/College Student (%)	3	2	17
• Homemaker (%)	1	0	3
Educational Attainment			
• Some High School or Less (%)	0	<1	3
• High School Graduate or GED (%)	3	4	14
• Some College (%)	11	9	20
• Associate or Technical Degree (%)	5	3	8
• Bachelor's Degree (%)	39	40	33
• Graduate Degree (%)	42	45	23
Annual Household Income			
• Median Household Income	$113,700	$125,500	$66,700
• Less than $10,000 (%)	<1	1	8
• $10,000 to $19,999 (%)	2	1	5
• $20,000 to $29,999 (%)	1	<1	6
• $30,000 to $39,999 (%)	3	3	9
• $40,000 to $49,999 (%)	5	6	9
• $50,000 to $74,999 (%)	15	11	18
• $75,000 to $99,999 (%)	16	16	14
• $100,000 to $149,999 (%)	24	24	13
• $150,000 to $199,999 (%)	13	15	7
• $200,000 or More (%)	19	23	9
Note: Columns may not sum to 100 percent due to rounding			
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey			

CHAPTER 6: AIRPORT RAIL STATION SHUTTLE SURVEY ANALYSIS

This chapter reports the findings from the analysis of the Milwaukee airport shuttle passenger survey data collected in Task 4 of this research project. An innovative two-part data collection procedure was implemented to collect 961 initial interviews and 155 follow-up Internet survey responses from passengers using the circulating shuttle to connect between the Milwaukee Airport Rail Station and the Milwaukee General Mitchell International Airport main terminal. Following a similar format as the analysis of the *Hiawatha Service* on-board passenger survey analysis presented in the previous chapter, this analysis is divided into three sections:

- Shuttle passenger trip information;
- Shuttle passenger behavior and decision-making; and
- Shuttle passenger demographic profile.

The initial interview collected information including the shuttle passenger's gender, trip purpose (business or personal), and home residential zip code. Similar information was also obtained from the questions presented in the follow-up Internet survey. From the trip purpose and residential zip code information, researchers assigned each initial interview and follow-up Internet survey participant into one of the four airport ground access market segments previously discussed (see Figure 2-1). The four market segments were as follows:

- Resident/Business;
- Resident/Non-Business;
- Non-Resident/Business; and
- Non-Resident/Non-Business.

Passengers with a home residence in the Milwaukee Combined Statistical Area (CSA), which includes the four counties in the Milwaukee MSA plus Racine County, were considered residents of the Milwaukee airport market area. Residents of the Chicago area (as defined by the Chicago Metropolitan Division) were also considered residents of the Milwaukee airport market area because the *Hiawatha Service* rail line offers a cost-competitive and convenient way to travel from the Chicago area to the Milwaukee airport. The remaining passengers were considered non-residents of the Milwaukee airport market area.

Table 6-1 shows the gender, trip purpose, residential status, and market segment for the initial interview and the follow-up Internet survey. For the purposes of comparison, Table 6-1 also presents similar data from the *Hiawatha Service* on-board passenger survey described in the previous chapter. Analysis of the initial interview data provides insight into the general characteristics of the Milwaukee airport air-rail transfer shuttle passengers. A majority of shuttle riders were male, representing approximately 58 percent of all riders. Most shuttle trips were by passengers that were traveling for personal reasons (65 percent), while 35 percent were for business purposes. A majority (59 percent) of shuttle passengers identified a residence outside of the Milwaukee and Chicago region. One-third of the passengers interviewed reported a residence in the Chicago area, and a small proportion of travelers (8 percent) were from Milwaukee. It was not surprising that a small proportion of shuttle riders were Milwaukee-area residents, as these travelers were likely to have other options for accessing the Milwaukee airport

readily available. Combining the trip purpose and residential status data, the largest market segment was non-resident/non-business, accounting for 41 percent of shuttle passengers. Market segmentation of the remaining shuttle passengers was as follows: resident/business, 17 percent; resident/non-business, 24 percent; and non-resident/business, 18 percent.

Table 6-1: Comparison of Traveler Gender, Trip Purpose, Residence, and Market Segment

Characteristic	Initial Interview (n = 961)	Follow-Up Survey (n = 155)	On-Board Survey (n = 2,298)
Gender (% Female)	42	43	54
Trip Purpose (Business, %)	35	37	35
• Commute to/from Work (%)	N/A	N/A	20
• Going to/from a Business Trip (%)	N/A	31	16
• Going to/from a Meeting/Conference (%)	N/A	6	N/A
Trip Purpose (Personal, %)	65	63	65
• Going to/from School (University/College, %)	N/A	0	4
• Leisure/Vacation (%)	N/A	20	26
• Personal Business (%)	N/A	7	5
• Visiting Family or Friends (%)	N/A	36	30
Residential Status			
• Milwaukee CSA (%)	8	8	57
• Chicago MSA (%)	33	43	24
• Non-Resident (All Others, %)	59	49	19
Market Segment			
• Resident Business (%)	17	21	32
• Resident Non-Business (%)	24	29	49
• Non-Resident Business (%)	18	16	4
• Non-Resident Non-Business (%)	41	34	15
Note: Columns may not sum to 100 percent due to rounding			
N/A indicates item not included on survey			
Source: 2011 TTI/WisDOT Milwaukee Airport Shuttle Passenger Survey			

Comparison between the initial interview data and the follow-up Internet survey data revealed additional details about the travel purpose of shuttle riders. A majority of shuttle riders were traveling to visit family or friends (36 percent) or for leisure or vacation (20 percent). Among business travelers, most were traveling to or from a business trip with a small group or going to or from a meeting or conference. Comparing the initial interview and follow-up survey data showed that, in general, the follow-up survey respondents were sufficiently representative of the shuttle riders observed during the initial interview. Chicago-area residents were a larger proportion of the follow-up survey, as compared to the initial interview. Non-residents accounted for this difference and were a smaller proportion of the follow-up survey group. This was not surprising, as Chicago-area residents have more opportunities to use the *Hiawatha Service* for a variety of trips and might have felt that their participation in the follow-up survey would help bring improvements to the rail service in the future. Chi-square tests comparing the distribution of market segment between the initial interview data and the follow-up survey data showed that the follow-up survey was sufficiently representative of the initial interview passengers for the four segments of the airport ground access travel market.

Comparison between the follow-up Internet survey data and the on-board passenger survey data offers a look at how the Milwaukee airport shuttle passengers differed from the overall *Hiawatha Service* ridership. The airport shuttle appeared to be attracting more male travelers than the overall ridership, with females accounting for 54 percent of the overall ridership but just 42 percent of the airport shuttle passengers. Interestingly, the percentage split between business and personal travel among both groups was equal, although the overall *Hiawatha Service* ridership consisted of a substantial percentage of travelers commuting to or from work. This category of trip purpose was not included on the follow-up shuttle passenger survey. The distribution of personal travel categories was also fairly consistent between the two surveys. However, the distribution of passenger residential status was not consistent. Specifically, the proportion of travelers from Milwaukee among the general *Hiawatha Service* ridership was significantly higher than the airport shuttle riders. This finding was not surprising, as residents of Milwaukee are likely to have several other travel options for accessing the airport and do not need to utilize the *Hiawatha Service* for that purpose.

SHUTTLE PASSENGER TRIP INFORMATION

Boarding and Alighting Station

The remainder of this chapter focuses on the analysis of the data obtained from the follow-up Internet survey of Milwaukee airport shuttle passengers. Trip information obtained from this survey included the passengers' boarding or alighting station and the location type of the shuttle passengers' origin or destination before or after the *Hiawatha Service* rail trip. Table 6-2 shows the boarding and alighting station for Milwaukee airport shuttle passengers. In the context of Table 6-2, the boarding and alighting stations are defined as the station where the passenger boarded (or alighted) the *Hiawatha Service* with the Milwaukee Airport Rail Station as the opposite end of the trip. For example, 9 percent of shuttle passengers boarded the *Hiawatha Service* at the Milwaukee Downtown Intermodal Station and departed the *Hiawatha Service* at the Milwaukee Airport Rail Station.

Table 6-2: Shuttle Passenger Boarding and Alighting Stations

Station	Boarding (To Airport)	Alighting (From Airport)
Milwaukee (Downtown, %)	9	28
Sturtevant (%)	1	1
Glenview (%)	19	9
Chicago (Union Station, %)	71	61
Note: Columns may not sum to 100 percent due to rounding		
Source: 2011 TTI/WisDOT Milwaukee Airport Shuttle Passenger Survey		

Not surprisingly, a majority of shuttle passengers started or ended their rail trip on the *Hiawatha Service* at Chicago Union Station. For passengers connecting to the airport station, 19 percent boarded the train in Glenview. Interestingly, 28 percent of passengers that boarded the *Hiawatha Service* at the airport station departed the train at the Milwaukee Downtown Intermodal Station. This is surprising because one might assume that passengers traveling to

downtown Milwaukee would have more convenient options than using the *Hiawatha Service* for such a relatively short trip.

Origin and Destination Location Type

Table 6-3 shows the location type of the shuttle passengers' origin or destination before or after the rail trip to the Milwaukee airport. Approximately half of shuttle passengers originated from or were destined to their home. Place of work or another employment-related location was the origin of the trip for 11 percent of passengers going toward the airport but was the destination for 7 percent of passengers coming from the airport. By contrast, 7 percent of passengers coming from the airport reported a tourist or vacation site as their destination, whereas only 1 percent of passengers traveling to the airport originated at such a location.

Table 6-3: Shuttle Passenger Origin/Destination Before/After Rail Trip

Location Type	Origin (To Airport)	Destination (From Airport)
Home (Yours, %)	47	49
Home (Friend or Relative's, %)	21	19
Hotel (%)	14	13
Meeting/Conference Site (%)	4	6
Place of Work or Other Employment-Related Location (%)	11	7
School/University (%)	1	0
Tourist or Vacation Site (%)	1	7
Note: Columns may not sum to 100 percent due to rounding		
Source: 2011 TTI/WisDOT Milwaukee Airport Shuttle Passenger Survey		

Air Carrier and Flight Destinations

Table 6-4 shows the air carrier used by shuttle passengers on their flight to or from Milwaukee. This question on the survey also included an option for passengers to select that they "Did Not Connect to/from Flight" and provided a series of non-flight activities as options from which to select. Table 6-4 also shows the responses to this question.

Among shuttle passengers, popular air carriers included AirTran Airways, Frontier Airlines, and Delta Airlines. It is not surprising that AirTran and Frontier were commonly used, as both airlines have a strong presence at Milwaukee General Mitchell International Airport. Interestingly, more than one-quarter of shuttle passengers were not traveling between the *Hiawatha Service* and the Milwaukee airport for the purposes of connecting to a flight. Using the shuttle to "Connect with Other Transportation Options" was reported by 19 percent of shuttle passengers surveyed. Such transportation options included airport-based rental car facilities, which tend to be open longer and have more vehicle choices than off-airport offices. Informal discussion with passengers during the initial interviews confirmed that connecting from the *Hiawatha Service* to airport rental car facilities is advised by rental agencies as a way to avoid a one-way rental car drop fee (the *Hiawatha Service* fare is cheaper than the fee). Passengers using the rail-air transfer at the Milwaukee Airport Rail Station also reported meeting/sending-off a family member, friend, or colleague or connecting to work at or near the airport as other non-flight-related uses of the shuttle connection.

Table 6-4: Shuttle Passenger Air Carrier/Other Reason for Accessing MKE

Air Carrier/Other Reason for Traveling	All Shuttle Passengers	Air Travelers Only	
		All Shuttle Passengers	All MKE Passengers
Air Canada (%)	0	0	<1
AirTran Airways (%)	25	33	29
American Airlines (%)	3	4	5
Continental Express (%)	2	3	4
Delta Airlines (%)	13	17	20
Frontier Airlines (%)	19	26	23
Southwest Airlines (%)	2	3	10
United Express (%)	8	10	4
U.S. Airways Express (%)	3	3	5
I Did Not Connect to/from Flight (%)	26	N/A	N/A
• Connect with Other Transportation Options (%)	19	N/A	N/A
• Meet/Send-Off Family/Friend/Colleague (%)	3	N/A	N/A
• Work at/near Airport (%)	3	N/A	N/A
• Unspecified Other (%)	1	N/A	N/A
Note: Columns may not sum to 100 percent due to rounding			
MKE airline passenger data source: (*37*)			
Source: 2011 TTI/WisDOT Milwaukee Airport Shuttle Passenger Survey			

Table 6-4 also displays the distribution of airlines used by shuttle passengers (as a percentage of survey respondents that were connecting to airlines) compared with the distribution of all airline passenger activity at the Milwaukee airport. Total passenger activity at the airport is given as the percentage of passengers screened at security by each airline for the month of June 2011. In general, the shuttle passengers' airline preferences reflected the airline preferences of all airport passengers. The share of passengers using United Express was higher among shuttle passengers, while Southwest Airlines was under-represented in the survey.

Table 6-5 reports the air carrier or other reason for accessing the Milwaukee airport for shuttle passengers by market segment. Three low-cost carriers serve Milwaukee General Mitchell International Airport: AirTran Airways, Frontier Airlines, and Southwest Airlines. The remaining six airlines that serve Milwaukee are grouped as "legacy carriers" in Table 6-5. Most shuttle passengers (46 percent) were connecting to one of the three low-cost carriers. The use of low-cost airlines was high among non-business travelers, particularly resident/non-business travelers (58 percent). Legacy carriers were utilized by approximately 30 percent of shuttle riders, with a majority of the non-resident/business segment connecting to flights operated by these air carriers. Connecting with other transportation options was greatest among resident/business travelers with 27 percent of those travelers specifying that option.

Table 6-5: Air Carrier/Other Reason for Accessing MKE by Market Segment

Air Carrier/Other Reason for Traveling	Resident/ Business	Resident/ Non-Business	Non-Resident/ Business	Non-Resident/ Non-Business	All Shuttle Riders
Low-Cost Carriers (%)	33	58	38	48	46
Legacy Carriers (%)	24	22	54	25	29
Connect to Other Transportation (%)	27	11	8	25	19
Other Reason (%)	15	9	0	2	6
Note: Columns may not sum to 100 percent due to rounding					
Source: 2011 TTI/WisDOT Milwaukee Airport Shuttle Passenger Survey					

Table 6-6 reports the top origin or destination cities for shuttle passengers connecting to or from flights at the Milwaukee airport. A total of 48 separate cities were reported, of which 12 cities (listed in Table 6-6) were listed by approximately half of the passengers. Top origin or destination cities included major cities like New York, Washington, D.C., Boston, Los Angeles, Denver, and San Francisco as well as regional destinations such as Rhinelander, Wisconsin.

Table 6-6: Top Origin/Destination Cities to/from MKE among Shuttle Passengers

Rank	Origin/Destination City	Shuttle Passengers
1	New York, NY (%)	13
2	Washington, D.C. (%)	11
3	Boston, MA (%)	6
4	Los Angeles, CA (%)	5
5	Denver, CO (%)	4
6	San Francisco, CA (%)	4
7	Akron/Canton, OH (%)	3
8	Atlanta, GA (%)	3
9	Kansas City, MO (%)	3
10	Las Vegas, NV (%)	3
11	Rhinelander, WI (%)	3
12	St. Louis, MO (%)	3
	All 36 Other Cities (%)	49
Note: Columns may not sum to 100 percent due to rounding		
Source: 2011 TTI/WisDOT Milwaukee Airport Shuttle Passenger Survey		

SHUTTLE PASSENGER BEHAVIOR AND DECISION-MAKING

The first section of this chapter examined various data items related to the Milwaukee airport shuttle passengers' trips. This section examines two aspects of shuttle passenger behavior and decision-making that were included on the Milwaukee airport shuttle passenger survey: the passengers' alternatives for accessing the Milwaukee airport and passenger motivations for using the *Hiawatha Service* to access the Milwaukee airport, instead of other options.

Alternative Travel Mode

In the case of the Milwaukee airport, travelers have a variety of private or public options for the ground access trip, including private automobile (parked or drop-off/pick-up),

motorcoach bus or taxi, local transit, or rental car. Additionally, since the *Hiawatha Service* provides convenient access between the Chicago region and the Milwaukee airport, the two Chicago-area airports, O'Hare International Airport and Midway Airport, are feasible alternatives for certain travelers. Due to the heavy presence of low-fare airlines and the convenient access to the airport (provided in part by the *Hiawatha Service* connection), the Milwaukee airport staff has marketed heavily to travelers in northeast Illinois and north Chicago suburbs as the low-fare alternative to Chicago O'Hare International Airport (*38*).

Table 6-7 shows the percentage of shuttle riders that would have utilized each alternative access mode or airport if the *Hiawatha Service* were not available. The most frequently reported alternative among shuttle riders was the use of one of the two Chicago-area airports, with approximately one-third of travelers selecting that option. Of these travelers, a majority would have used Chicago O'Hare International Airport. One-quarter of shuttle riders would have driven to the Milwaukee airport in a personal vehicle and parked at one of the adjacent parking facilities. Other popular alternatives to the *Hiawatha Service* for airport access included motor coach bus or shuttle, taxi, or drop-off/pick-up by a relative, friend, or colleague

Table 6-7: Shuttle Passenger Travel Alternatives by Market Segment

Alternative to *Hiawatha Service*	Resident/ Business	Resident/ Non-Business	Non-Resident/ Business	Non-Resident/ Non-Business	All Shuttle Riders
I Would Use a Different Airport (%)	12	60	35	24	33
• Chicago O'Hare (%)	3	51	22	22	26
• Chicago Midway (%)	9	9	13	2	7
Drove Myself and Parked (%)	56	20	13	16	25
Motorcoach Bus/Shuttle Service (%)	16	11	17	4	11
Taxi/Car Service (%)	6	2	9	22	11
Driven by Relative/Friend/Colleague (%)	3	4	13	16	9
Other Travel Modes (%)	6	0	9	6	5
Local Transit Service (%)	0	2	0	6	3
Rental Car (%)	0	0	4	8	3
Note: Columns may not sum to 100 percent due to rounding					
Source: 2011 TTI/WisDOT Milwaukee Airport Shuttle Passenger Survey					

Upon examining the travel alternatives for each of the four market segments reported in Table 6-7, some trends were immediately evident. Among the resident/business segment, driving to the Milwaukee airport and parking was the preferred alternative for the ground access trip. This group also had the lowest share of "Use a Different Airport" among the segments. Conversely, a majority of travelers in the resident/non-business segment (60 percent) would have used a different airport (mostly Chicago O'Hare) as an alternative to using the *Hiawatha Service* to travel to the Milwaukee airport. In the case of the resident/non-business segment, the *Hiawatha Service* appears to be not only facilitating ground access trips but also diverting air passengers from the two Chicago airports to the Milwaukee airport. Among non-residents, accessing the Milwaukee airport via a taxi or car service, transportation provided by a relative, friend, or colleague, or the use of a rental car was higher as compared with the two resident market segments. The use of a taxi or car service as an alternative was particularly high among

the non-resident/non-business market segment, a finding that was not surprising given that this segment of travelers was probably the least informed and most unfamiliar with the various access options that may be available at a particular airport (*14*).

Reasons for Using Rail to Access MKE

On the follow-up Internet survey, shuttle passengers were asked to consider the importance of 16 items on their decision to use the *Hiawatha Service* to access the Milwaukee airport instead of other options. Respondents rated each of the 16 items on a five-point scale ranging from extremely unimportant (1) to extremely important (5). Table 6-8 shows the average scores for each item for the four market segments and the average and standard deviation for each item for the overall shuttle ridership.

Table 6-8: Shuttle Passenger Motivations for Choosing *Hiawatha Service* for Airport Trip

Motivation	Resident/ Business	Resident/ Non-Business	Non-Resident/ Business	Non-Resident/ Non-Business	All Shuttle Riders
Convenient to My Final Destination	4.00	4.09	4.42	4.37	4.22 (0.99)
More Convenient than Other Options	4.24	4.11	3.71	4.20	4.10 (0.97)
Schedule Matched My Schedule	4.00	3.89	3.71	4.16	3.97 (1.11)
Avoid Highway Congestion	4.00	3.93	3.88	4.00	3.96 (1.21)
Less Expensive than Other Options	3.85	3.98	4.25	3.72	3.91 (1.11)
Faster than Other Options	3.97	3.78	3.54	3.73	3.77 (1.08)
More Comfortable than Other Options	3.76	3.89	3.50	3.57	3.69 (1.15)
More Reliable than Other Options	3.61	3.76	3.42	3.56	3.61 (1.06)
Opportunity to Sleep/Relax	4.00	3.76	3.25	3.25	3.56 (1.14)
Convenient to My Residence	3.84	3.86	2.46	3.09	3.38 (1.25)
Opportunity to Work while Traveling	3.64	3.42	3.50	2.82	3.28 (1.13)
Safer than Other Options	3.24	3.44	2.88	3.22	3.24 (1.17)
Avoid Airport Parking	3.12	3.27	2.54	3.06	3.05 (1.28)
No Other Transportation Available	3.03	3.09	2.79	2.72	2.91 (1.27)
Family/Friend/Colleague	2.48	3.13	2.96	2.94	2.90 (1.09)
Usual Option Not Available	2.66	2.40	2.42	2.69	2.55 (1.09)
Scale: (1) Strongly Unimportant to (5) Strongly Important					
Rows in italics indicate items with ANOVA test for equality of mean scores rejected for $\alpha = 0.05$					
Source: 2011 TTI/WisDOT Milwaukee Airport Shuttle Passenger Survey					

Among all shuttle riders and across market segments, convenience appeared to be a major consideration when choosing the *Hiawatha Service*. This was reflected in the average scores for the "Convenient to My Final Destination" and "More Convenient than Other Options" items, which were scored as the two highest among all the items (average scores of 4.22/5 and 4.10/5, respectively). In addition to being the two most important items, these two items also had the lowest standard deviation among all the items, suggesting that there was a high level of consensus among the ridership about the importance of these items. Other items that were rated to be important factors in choosing the rail service included the rail schedule matching the traveler's schedule needs (average score 3.97/5), desire to avoid highway congestion (3.96/5),

and the lower cost of the train relative to other options (3.91/5). Two of the three lowest-rated scores were associated with the availability of alternative travel modes. Low importance ratings for the items "Usual Option Not Available" (2.55/5) and "No Other Transportation Available" (2.91/5) indicated readily available alternatives to the rail service among shuttle riders.

Comparing the mean scores on each of the items across the four market segments revealed some important differences in the traveler decision-making process among each segment. ANOVA tests for the equality of means were rejected for the factors "Convenient to My Residence" ($F = 10.73$, $p < 0.0001$), "Opportunity to Sleep/Relax while Traveling" ($F = 4.13$, $p = 0.0076$), and "Opportunity to Work while Traveling" ($F = 4.71$, $p = 0.0036$), indicating some differences across the segment means for each of those items. Under the "Convenient to My Residence" item, the mean importance scores for each of the two non-resident market segments were significantly lower than the two resident market segments. This was not surprising, considering the *Hiawatha Service* rail line was probably not conveniently located near the residential location of a passenger who did not live in the Milwaukee or Chicago region. The importance of the "Opportunity to Sleep or Relax" during the airport ground access trip via rail was also different among the market segments. Non-resident travelers in both business and non-business market segments rated this item lower than their resident counterparts. The importance of the "Opportunity to Work" item was significantly lower for the non-resident/non-business segment as compared to the other three segments—not surprising, as this segment probably has less to be working on while traveling (as compared to the other segments).

Significant pairwise means comparisons across market segments for items without a significant ANOVA rejection were also detected. Specifically, the mean score on the item "Avoid Airport Parking" for the non-resident/business segment was significantly lower than the resident/non-business segment, which was not surprising given that the non-resident/business segment does not have to worry about airport parking at the Milwaukee airport if they are using the *Hiawatha Service* for ground access. The mean score for the item "Recommended by Family/Friend/Colleague" for the resident/business segment was significantly lower than the score for the resident/non-business segment, not surprising because business travelers in the market area of an airport are the most likely to know the menu of travel options for airport ground access trips and therefore the least likely to need a recommendation or assurance from a local contact person about the viability of a particular travel mode (*14*). While not statistically significant, it is noted that the non-resident/business segment rated the importance of "Less Expensive than Other Options" very high, with a mean score of 4.25. This was surprising, as one might expect this segment to be the least cost-sensitive of the four. However, the importance of cost when selecting the *Hiawatha Service* for the access trip suggests that the rail service provides value to business travelers who may be trying to reduce expenses in an era of economic uncertainty and tight company travel budgets.

SHUTTLE PASSENGER DEMOGRAPHIC PROFILE

The final section of this chapter examines the demographic profile characteristics of the Milwaukee airport shuttle passengers. This examination includes the residential location of shuttle passengers and other demographic profile information. Comparisons between the shuttle passengers and the general *Hiawatha Service* ridership are also provided.

Table 6-9 shows the residential location of the shuttle passengers, as identified from the initial interview responses and the responses provided to the follow-up Internet survey. Similar data from the on-board survey (Table 5-19) are repeated here for comparison. Previous discussion (Table 6-1) identified several of the key differences between the initial interview data and the follow-up survey data. Specifically, Illinois residents were over-represented in the follow-up survey, and residents of other U.S. states were under-represented. Most of this difference was detected among residents of the Chicago Metropolitan Division. It is worth pointing out again the significant difference between the general *Hiawatha Service* ridership and the Milwaukee airport shuttle ridership in terms of the percentage of Milwaukee MSA and Racine County residents that comprised each. The percentage of residents from other areas of Wisconsin was also lower among shuttle passengers than among the overall *Hiawatha Service* ridership. Conversely, the percentage of residents from other U.S. states was significantly higher among shuttle passengers as compared with the overall *Hiawatha Service* ridership.

Table 6-9: Shuttle Passenger Residential Location

Residential Location	Initial Interview (n = 961)	Follow-Up Survey (n = 155)	On-Board Survey (n = 2,298)
Wisconsin (%)	**11**	**10**	**67**
• Milwaukee MSA (%)	7	7	52
• Racine County (%)	1	1	5
• Kenosha County (%)	<1	0	<1
• All Remaining Wisconsin (%)	3	2	9
Illinois (%)	**35**	**43**	**24**
• Chicago Metropolitan Division (%)	32	42	23
• Lake County (%)	2	1	<1
• All Remaining Illinois (%)	1	0	1
Other U.S. States (%)	**55**	**47**	**9**
Note: Columns may not sum to 100 percent due to rounding			
Source: 2011 TTI/WisDOT Milwaukee Airport Shuttle Passenger Survey			

Table 6-10 shows the demographic profile of all shuttle passengers compared to the demographic profile of all *Hiawatha Service* passengers (Table 5-21). Table 6-11 shows the demographic profile of the four market segments. As previously noted, male travelers accounted for a majority of shuttle riders, but the overall *Hiawatha Service* ridership was majority female. This was the case across the four market segments with the exception of the non-resident/non-business segment, which was 54 percent female. In general, access to vehicles did not appear to be an issue for most shuttle riders and the *Hiawatha Service* ridership as a whole, as most surveys reported at least one household vehicle available for use. The only exception to this was among the resident/non-business shuttle passenger segment, of which 36 percent reported living in a household with no vehicles owned or leased among household members.

In general, the median age of the shuttle passengers was approximately equal to the median age of the overall *Hiawatha Service* ridership. The exception was the non-resident/non-business segment, with a median age of 48.3 years. A majority of shuttle passengers and all *Hiawatha Service* passengers reported full-time employment status. Not surprisingly, the two

business traveler segments had a higher percentage of full-time employees than the non-business segments, while retirees were only reported in the non-business segments.

Shuttle passengers reported higher levels of educational attainment than the overall *Hiawatha Service* ridership. A large majority of shuttle passengers (88 percent) reported possession of a bachelor's or graduate degree, while only 65 percent of all rail passengers had attained similar levels of education. Among shuttle passengers, the non-resident/non-business market segment reported the most diverse educational background. Median annual household income among shuttle passengers was slightly higher than the overall ridership ($92,900 versus $84,000). Median household incomes were highest among the non-resident/business segment, estimated at approximately $125,000 annually. Low-income passengers (annual household incomes less than $20,000) were only present in the non-business segments, with 7 percent of the resident/non-business segment and 18 percent of the non-resident/non-business segment reporting annual household incomes in this range.

Table 6-10: Comparison of *Hiawatha Service* and Shuttle Passenger Demographics

Characteristic	Airport Shuttle Passengers	*Hiawatha Service* Passengers
Gender (% Female)	43	54
Household Vehicles		
• Average Vehicles per Household	1.5	1.9
• None (%)	16	9
• One (%)	38	26
• Two (%)	30	42
• Three (%)	14	14
• Four or More (%)	2	9
Age Group		
• Median Age	42.9	39.7
• 18 to 24 years (%)	8	17
• 25 to 34 years (%)	30	24
• 35 to 44 years (%)	16	20
• 45 to 54 years (%)	22	19
• 55 to 64 years (%)	17	14
• 65 years and over (%)	7	6
Current Employment Status		
• Employed Full-Time (%)	72	66
• Employed Part-Time (%)	9	9
• Unemployed (%)	4	3
• Retired (%)	10	8
• University/College Student (%)	5	12
• Homemaker (%)	0	2
Educational Attainment		
• Some High School or Less (%)	1	2
• High School Graduate or GED (%)	2	10
• Some College (%)	6	16
• Associate or Technical Degree (%)	3	7
• Bachelor's Degree (%)	44	35
• Graduate Degree (%)	44	30
Annual Household Income		
• Median Household Income	$92,900	$84,000
• Less than $10,000 (%)	2	6
• $10,000 to $19,999 (%)	6	4
• $20,000 to $29,999 (%)	6	4
• $30,000 to $39,999 (%)	1	7
• $40,000 to $49,999 (%)	5	8
• $50,000 to $74,999 (%)	15	16
• $75,000 to $99,999 (%)	19	15
• $100,000 to $149,999 (%)	21	17
• $150,000 to $199,999 (%)	11	10
• $200,000 or More (%)	13	14
Note: Columns may not sum to 100 percent due to rounding		
Source: 2011 TTI/WisDOT Milwaukee Airport Shuttle Passenger Survey		

Table 6-11: Shuttle Passenger Demographic Characteristics by Market Segment

Characteristic	Resident/ Business	Resident/ Non-Business	Non-Resident/ Business	Non-Resident/ Non-Business
Gender (% Female)	38	40	33	54
Household Vehicles				
• Average Vehicles per Household	1.4	1.1	2.0	1.7
• None (%)	9	36	0	10
• One (%)	50	31	25	42
• Two (%)	28	27	54	23
• Three (%)	13	4	17	23
• Four or More (%)	0	2	4	2
Age Group				
• Median Age	40.5	38.3	41.7	48.3
• 18 to 24 years (%)	0	9	17	8
• 25 to 34 years (%)	31	36	25	25
• 35 to 44 years (%)	34	14	13	8
• 45 to 54 years (%)	13	16	33	29
• 55 to 64 years (%)	16	14	13	23
• 65 years and over (%)	6	11	0	8
Current Employment Status				
• Employed Full-Time (%)	77	59	83	73
• Employed Part-Time (%)	19	11	0	6
• Unemployed (%)	3	5	8	2
• Retired (%)	0	18	0	13
• University/College Student (%)	0	7	8	6
• Homemaker (%)	0	0	0	0
Educational Attainment				
• Some High School or Less (%)	0	0	0	4
• High School Graduate or GED (%)	0	0	0	6
• Some College (%)	0	14	8	2
• Associate or Technical Degree (%)	0	0	4	6
• Bachelor's Degree (%)	44	47	54	38
• Graduate Degree (%)	56	40	33	44
Annual Household Income				
• Median Household Income	$96,900	$89,300	$125,000	$82,300
• Less than $10,000 (%)	0	2	0	4
• $10,000 to $19,999 (%)	0	5	0	14
• $20,000 to $29,999 (%)	10	10	9	0
• $30,000 to $39,999 (%)	0	0	0	4
• $40,000 to $49,999 (%)	0	5	9	8
• $50,000 to $74,999 (%)	17	19	9	14
• $75,000 to $99,999 (%)	27	17	4	24
• $100,000 to $149,999 (%)	17	12	39	22
• $150,000 to $199,999 (%)	10	17	17	4
• $200,000 or More (%)	20	14	13	8
Note: Columns may not sum to 100 percent due to rounding				
Source: 2011 TTI/WisDOT Milwaukee Airport Shuttle Passenger Survey				

CHAPTER 7: CONCLUSIONS

The overall objective of this research was to examine the impacts of intercity passenger rail on urban, regional, and national mobility using the Milwaukee-Chicago *Hiawatha Service* intercity passenger rail route as a case study. This chapter summarizes the key findings from the two surveys conducted as a part of this project—the *Hiawatha Service* on-board passenger survey and the two-part Milwaukee airport shuttle passenger survey. The findings from the two surveys are then synthesized to characterize the impacts of intercity passenger rail on urban, regional, and national mobility. Potential applications of the research findings are also discussed. The chapter concludes by identifying potential avenues for future research.

SUMMARY OF FINDINGS

The setting for this research project was the *Hiawatha Service*, an Amtrak intercity passenger rail route operating in the 86-mile corridor between Milwaukee, Wisconsin, and Chicago, Illinois. In many respects, the *Hiawatha Service* serves as a model of successful implementation of intercity passenger rail. The service operates in a relatively short-distance multi-state corridor with travel times that are competitive with automobile travel. Multiple daily frequencies are provided with departure times throughout the day, providing travelers with a variety of choices. Both Wisconsin and Illinois contribute funds to support *Hiawatha Service* operations, and additional targeted investment by the State of Wisconsin has improved facilities and increased awareness of the route. In Chicago, passengers can connect from the service to other Amtrak routes. In Milwaukee, passengers can make direct connections with Amtrak's Thruway bus service. Additionally, passengers have the option of directly connecting to commercial air carrier flights at Milwaukee's General Mitchell International Airport. Ridership on the route has grown more than 40 percent over the last five years and exceeded 819,000 passengers in FFY 2011. Consequently, the lessons learned from examining the roles of the *Hiawatha Service* may have broad application for planning activities related to current or proposed passenger rail routes in other regions, to the extent that such routes share similar characteristics as the *Hiawatha Service*.

To examine the mobility impacts of the *Hiawatha Service*, two separate data collection efforts were undertaken in this project. The first was an on-board survey of *Hiawatha Service* passengers conducted in March and April 2011. The four-page survey, which consisted of 25 questions, identified information about the passenger's trip purpose on the day of the survey, alternatives to the *Hiawatha Service*, motivations for using the train instead of other modes, and demographic profile information. Across two days of data collection (a weekday and a weekend day), a total of 2,298 completed surveys were obtained from *Hiawatha Service* passengers, achieving a participation rate of approximately 58 percent. The second data collection effort was a more detailed study of passengers utilizing the shuttle connecting the Milwaukee Airport Rail Station and the airport terminal at Milwaukee General Mitchell International Airport. The shuttle passenger survey employed an innovative two-part data collection procedure consisting of an initial field interview conducted with shuttle passengers at the rail station and a follow-up Internet survey questionnaire. A total of 848 initial interviews were conducted with passengers at the Milwaukee Airport Rail Station over a 15-day period in May and June 2011. From these

initial interviews, a total of 155 follow-up Internet survey responses were obtained, resulting in a response rate of approximately 18 percent.

The *Hiawatha Service* on-board passenger survey data revealed valuable insight into the travel behavior, decision-making, and demographic profile of the rail passengers. There were clear trends observed between the weekday and the weekend survey data in terms of passenger trip purpose. On weekdays, a majority of passengers were traveling on the *Hiawatha Service* for business-related or work commute purposes. This included 21 percent traveling to/from a business trip, 20 percent commuting on a daily basis, and 13 percent of passengers commuting to/from work on a less-than-daily basis. Conversely, almost 80 percent of weekend passengers were traveling for personal reasons, including 43 percent for visiting family or friends, 25 percent for leisure or entertainment, 7 percent for vacation, and 4 percent for shopping. This contrast in trip purpose between weekday and weekend passengers was evident in the demographic profile analysis, which reflected trends in age, employment status, educational attainment, and annual household income that would be expected between the business/work commute groups and the personal traveler groups. Another contrast between weekday and weekend passengers was noted in the passengers' reasons for choosing the *Hiawatha Service* for the trip. Weekday passengers tended to view the convenience aspects of the rail service as more attractive, while weekend passengers rated the connections between the rail service and other Amtrak trains, intercity buses, or airline services more favorably. One finding from the on-board survey that was consistent across both days was that the automobile was the primary alternative to rail service, with nearly 70 percent of passengers preferring the automobile over other options. More detailed analysis of this finding will be provided in the next section. Two-thirds of *Hiawatha Service* passengers reported a home residence in Wisconsin (a majority from the Milwaukee MSA), while approximately 25 percent were from Chicago or other areas of Illinois.

The Milwaukee Airport Rail Station is one of only four stations in the Amtrak national intercity passenger rail network where direct access to an airport is provided. The Milwaukee airport shuttle passenger survey conducted in this project was unique in that it specifically focused on passengers utilizing an airport-intercity passenger rail connection in the U.S. A majority of shuttle passengers were traveling for personal reasons and were non-residents of the Milwaukee airport market area. Four segments of the airport ground access travel market, as defined by previous research on public transportation access to airports (*14*), were identified from this survey as follows:

- Resident/Business (17 percent of shuttle passengers);
- Resident/Non-Business (24 percent);
- Non-Resident/Business (18 percent); and
- Non-Resident/Non-Business (41 percent).

Milwaukee-area residents comprised just 8 percent of the shuttle ridership, as compared to 59 percent of the overall *Hiawatha Service* ridership. This was not a surprising finding, as residents of the Milwaukee area were more likely to have other options for accessing the Milwaukee airport readily available than non-residents. One of the most interesting findings from the shuttle survey was that not all passengers riding the shuttle were connecting between the *Hiawatha Service* and a flight at MKE. Rather, 19 percent of shuttle passengers were connecting between the rail station and the airport to connect with other transportation options

available at the airport, such as rental car services. If the airport-intercity passenger rail connection at MKE were not available, one-third of shuttle passengers would have used one of the two Chicago-area airports instead of MKE for their flight. Other alternatives to rail access included driving and parking at MKE, using motorcoach bus or shuttle service, and using taxi or car service. Convenience of schedule and train destinations and the desire to avoid highway congestion were among the key motivations for shuttle passengers to use the *Hiawatha Service* to access the Milwaukee airport instead of other options. Consequently, synergy between the Milwaukee airport and larger travel markets in the Chicago central business district is strengthened by the rail service, potentially allowing for the Milwaukee airport to evolve into a *de facto* third airport for the larger region as the connection becomes more fully integrated.

MOBILITY IMPACTS

The primary goal of this research was to examine the impacts of the *Hiawatha Service* on urban, regional, and national mobility. The data obtained from the two user surveys conducted in this project provided a great deal of insight into how the *Hiawatha Service* supports personal mobility. The data also provide a starting point to develop a more quantitative estimate of the mobility impacts of the rail service on urban, regional, and national levels. Broadly, intercity passenger rail lines support personal mobility on all geographic levels in two distinct ways. First, by providing another modal option for intercity travel, passenger rail service in major intercity corridors provides congestion relief for travelers in parallel surface and air transport networks and helps to support a more balanced transportation system. Second, for certain groups of travelers, passenger rail may be the only feasible option for intercity travel.

To examine the influence of the *Hiawatha Service* on congestion relief, researchers developed an estimate of the number of diverted and induced trips that comprised the total *Hiawatha Service* ridership. Passenger responses to the question about alternative travel modes if the *Hiawatha Service* were not available were used in this estimate (see Tables 5-11 and 5-12). A trip was considered "diverted" if the passenger responded that he or she would use an alternative mode in the absence of the rail service. A trip was classified as "induced" if the passenger would have not made the trip if the rail service were not available. In FFY 2011, a total of 819,493 passengers rode the *Hiawatha Service*. Unpublished data from WisDOT showed that the split of ridership between weekday and weekend trains was 76 percent weekday, 24 percent weekend. Researchers estimated the number of trips that were diverted or induced by multiplying the percentage of weekday or weekend passengers that would use each alternative mode (Table 5-11) by the estimated FFY 2011 weekday or weekend ridership. Table 7-1 shows an estimate of the number of diverted and induced trips on the *Hiawatha Service* in FFY 2011.

If the rail service did not exist, nearly 70 percent of *Hiawatha Service* passengers would travel via automobile. The estimates in Table 7-1 show that, in FFY 2011, the *Hiawatha Service* diverted more than 521,000 vehicle trips from adjacent roadways. This includes rail passengers that would drive a car or truck or would drive a rental car or company vehicle. Rail passengers that reported they would travel as a passenger in a car or truck if the rail service were not available were not included in this estimate. Assuming an average trip length of 80 miles, the automobile trips diverted onto the *Hiawatha Service* result in an estimated 41.7 million annual VMT that are eliminated from adjacent highways. Accompanying this reduction in VMT are

improvements in safety, fuel consumption, and vehicular emissions that generally accompany reductions in vehicle travel.

Table 7-1: Estimate of Diverted and Induced Trips on *Hiawatha Service*, FFY 2011

Alternative Travel Mode	Weekday	Weekend	Total
Drive Car/Truck	378,628	119,633	498,261
Passenger in Car/Truck	26,745	10,699	37,444
Rental Car/Company Vehicle	18,355	5,252	23,607
Intercity Bus	38,282	16,729	55,011
Local Transit Bus	8,391	4,280	12,670
METRA Commuter Rail	40,380	6,808	47,188
Airplane	23,074	6,614	29,688
I Would Not Have Made This Trip	90,724	24,899	115,623
Total FFY 2011	**624,579**	**194,914**	**819,493**

Table 7-1 also shows the estimated diversion from other non-personal vehicle modes to the *Hiawatha Service*. In FFY 2011, more than 55,000 intercity bus trips were estimated to be diverted onto the rail service. Researchers estimated that the rail service diverts more than 47,000 commuter rail trips and 12,000 local transit bus trips annually. Nearly 30,000 trips on the *Hiawatha Service*, or more than 80 trips per day, were estimated to be diverted from a commercial air carrier flight.

By diverting trips from other surface transportation modes (highway, intercity bus, local rail and bus), the *Hiawatha Service* supports personal mobility in the major urban areas of the corridor (Milwaukee and Chicago) as well as throughout the entire two-state region. Diversion from private vehicles to the rail service reduces congestion on major regional highways, in turn allowing for existing highway capacity to be used more efficiently. In a similar manner, diverting regional and local transit trips to the *Hiawatha Service* increases capacity on those modes. In particular, the diversion from local commuter rail and transit bus service to the rail line improves the quality of service for passengers traveling within a single urban area by providing alternatives for those passengers that are traveling longer distances, thus allowing additional capacity to be used by intra-urban travelers. On a regional basis, the *Hiawatha Service* provides a high-capacity alternative to regional intercity bus service. In the Milwaukee urban area, the link between the *Hiawatha Service* and the Milwaukee General Mitchell International Airport at the Milwaukee Airport Rail Station provides a sustainable alternative mode for airport access, in turn providing additional congestion relief for the local roadways surrounding the airport.

On a national level, the contribution of the *Hiawatha Service* to personal mobility is centered on the relationship between the rail service and commercial airline service. Approximately 4 percent of *Hiawatha Service* passengers, or about 80 passengers per day, reported that they would have used an airplane to travel if the rail service were not available. In addition to diverting airplane flights between Milwaukee and Chicago onto the rail service, the *Hiawatha Service* also allows for residents of the Chicago region to conveniently access the Milwaukee airport for airline trips. The shuttle passenger survey showed that approximately one-third of the more than 12,000 annual shuttle passengers would have used one of the two Chicago-region airports (O'Hare or Midway) if the connection between the rail service and the

airport were not available. While the contribution of the *Hiawatha Service* to reducing airline flights is relatively small on a daily basis, it is noted that the Chicago-region airspace is one of the busiest in the world. As such, any opportunity to reduce the number of short-haul flights and increase airport capacity for longer flights at the two Chicago airports represents an improvement in the overall efficiency of the national air transportation system.

The *Hiawatha Service* also contributes to personal mobility by providing a transportation alternative for certain segments of the population that may have limited or no access to other transportation options. In particular, three groups of rail passengers are identified:

- Passengers from zero-vehicle households—approximately 9 percent of passengers;
- Elderly passengers (age 65 and over)—approximately 6 percent of passengers; and
- Low-income passengers (annual household incomes less than $20,000)—approximately 10 percent of passengers.

For all three groups of passengers, access to a personal vehicle, a key alternative to the rail service, may be limited due to financial or physical constraints affecting these passengers. Examining the alternatives to the *Hiawatha Service* reported in the on-board survey from this research provides a look at how the rail service supports mobility among these passengers.

Table 7-2 shows the passengers' self-reported alternatives to the *Hiawatha Service* by number of household vehicles, passenger age, and annual household income. From the passenger survey, the three automobile alternatives (drive vehicle, be a vehicle passenger, and drive rental car) and the two local transit alternatives (transit bus and commuter rail) were collapsed into auto and local transit, respectively, in Table 7-2. Also shown in Table 7-2 for the purposes of comparison is the response distribution across the five alternatives for all passengers. If the rail service were not available, passengers from zero-vehicle households would be more likely to use intercity bus or not make the trip and less likely to use an automobile for their trip. Elderly passengers, on the other hand, did not vary substantially from the overall ridership in terms of alternatives to the rail service. These passengers would be less likely to drive and more likely to use an airplane, although these differences were minor. Low-income passengers exhibited similar behavior as passengers from zero-vehicle households in terms of alternatives to the rail service. Low-income passengers would be less likely to drive and more likely to use intercity bus or not make the trip if the rail service were not available. The propensity to use an automobile as an alternative increased and the propensity to use an intercity bus decreased with increasing income.

Table 7-2: Passenger Alternatives by Household Vehicles, Age, and Income

Passenger Segment	Auto (%)	Intercity Bus (%)	Local Transit (%)	Airplane (%)	Would Not Make Trip (%)
All Passengers	69	7	7	4	13
Household Vehicles					
• None	33	25	9	5	28
• One	67	8	7	4	14
• Two	77	4	7	3	10
• Three or More	73	5	6	4	12
Age Group					
• 18 to 24 years	63	13	8	3	13
• 25 to 34 years	71	7	4	3	15
• 35 to 44 years	71	5	10	2	13
• 45 to 54 years	70	5	7	3	15
• 55 to 64 years	70	6	6	4	14
• 65 years and over	60	10	6	10	14
Annual Household Income					
• Less than $20,000	47	18	6	8	22
• $20,000 to $49,999	63	14	6	2	14
• $50,000 to $99,999	70	6	8	3	12
• $100,000 to $199,999	73	4	7	3	13
• $200,000 or More	78	2	6	3	12
Note: Rows may not sum to 100 percent due to rounding					
Source: 2011 TTI/WisDOT *Hiawatha Service* On-Board Passenger Survey					

POTENTIAL APPLICATIONS

The synthesis presented in the previous section demonstrated how the *Hiawatha Service* intercity passenger rail route impacts mobility on the urban, regional, and national levels. The findings from this research project have a variety of applications for intercity passenger rail planning practice and the development of transportation policy. For passenger rail planning, the findings of this research can be used in formulating service development plans for future intercity passenger rail routes, to the extent that the corridors being considered are similar to the *Hiawatha Service* corridor. For example, the alternative travel mode findings from this study (Tables 5-11 and 7-1) can be used to estimate the impact of new rail services on congestion in parallel surface and air transportation networks. Findings on the mode split of passenger station access and egress (Tables 5-2 and 5-3) can be used to aid planners in developing site layout and parking plans for new or renovated stations along a rail corridor. Understanding which service features attract passengers to the *Hiawatha Service* (Tables 5-13 and 5-14) or would increase the frequency of rail travel among current passengers (Table 5-15 and 5-16) provides planners with guidance on the selection of amenities for rail lines in development. The findings could also be used by planners to support funding applications for federal grant programs for intercity passenger rail investments.

One unique aspect of the *Hiawatha Service* is the airport-intercity passenger rail connection provided at the Milwaukee Airport Rail Station. The findings of this project pertaining to the Milwaukee Airport Rail Station can be used by rail planners to guide the

development of future airport rail stations on existing or new rail corridors. The two surveys—the on-board passenger survey and the shuttle passenger survey—revealed that the airport rail station serves two important roles. First, the airport rail station allows for intercity passenger rail to serve as a ground access mode for the Milwaukee airport. In this role, rail passengers are not only connecting to airline flights at the airport but also to other transportation services at the airport, such as rental car facilities. The *Hiawatha Service* also has the effect of expanding the market area for an airport in a smaller city (Milwaukee) by improving the accessibility of the airport to residents of a large population center (Chicago), in turn providing these residents with improved access to greater choices for air travel. Second, the airport rail station provides a more convenient location for residents from the area around the airport to access the rail service. After the airport rail station opened in 2005, some passengers shifted from the Milwaukee downtown station to the airport station, while others reported that they starting using the *Hiawatha Service* because of the airport rail station. Intercity passenger rail planners are encouraged to consider the findings from this project when undertaking planning activities for new intercity passenger rail stations to be built near airports.

For statewide rail planning and policy development, the findings from this research project offer assistance to both public agency planning staff and policymakers. In the development of state rail plans, the findings of this project can be used by rail planners to quantify the impacts of intercity passenger rail service on statewide mobility and to identify rail infrastructure or equipment investments to support a desired level of rail service across a state. Legislators and their staff can use the findings from this research to support policy formation and decision-making on transportation investments.

FUTURE RESEARCH

The findings from this research project raise several interesting questions and topics for future research. As interest in developing the nation's intercity passenger rail system grows among planners, policymakers, and the general public, a greater understanding of the impacts of rail lines on urban, regional, and national mobility is desired. Moving forward, new on-board surveys of passengers on other Amtrak routes across the U.S. would be helpful to this understanding. With the new train sets scheduled to begin service on the *Hiawatha Service* route in 2012, a future on-board survey of *Hiawatha Service* passengers will help understand the impacts of new equipment on the characteristics of the ridership. The airport shuttle passenger survey conducted as part of this project examined the characteristics of the passengers connecting between intercity passenger rail and airports at one of the four U.S. airports where such a connection is provided. Surveys of connecting passengers at the other three airports would yield additional insights into how the air-rail intermodal connection supports personal mobility. Future studies could also seek to improve the innovative two-part data collection procedure used in the shuttle passenger survey. Possible future research efforts could include the deployment of the procedure in a setting with a larger population or elimination of the initial interview portion to determine the true effect of the foot-in-the-door technique on survey response.

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APPENDIX A: ON-BOARD SURVEY QUESTIONNAIRE

(Office use only) ___ ___ ___ ___ ___ ___ ___

AMTRAK *HIAWATHA SERVICE* CUSTOMER SURVEY

DT1974 02/2011

Welcome aboard! The University Transportation Center for Mobility at the Texas Transportation Institute and the Wisconsin Department of Transportation, in cooperation with Amtrak and the Illinois Department of Transportation, are conducting a survey of Amtrak *Hiawatha Service* customers. The survey will improve understanding of how the *Hiawatha Service* impacts mobility in the region. Participation is optional and survey responses are anonymous. A survey team representative is available to answer questions and will collect your survey before you leave the train. **Thank you for your participation and for riding the *Hiawatha Service*.**

Please place an "X" in the box or fill in the blank space corresponding to your answer for each question.

DESCRIBE YOUR TRIP TODAY– For questions in this section, please base your responses on today's trip.

1. **At what station did you board this train?** ☐ Milwaukee ☐ Milwaukee Airport Rail Station ☐ Sturtevant ☐ Glenview ☐ Chicago

2. **How did you get to that train station?**
   - ☐ Drove car / truck
   - ☐ Dropped off in car / truck
   - ☐ Local Transit (Bus)
   - ☐ CTA Rapid Transit ("EL" Train)
   - ☐ Walked
   - ☐ Bicycled
   - ☐ Commuter Train (METRA)
   - ☐ Taxi
   - ☐ Hotel courtesy car / Shuttle
   - ☐ Transfer from another Amtrak train
   - ☐ Transfer from intercity bus
   - ☐ Transfer from airplane (*Please Specify Airport*): _____
   - ☐ Other (*Please Specify*): _____

3. **Before you arrived to board this train, where did your trip start?**
   Building, address or community: _____

   This location is a: (Check one)
   - ☐ Home (yours)
   - ☐ Home (friend's or relative's)
   - ☐ Meeting / conference site
   - ☐ Place of personal business
   - ☐ Place of work
   - ☐ School / university
   - ☐ Shopping center / store
   - ☐ Tourism / entertainment site
   - ☐ Other (*Please Specify*): _____

4. **At what station will you depart this train?** ☐ Milwaukee ☐ Milwaukee Airport Rail Station ☐ Sturtevant ☐ Glenview ☐ Chicago

5. **How will you get to your final destination after departing this train?**
   - ☐ Drive car / truck
   - ☐ Be dropped off in car / truck
   - ☐ Local Transit (Bus)
   - ☐ CTA Rapid Transit ("EL" Train)
   - ☐ Walk
   - ☐ Bicycle
   - ☐ Commuter Train (METRA)
   - ☐ Taxi
   - ☐ Hotel courtesy car / Shuttle
   - ☐ Transfer to another Amtrak train
   - ☐ Transfer to intercity bus
   - ☐ Transfer to airplane (*Please Specify Airport*): _____
   - ☐ Other (*Please Specify*): _____

6. **After you depart this train, where will your trip end?**
   Building, address or community: _____

   This location is a: (Check one)
   - ☐ Home (yours)
   - ☐ Home (friend's or relative's)
   - ☐ Meeting / conference site
   - ☐ Place of personal business
   - ☐ Place of work
   - ☐ School / university
   - ☐ Shopping center / store
   - ☐ Tourism / entertainment site
   - ☐ Other (*Please Specify*): _____

7. Which one of the following best describes the main purpose of this trip?

- ☐ Daily commute to/from work
- ☐ Commute to/from work (*less than daily*)
- ☐ Going to/from a business trip/meeting
- ☐ Going to/from school (*university/college*)
- ☐ Personal business
- ☐ Visiting family or friends
- ☐ Shopping
- ☐ Leisure / Entertainment
- ☐ Vacation
- ☐ Other (*Please Specify*): _____

8. Are you making a round-trip today on Amtrak's *Hiawatha Service*? ☐ Yes ☐ No

9. How often do you make this trip on the *Hiawatha Service*?

- ☐ First time riding
- ☐ Once per year or less
- ☐ Once every few months
- ☐ 1-4 times each month
- ☐ 5-9 times each month
- ☐ 10-19 times each month
- ☐ 20 or more times each month

10. If the *Hiawatha Service* was not available, how would you typically make this trip?

- ☐ Drive car / truck
- ☐ Passenger in car / truck
- ☐ Rental car / company vehicle
- ☐ I would not have made this trip
- ☐ Airplane (*commercial or private*)
- ☐ Intercity bus
- ☐ Local transit bus
- ☐ METRA commuter rail (*Please Specify Route/Station*): _____
- ☐ Other (*Please Specify*): _____

EVALUATE OUR SERVICE – for questions in this section, please base your responses on today's trip and/or other recent trips on Amtrak's *Hiawatha Service*.

11. When you decided to use the *Hiawatha Service* for this trip instead of another option, how important were the following considerations in making your choice? *Please indicate the importance of each item.*

	Extremely Unimportant	*Unimportant*	*Neutral*	*Important*	*Extremely Important*
Avoid highway congestion	☐	☐	☐	☐	☐
Convenient to my final destination	☐	☐	☐	☐	☐
More comfortable than other options	☐	☐	☐	☐	☐
More environmentally-friendly than other options	☐	☐	☐	☐	☐
More reliable than other options	☐	☐	☐	☐	☐
Opportunity to read or socialize with other passengers while traveling	☐	☐	☐	☐	☐
Opportunity to sleep / relax	☐	☐	☐	☐	☐
Avoid snow / winter driving	☐	☐	☐	☐	☐
Convenient to my residence	☐	☐	☐	☐	☐
I would rather not fly	☐	☐	☐	☐	☐
Price of gasoline	☐	☐	☐	☐	☐
Schedule matched my schedule needs	☐	☐	☐	☐	☐
I cannot drive	☐	☐	☐	☐	☐
I would rather not drive	☐	☐	☐	☐	☐
Less expensive than other options	☐	☐	☐	☐	☐
Parking availability at station	☐	☐	☐	☐	☐
No other form of transportation available	☐	☐	☐	☐	☐
Avoid parking problems at destination	☐	☐	☐	☐	☐
Faster than other options	☐	☐	☐	☐	☐
Drink/snack cart service on-board train	☐	☐	☐	☐	☐
Opportunity to work while traveling	☐	☐	☐	☐	☐
Safer than other options	☐	☐	☐	☐	☐
Connections with other Amtrak trains	☐	☐	☐	☐	☐
Connections with intercity buses	☐	☐	☐	☐	☐
Connections with airline service	☐	☐	☐	☐	☐

12. Please evaluate Amtrak's *Hiawatha Service* based on these factors:

	Poor	*Fair*	*Good*	*Excellent*	*Don't Know*
Convenient departure / arrival times	☐	☐	☐	☐	☐
Number of departures / arrivals	☐	☐	☐	☐	☐
On-time performance	☐	☐	☐	☐	☐
Speed / overall trip time	☐	☐	☐	☐	☐
Cleanliness / comfort of train	☐	☐	☐	☐	☐
Food service on-board train	☐	☐	☐	☐	☐
Seats / space available on train	☐	☐	☐	☐	☐
Staff performance on-board train	☐	☐	☐	☐	☐
Travel information available on-board train	☐	☐	☐	☐	☐
Staff performance at stations	☐	☐	☐	☐	☐
Cleanliness / comfort of stations	☐	☐	☐	☐	☐
Travel information available at stations	☐	☐	☐	☐	☐
Connections with other Amtrak trains	☐	☐	☐	☐	☐
Connections with intercity buses	☐	☐	☐	☐	☐
Connections with airline service	☐	☐	☐	☐	☐
Connections to local transportation (*transit/taxis*)	☐	☐	☐	☐	☐
Station parking convenience	☐	☐	☐	☐	☐
Station parking price	☐	☐	☐	☐	☐

HELP US PLAN FOR THE FUTURE

13. How did you learn about Amtrak's *Hiawatha Service* (*please check all that apply*)?

☐ Newspaper ad
☐ Sign / billboard
☐ Travel agency
☐ 1-800-USA-RAIL
☐ Other (*Please Specify*): _____
☐ Word of mouth / friend or relative
☐ Organization newsletter / flyer
☐ Airport display advertising
☐ Web Site (*Please Specify*): _____
☐ Television ad
☐ Direct mail / e-mail
☐ Radio ad

14. What potential changes to the *Hiawatha Service* would encourage you to ride the *Hiawatha Service* more often? *Please indicate your level of agreement with each of the following items concerning how each potential change would encourage you to ride more often.*

	Strongly Disagree	*Disagree*	*Neutral*	*Agree*	*Strongly Agree*
Faster travel times	☐	☐	☐	☐	☐
Lower fares	☐	☐	☐	☐	☐
More daily departures / arrivals	☐	☐	☐	☐	☐
Expanded Quiet Car seating	☐	☐	☐	☐	☐
Full on-board café car food service	☐	☐	☐	☐	☐
Improved parking at stations	☐	☐	☐	☐	☐
Racks for carry-on bicycles inside the train	☐	☐	☐	☐	☐
Reserved seating availability	☐	☐	☐	☐	☐
Wi-Fi Internet access	☐	☐	☐	☐	☐
Increasing gasoline prices	☐	☐	☐	☐	☐
Additional early evening departure from Chicago	☐	☐	☐	☐	☐
Additional late evening departure from Chicago	☐	☐	☐	☐	☐
Additional morning departure from Milwaukee	☐	☐	☐	☐	☐
Checked bag service from boarding station to airline	☐	☐	☐	☐	☐
Coordinated schedules with flights from Milwaukee airport	☐	☐	☐	☐	☐
Extend passenger rail service to other cities	☐	☐	☐	☐	☐
New, modern passenger coach cars	☐	☐	☐	☐	☐

15. How has the Milwaukee Airport Rail Station, opened in 2005, influenced your use of the *Hiawatha Service*? *Please check all that apply.*

☐ I do not use the Milwaukee Airport Rail Station
☐ Use to transfer to / from airline service
☐ Use instead of Sturtevant station
☐ Use instead of Milwaukee Intermodal Station
☐ I started using the *Hiawatha Service* after 2005 primarily because of the Milwaukee Airport Rail Station

16. How often do you use the Milwaukee Airport Rail Station for the following activities?

	Never	*Occasionally*	*Frequently*
Use to access Milwaukee airport instead of driving to airport	☐	☐	☐
Use to fly to/from Milwaukee airport instead of Chicago-O'Hare	☐	☐	☐
Use to fly to/from Milwaukee airport instead of Chicago-Midway	☐	☐	☐
Use to park and ride Amtrak *Hiawatha Service*	☐	☐	☐
Use to be dropped off/picked up to/from Amtrak *Hiawatha Service*	☐	☐	☐

DESCRIBE YOURSELF *Your answers to the following questions will help the researchers understand the general characteristics of Hiawatha Service passengers. This information is completely anonymous.*

17. Are you: ☐ Male ☐ Female

18. Traveling: ☐ Alone ☐ With family # _____ ☐ With a group # _____

19. How many vehicles does your household own or lease? _____

20. What is your home ZIP code? | | | | | |

21. What is your age?
☐ 18 – 24 years old
☐ 25 – 34 years old
☐ 35 – 44 years old
☐ 45 – 54 years old
☐ 55 – 64 years old
☐ 65 years or older

22. Which of the following best describes your current employment status?
☐ Employed full-time
☐ Employed part-time
☐ Unemployed
☐ Retired
☐ University/College Student
☐ Homemaker

23. What is your highest completed level of education?
☐ Some high school or less
☐ High school graduate or GED
☐ Some college
☐ Associate or technical degree
☐ Bachelor's degree
☐ Graduate degree

24. What is your current annual household income (*total for all people who live in your household*)?
☐ Less than $10,000
☐ $10,000 to $19,999
☐ $20,000 to $29,999
☐ $30,000 to $39,999
☐ $40,000 to $49,999
☐ $50,000 to $74,999
☐ $75,000 to $99,999
☐ $100,000 to $149,999
☐ $150,000 to $199,999
☐ $200,000 or more

25. Please provide any other comments or suggestions that will help improve the *Hiawatha Service*.

_____
_____
_____

THANK YOU FOR YOUR PARTICIPATION!

An on-board survey worker will collect completed surveys before the train reaches its last stop.

For more information:
About this survey, contact Arun Rao at the Wisconsin DOT at (608) 264-7293 or arun.rao@dot.wi.gov
About Amtrak's *Hiawatha Service*, call 1-800-USA-RAIL or visit www.amtrakhiawatha.com

APPENDIX B: AIRPORT RAIL STATION DATA COLLECTION FORMS

Milwaukee Airport Amtrak Shuttle Passenger Interview Form
Texas Transportation Institute / Wisconsin DOT

Date: ____________ Staff Name: ____________

	Going To	Train #	Adults	Child	Gender	Purpose	Residence/Zip Code	Token Code
1.	Air Rail				M / F	Business Personal		
2.	Air Rail				M / F	Business Personal		
3.	Air Rail				M / F	Business Personal		
4.	Air Rail				M / F	Business Personal		
5.	Air Rail				M / F	Business Personal		
6.	Air Rail				M / F	Business Personal		
7.	Air Rail				M / F	Business Personal		
8.	Air Rail				M / F	Business Personal		
9.	Air Rail				M / F	Business Personal		
10.	Air Rail				M / F	Business Personal		
11.	Air Rail				M / F	Business Personal		
12.	Air Rail				M / F	Business Personal		
13.	Air Rail				M / F	Business Personal		
14.	Air Rail				M / F	Business Personal		
15.	Air Rail				M / F	Business Personal		
16.	Air Rail				M / F	Business Personal		
17.	Air Rail				M / F	Business Personal		
18.	Air Rail				M / F	Business Personal		
19.	Air Rail				M / F	Business Personal		
20.	Air Rail				M / F	Business Personal		

Form Instructions: One interview row per adult traveler. Fill in travel direction, train number, and personal information from observation. Fill in purpose and zip code from verbal interview prompts. If person does not want to give zip code then community name is acceptable. Record token code if card distributed or "N/A" if card was refused.

Milwaukee Airport Shuttle Passenger Study

The Texas Transportation Institute and WisDOT invite you to participate in a research study on how travelers utilize the Amtrak *Hiawatha Service* to connect with the Milwaukee Airport. Your participation in this research study is voluntary, and your responses are confidential.

Please visit the following website to take our survey:

http://www.railsurvey.org/mke

When Prompted, Please Enter the Following Code: **626201**

One Randomly-Selected Respondent will Receive a
$250 Visa Gift Card

Your Participation by July 17, 2011 is Appreciated.

APPENDIX C: SHUTTLE PASSENGER SURVEY QUESTIONNAIRE

Participants were provided with an access code on the recruitment postcard that was entered before starting the survey. This code was used to customize the survey questions to the participant's experience. Items marked in <> with <italic> face indicate customized content.

Welcome Screen

Dear Traveler:

The Texas Transportation Institute, in conjunction with the Wisconsin Department of Transportation, is conducting a research study to better understand how travelers use Amtrak's *Hiawatha Service* to access Milwaukee General Mitchell International Airport. As part of this study, we are asking travelers like you to participate in a short survey of your travel experiences.

This is a short survey and should take you no more than 15 minutes to complete. Your participation in this research study is voluntary, and your responses will remain confidential. **A randomly-selected survey participant will receive a $250 Visa gift card.** Your contact information will be stored separately from your survey responses and cannot be linked to your responses to these questions.

Thank you for your participation. If you have any questions regarding this survey, please contact me at (979) 458-1683 or c-morgan@ttimail.tamu.edu.

Sincerely,

Curtis Morgan, Principal Investigator
Passenger Rail Research Program
Texas Transportation Institute

This research study has been reviewed by the Human Subjects' Protection Program and/or the Institutional Review Board at Texas A&M University. For research-related problems or questions regarding your rights as a research participant, Click Here for more information or you may contact these offices at (979) 458-4067 or irb@tamu.edu.

Please click the "Next" button below to start the survey.

Introduction

In this survey, we will be asking you some questions about the trip you made on <*trip date*> where you used the Amtrak Shuttle to connect between the Milwaukee Airport Rail Station and the Milwaukee General Mitchell International Airport terminal.

1. Which one of the following <u>best</u> describes the main purpose of your trip that day?
Choose one of the following answers.

- o Going to/from a business trip
- o Going to/from a meeting or conference
- o Going to/from school (university/college)
- o Personal business
- o Visiting family or friends
- o Leisure/Vacation
- o Other (Please Specify)

Amtrak *Hiawatha Service* Trip Information

In this section, we are going to ask you about the rail portion of your trip on <*trip date*>.

2. At what station did you <*board/depart*> the *Hiawatha Service*?
Choose one of the following answers.

- o Milwaukee, Wisconsin (Milwaukee Intermodal Station)
- o Sturtevant, Wisconsin
- o Glenview, Illinois
- o Chicago, Illinois (Chicago Union Station)

3. How did you get to that train station?
Choose one of the following answers.

- o Drive car/truck
- o Dropped off in car/truck
- o Local Transit (Bus)
- o CTA Rapid Transit ("EL" Train)
- o Walked
- o Bicycled
- o Commuter Train (METRA)
- o Taxi
- o Hotel courtesy car / Shuttle
- o Transfer from another Amtrak train
- o Transfer from intercity bus
- o Other (Please Specify)

4. <*Before/After*> you <*boarded/departed*> the *Hiawatha Service* where did your trip <*start/end*>? (*Building, Address, or Community Name)*** [Text Box]

5. What type of location was this?
Choose one of the following answers.

- o Home (Yours)
- o Home (Friend's or Relative's)
- o Meeting or Conference Site
- o Place of Personal Business
- o Place of Work or Other Employment-Related Location
- o School or University
- o Tourist or Vacation Site
- o Hotel
- o Other (Please Specify)

Alternatives to the *Hiawatha Service*

6. If the *Hiawatha Service* was <u>not available</u> for you to use to travel <*to/from*> the Milwaukee Airport, how might you have traveled <*to/from*> the Milwaukee Airport for your trip on <*trip date*>?

Choose one of the following answers.

- o Drive Myself and Park
- o Driven by Relative, Friend, or Colleague
- o Taxi/Car Service
- o Motorcoach Bus/Shuttle Service
- o Local Transit Service
- o I Would Use a Different Airport
- o Other (Please Specify)

7. Which airport might you have used instead of the Milwaukee Airport?
Choose one of the following answers.
Only shown if question #6 response was "I Would Use a Different Airport"

- o Chicago – O'Hare Airport
- o Chicago – Midway Airport
- o Other (Please Specify)

Motivations for Using the *Hiawatha Service* to Access Milwaukee Airport

8. When you decided to use the *Hiawatha Service* to travel <to/from> the Milwaukee Airport instead of other options, how important were the following considerations in making your choice?
Note: Responses for each item given on a five-point scale as follows: Extremely Unimportant, Unimportant, Neutral, Important, Extremely Important. Items displayed in random order on respondent's screen.

- o Avoid Airport Parking
- o Avoid Highway Congestion
- o Convenient to My Final Destination
- o Convenient to My Residence
- o Faster than Other Options
- o Less Expensive than Other Options
- o More Comfortable than Other Options
- o More Convenient than Other Options
- o More Reliable than Other Options
- o No Other Form of Transportation Available
- o Opportunity to Sleep/Relax
- o Opportunity to Work While Traveling
- o Recommended by Family/Friend/Colleague
- o Safer than Other Options
- o Schedule Matched My Schedule Needs
- o Usual Option Not Available

Knowledge of *Hiawatha Service* to the Milwaukee Airport

9. How did you learn that the *Hiawatha Service* was an option to access the Milwaukee Airport?
Please check any that apply.

- o Newspaper Ad
- o Sign/Billboard
- o Travel Agency
- o 1-800-USA-RAIL
- o Word of Mouth
- o Friend/Relative/Colleague
- o Organization Newsletter/Flyer
- o Airport Display Advertising
- o Television Ad
- o Direct Mail/E-Mail
- o Radio Ad
- o Milwaukee Airport Website

- o Hiawatha Service Website
- o Amtrak Website
- o Other (*Please Specify*)

Flight Information

In this section, we are going to ask you about the airline portion of your trip on <*trip date*>.

10. What airline did you use for your flight <*from/to*> Milwaukee?
Choose one of the following answers.

- o Air Canada
- o AirTran Airways
- o American Airlines
- o Continental Express
- o Delta Airlines
- o Frontier Airlines
- o Southwest Airlines
- o United Express
- o US Airways Express
- o I Did Not Connect To/From Flight
- o Other (*Please Specify*)

11. In what city or airport did your flight <*end/start*>? [Text Box]

12. Was this flight part of a round-trip flight out of the Milwaukee Airport?
Choose one of the following answers.

- o Yes
- o No

13. Did you use the *Hiawatha Service* to connect <*from/to*> the Milwaukee Airport for the other flight?
Choose one of the following answers. Only shown if question #12 response was "Yes"

- o Yes
- o No

14. Why did you not use the *Hiawatha Service* on that trip?
Choose one of the following answers. Only shown if question #13 response was "No"

- o Schedule did not Match My Flight Time
- o Not Enough Connection Time
- o Other Connecting Options Available
- o Changed Plans Last-Minute
- o Luggage Limitations
- o Other (*Please Specify*)

About Yourself

Finally, we would like to know a little about yourself and your household. Your responses to the questions in this section will be used to help us better understand who is using the Milwaukee Airport Amtrak Shuttle. Your responses to these questions will remain confidential.

15. What is your home ZIP code? [Text Box]

16. What is your age?
Choose one of the following answers.

- o 18 to 24 years
- o 25 to 34 years
- o 35 to 44 years
- o 45 to 54 years
- o 55 to 64 years
- o 65 years and over

17. What is your gender?
Choose one of the following answers.

- o Female
- o Male

18. How many vehicles does your household own or lease?
Choose one of the following answers.

- o None
- o One
- o Two
- o Three
- o Four or More

19. Which of the following best describes your current employment status?
Choose one of the following answers.

- o Employed full-time
- o Employed part-time
- o Unemployed
- o Retired
- o University/College Student
- o Homemaker

20. What is your highest completed level of education?
Choose one of the following answers.

- o Some high school or less
- o High school graduate or GED
- o Some college
- o Associate or technical degree
- o Bachelor's degree
- o Graduate degree

21. What is your current annual household income (total for all people who live in your household)?
Choose one of the following answers.

- o Less than $10,000
- o $10,000 to $19,999
- o $20,000 to $29,999
- o $30,000 to $39,999
- o $40,000 to $49,999
- o $50,000 to $74,999
- o $75,000 to $99,999
- o $100,000 to $149,999
- o $150,000 to $199,999
- o $200,000 or More

22. Please enter any additional comments you might have about your Milwaukee Airport Amtrak Shuttle experiences or this study in the box below. [Text Box]

APPENDIX D: IRB DOCUMENTATION

TEXAS A&M UNIVERSITY
DIVISION OF RESEARCH AND GRADUATE STUDIES - OFFICE OF RESEARCH COMPLIANCE

1186 TAMU, General Services Complex
College Station, TX 77843-1186
750 Agronomy Road, #3500

979.458.1467
FAX 979.862.3176
http://researchcompliance.tamu.edu

Human Subjects Protection Program — Institutional Review Board

DATE: 11-Jan-2011

MEMORANDUM

TO: MORGAN, CURTIS A

FROM: Office of Research Compliance
Institutional Review Board

SUBJECT: Initial Review

Protocol Number: 2010-1016

Title: TTI Project 476090-00075 Task 3: Intercity Passenger Rail: Implications for Urban, Regional, and National Mobility

Review Category: Exempt from IRB Review

It has been determined that the referenced protocol application meets the criteria for exemption and no further review is required. However, any amendment or modification to the protocol must be reported to the IRB and reviewed before being implemented to ensure the protocol still meets the criteria for exemption.

This determination was based on the following Code of Federal Regulations:
(http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm)

45 CFR 46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior, unless: (a) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (b) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Provisions:

This electronic document provides notification of the review results by the Institutional Review Board.

TEXAS A&M UNIVERSITY
DIVISION OF RESEARCH AND GRADUATE STUDIES - OFFICE OF RESEARCH COMPLIANCE

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Human Subjects Protection Program

Institutional Review Board

DATE: 05-May-2011

MEMORANDUM

TO: MORGAN, CURTIS A

FROM: Office of Research Compliance
Institutional Review Board

SUBJECT: Initial Review

Protocol Number: 2011-0312

Title: TTI Project 476090-00075 Task 4: Intercity Passenger Rail: Implications for Urban, Regional, and National Mobility

Review Category: Exempt from IRB Review

It has been determined that the referenced protocol application meets the criteria for exemption and no further review is required. However, any amendment or modification to the protocol must be reported to the IRB and reviewed before being implemented to ensure the protocol still meets the criteria for exemption.

This determination was based on the following Code of Federal Regulations:
(http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.htm)

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Provisions:

This electronic document provides notification of the review results by the Institutional Review Board.

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