Beloit Transit Development Plan

Final Report

October 2015

NELSON
NYGAARD

Disclaimer

The Beloit Transit Development Plan was developed for the Beloit Transit System, a division of the City of Beloit, with funding administered through the Stateline Area Transportation Study (SLATS). SLATS is the Metropolitan Planning Organization federally recognized to coordinate and conduct transportation planning for the Beloit Urbanized Area as designated by the US Census Bureau.

This plan was prepared with Federal Funds, but does not necessarily reflect the official views or policy of the U.S. Department of Transportation.

The Beloit Transit Development Plan was accepted by Beloit City Council on October XX, 2015.

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1 EXECUTIVE SUMMARY

INTRODUCTION

Beloit Transit System (BTS) is a division of the City of Beloit that provides fixed-route bus service. The Beloit Transfer Center, located southwest of downtown Beloit and east of the Rock River, serves as the system hub for four routes operating on weekdays and Saturdays. BTS and the Janesville Transit System jointly operate an intercity route that connects Beloit, Janesville, and intermediate destinations on weekdays. BTS also operates supplemental bus service to select local public schools that coincide with school start and end times.

In August 2010, BTS local route schedules were adjusted from 30 to 40 minutes to reflect travel times that had increased over time. While system ridership initially declined following the schedule adjustments, ridership has gradually increased while service levels have remained constant, indicating an increased demand for transit service within Beloit.

The City of Beloit Comprehensive Plan is supportive of transit and includes the following policy: "Continue to promote the use of the City's bus system and explore new bus routes to serve future development and existing developed areas which are underserved."

In an effort to meet these goals and conduct a comprehensive evaluation of existing BTS service, a Transit Development Plan (TDP) was initiated in November 2014. The TDP will cover the five year planning horizon from 2016-2020 and updates the 2011 TDP developed by BTS staff.

The Beloit TDP will serve as a blueprint for improving bus service and expanding BTS in a logical and cost-effective manner as funding becomes available. Recommendations included in this report are expected to:

- Increase customer satisfaction by reducing transfers and travel time
- Attract new riders by simplifying routes and expanding schedules
- Improve access to jobs, education, and shopping destinations
- Make efficient use of limited BTS resources by reallocating service to high demand areas
- Enhance operational safety and improve customer access at key boarding locations
- Set BTS on a path for sustainable growth and increased community support

PLAN DEVELOPMENT

Beloit Transit System and Stateline Area Transportation Study (SLATS) staff were closely involved throughout this process. The following summaries include key tasks and identify important findings for each phase of the planning process.

Comprehensive Service Evaluation

The initial phase of the study included a comprehensive evaluation of the entire transit system and service area to identify strengths, weaknesses, and opportunities for improvement. Socio-economic and demographic characteristics of the Beloit area were analyzed to identify concentrations of high transit demand. Employment characteristics were also examined. Ridership for each route, trip, and bus stop in the system was collected and evaluated to measure the existing service performance. The evaluation process also included extensive field work in which each bus route was reviewed.

A number of important findings were identified during the comprehensive service evaluation process:

- On-time performance issues on Route 3 are negatively impacting the entire system
- Most customers traveling to destinations near the intersection of Cranston & Milwaukee must transfer
- The indirect nature of several routes results in inconvenient travel times
- The current system design forces many customers to transfer to reach their destination
- Choice riders (transit users with regular access to alternate means of transportation, typically a automobile) constitute a minimal percentage of total riders
- Increased service span and Sunday service are the most common customer requests

Community Engagement

An extensive outreach effort engaged the community and helped determine the needs and preferences of customers. This phase of the project included customer surveys administered on buses and then made available online, interviews conducted with BTS bus operators, discussions with community stakeholders, and open house public meetings held at the Beloit Transfer Center and Beloit Public Library.

The following comments were expressed throughout the community engagement process:

- Later service is needed for employees with evening/night shifts
- The cost of transit fares is an issue for many customers
- Existing service is reliable yet inconvenient in terms of speed and directness
- Opportunities exist to improve route and schedule information

Information obtained throughout the community engagement effort was utilized by the consultant team to refine service alternatives and develop final recommendations.

Service Recommendations

Findings from the comprehensive service evaluation and community engagement effort were summarized in an existing conditions report that served as a basis for service recommendations.

Service recommendations are divided into two categories:

- Route design improvements (Phase 1)
- System service expansion (Phase 2-5)

Route design improvements include a series of changes that improve service to major destinations, such as Eclipse Center, Beloit Public Library, Walmart, Beloit Memorial High School, Beloit Learning Academy, Beloit Clinic, and Beloit Memorial Hospital. Route improvements are intended to reduce out-of-direction travel and simplify service for existing and potential customers. Recommendations also seek to focus service along major corridors and high ridership residential areas to maximize the efficient use of limited resources. Route changes are a significant departure from existing loop-route system yet are cost-neutral in terms of revenue hours and peak vehicles.

System expansion recommendations are intended to build upon restructure recommendations and require additional funding. System expansion recommendations include the extension of weekday operating hours, increased Saturday service, the addition of Sunday service, and a potential partnership with regional entities to implement a new route connecting Beloit, to urbanized areas of northern Winnebago County, and Rockford.

Report Organization

The Final Report consists of fourteen chapters, which are summarized below.

- Chapter 1 summarizes the TDP process and objectives.
- Chapter 2 evaluates socio-economic and demographic conditions within the Beloit Transit service area to better understand transit demand and service gaps.
- Chapter 3 summarizes relevant transportation plans.
- Chapter 4 provides a detailed assessment of each BTS route.
- Chapter 5 consists of detailed profiles that describe service characteristics, ridership patterns, and on-time performance of each route.
- Chapter 6 summarizes school tripper service operated by BTS.
- Chapter 7 provides an overview of feedback obtained by bus operators during interview sessions held at the start of the project.
- Chapter 8 summarizes community feedback obtained through an on-board survey, stakeholder discussions, two open house public meetings, and an online survey.
- Chapter 9 includes a review of peer transit systems.
- Chapter 10 outlines detailed service recommendations.
- Chapter 11 consists of a financial plan for operational and capital needs.
- Chapter 12 provides an overview of potential future service expansions.
- Chapter 13 consists of performance metrics to be utilized regularly to monitor service effectiveness.
- Chapter 14 includes bus stop guidelines to ensure adequate spacing and placement.

2 DEMOGRAPHIC AND ECONOMIC ANALYSIS

This section focuses on demographic and economic characteristics that affect transit usage in Beloit. The evaluation includes:

- Population and employment densities
- Senior population (age 65 and over)
- Youth population (ages 10 to 17)
- Low income population
- Population in poverty
- Households without access to a vehicle

POPULATION AND EMPLOYMENT DENSITY

Population Density

The distribution and density of population is among the most important factors influencing the viability of transit service because nearly all transit trips require walking to/from the bus on at least one end of the trip. Higher density communities have more people within walking distance of common corridors that might support transit. Together with employment density, population density will determine the success of transit more than any other factor.

The ample population in densely developed areas produces demand for frequent service that increases the attractiveness of transit for riders. However, in less densely developed areas, the overall demand is lower and, consequently, service levels tend to be lower.

Data from the 2010 U.S. Census has been mapped at the block level to illustrate the distribution of population throughout the Beloit area (see Figure 1).

- The most significant population clusters in the BTS service area are on the Beloit College Campus and to the west across the Rock River, with many of the blocks having 16+ people per acre. These areas are well served by several BTS routes.
- There is also significant population density to the north of downtown Beloit and south of Cranston Rd, particularly along Wisconsin Ave. This population cluster is primarily served by Route 3.
- The edge of Beloit, especially to the east, north, and west, has low population densities. Where there are moderate population densities on the peripheries, BTS service is currently provided by at least one route respectively.

Employment Density

Employment is especially important in travel markets because traveling to and from work often accounts for the singular most frequent type of trip. Therefore, understanding the distribution and density of employment is critical to transit service design. Transit that serves areas of high employment density provides key connections to job opportunities.

Data from the 2010 U.S. Census LEHD Origin-Destination Employment Statistics was mapped to display employment density at the block level as shown in Figure 2. Several findings are apparent:

- The most significant employment density is found near Downtown Beloit, which is well served by BTS.
- Outside of downtown Beloit, much of the employment density is on the edge of town. Major employers include the Beloit Memorial Hospital to the north, Woodman's Food Market to the west, and newer commercial developments along Milwaukee Rd to the east, including the Walmart Supercenter.
- In general, the moderate to high employment clusters are served by BTS routes either directly, or within a short walking distance. There are some significant employers on the east side of Beloit, including Staples Fulfillment Center and Kettle Foods manufacturing facility, which are not served. These do not appear as high employment density areas on the map because the areas surrounding these facilities have no employment, which reduces the overall density.

As a supplement to the employment density data, major employers of greater Beloit are included in Figure 3. Beloit Health System is the largest employer, followed by School District of Beloit and Taylor Company.

Figure 1 Population Density (2010)

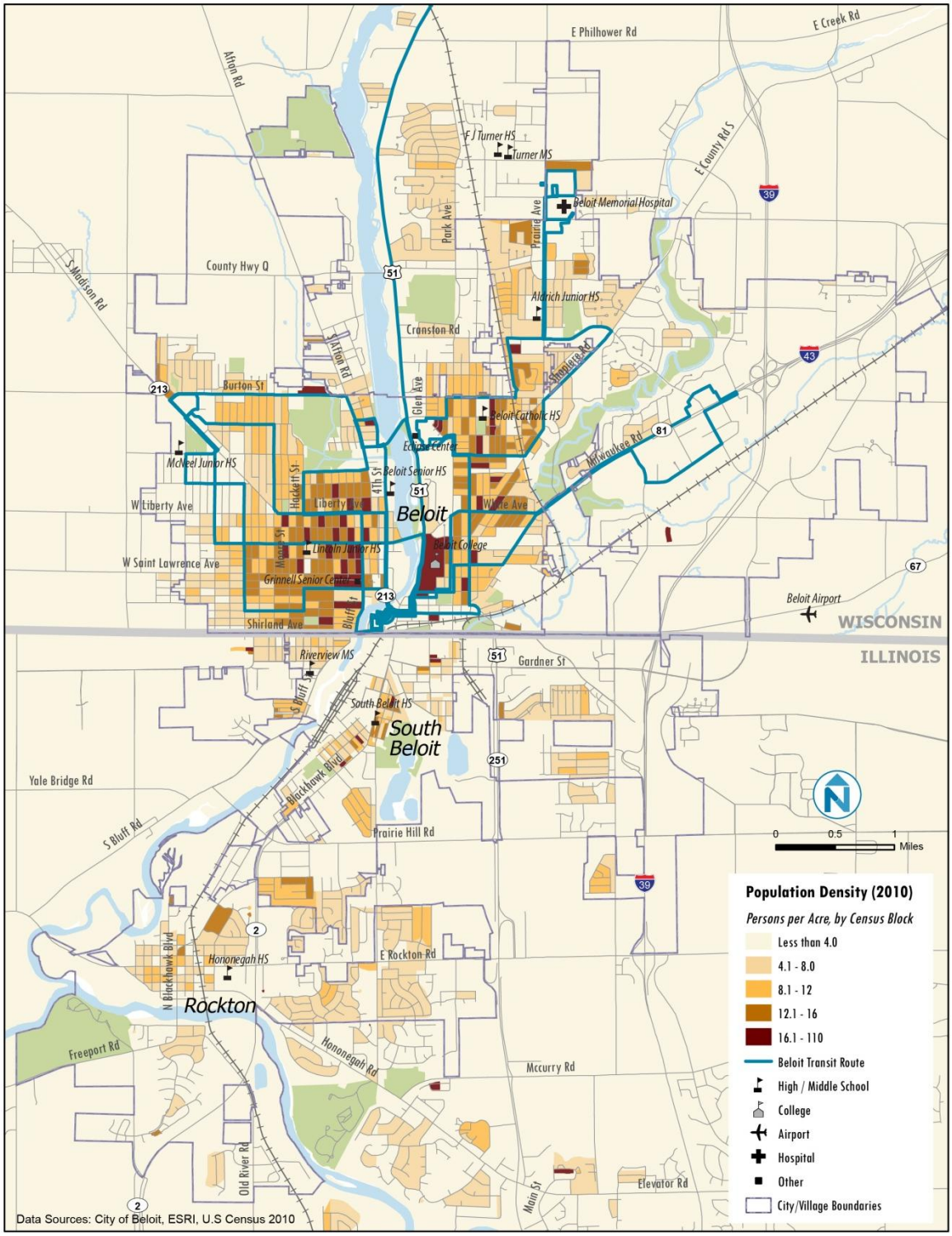


Figure 2 Employment Density (2010)

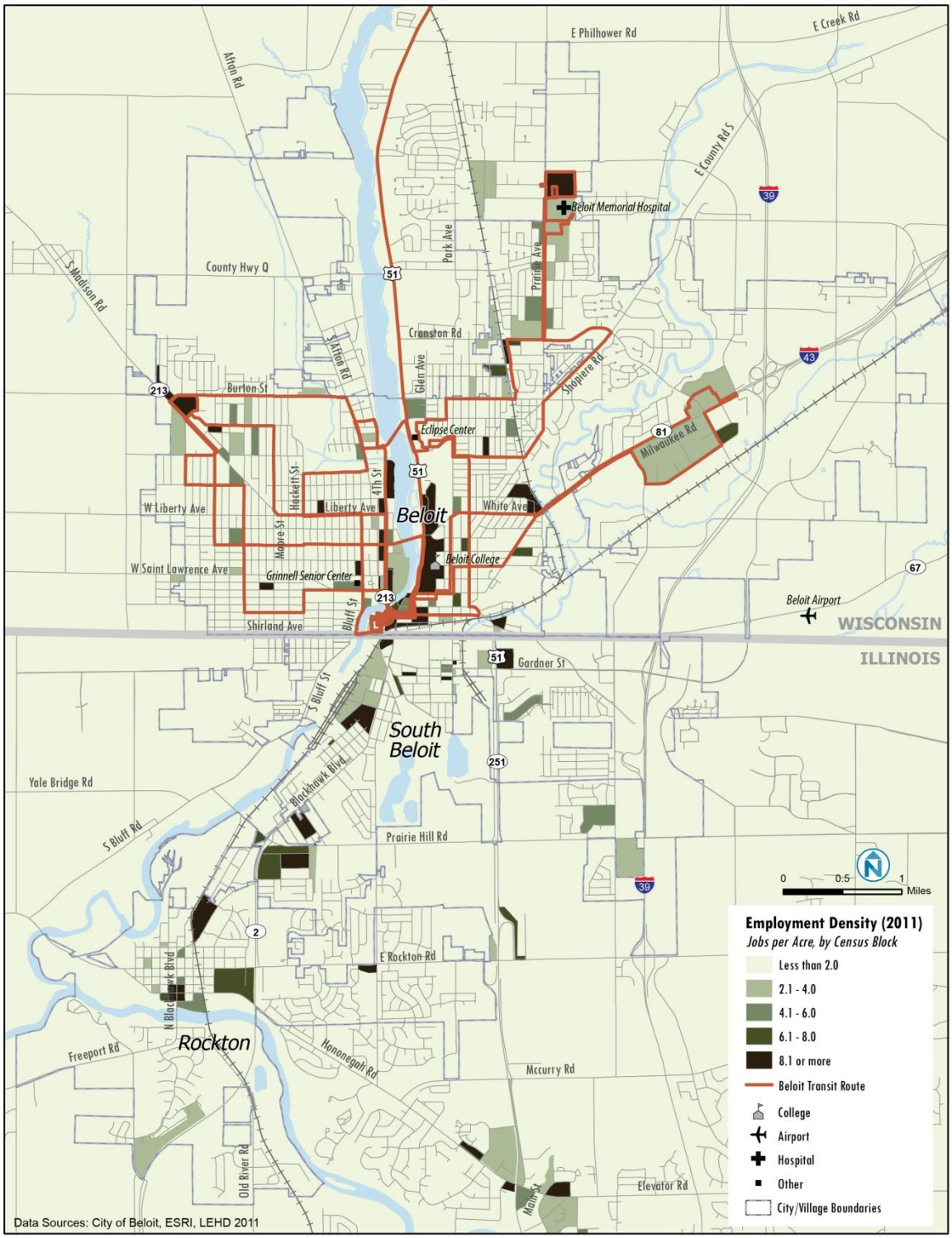


Figure 3 Major Employers in Greater Beloit

Employer	Product or Service	Number of Employees
Beloit Health System	Medical Services	1,550
School District of Beloit	Public Education Grades K-12	1,006
Taylor Company	Food Service Industry	750
Birds Eye	Frozen Food Specialty Manufacturer	726
Kerry Americas	Dehydrated Food Products	690
Frito-Lay	Snack Foods	685
City of Beloit	Municipal Services	475
Beloit College	4-year Liberal Arts College	413
ABC Supply Co.	Roofing, Siding and Building Products	406
Fairbanks Morse Engines	Diesel Engines & Accessories	373
Walmart Super Store	Retail Department Store	300
Hormel Foods	Canned Meat Products	300
Ecolab, Inc.	Disinfectants and Germicides Manufacturer	280
School District of Beloit Turner	Public Education Grades K-12	225
Staples Fulfillment Center	Office Supply Distributor	220
Serta Mattress Co.	Mattresses	210
Scot Forge	Iron/Steel Forgings Manufacturer	201
Axium Foods	Food Products-Machinery Manufacturers	174
First National Bank & Trust Co.	Financial Institution	166
Beloit Health & Rehabilitation	Skilled Nursing Care & Short-term Rehabilitation	164
Woodman's Food Market	Supermarket	160
Durst-Mastergear	Motor and Generator Manufacturer	150
Diamond Foods Inc.	Potato Chip Manufacturer	146
Morse Group/Amp Electric	Electrical Contracting Firm	140
Alliant Energy	Utility service provider	137
Valmet	Paper Mill Supplies Manufacturer	120
Paperchine	Paper Mill Machinery Manufacturer	110
Regal	Cutting tools/Power trans equipment	100
Cotta Transmission	Transmission and gearbox Designer and Manufacturer	85
Dupont	Develops and markets enzymes	80
Community Health Systems	Medical Services	72
Avid Pallet Services, LLC	Manufacturer/distributor of pallets and lumber products	72
Beloit Daily News	Media Newspaper	47
Wisconsin Knife Works	Cutting Tools	39

DEMOGRAPHIC CHARACTERISTICS

Senior Population Density

Older adults (those 65 years and older) are more likely to use transit than the general population because they are more likely to have chosen to stop driving or can no longer drive. Throughout the country, this is a key market for transit, in part because it is increasing so dramatically. In 2000, 35 million Americans were age 65 and over, or 12.4% of the total population. By 2010, that number had grown to 40 million, or 13.0% of the total population. This trend is expected to continue and accelerate as the Census Bureau projects this group will jump to 70 million people by 2030 and represent 20% of the total population. Understanding the distribution of older adults is therefore important in identifying areas of more transit-dependent riders.

Data from the U.S. 2010 Census was used to map individuals aged 65+ by census block. Figure 4 shows the geographic distribution of these older adults throughout the Beloit area. A number of findings are apparent:

- The senior population in Beloit is fairly evenly distributed throughout the city. That said, there are high concentrations on the west, north, and northwest sides of Beloit.
- The senior population is generally served by current BTS service, with most of the living in blocks that are directly served by at least one route.
- Moderately high populations of seniors live north of Beloit, to the east of Riverside Dr, but are adjacently served by the Beloit-Janesville Express.

Youth Population Density

Data from the U.S. 2010 Census was used to map individuals aged 10 to 17 (youths) by census block. Figure 5 shows the geographic distribution of these older adults throughout the Beloit area. A number of findings are apparent:

- Most of the youth population in Beloit lives in or near the city core, with large populations to the west of Rock River between Olympian, 4th Street, Shirland, and Hackett. and east of Rock River in the vicincity of Wisconsin Ave between Henry and White. These areas are well served by current BTS routes.

Low-Income Population

Data from the U.S. Census' American Community Survey 5-Year Estimates 2008-2012 was used to map median household income at the census block group unit of analysis. Figure 6 shows the geographic distribution of these household incomes throughout the Beloit area. A number of findings are apparent:

- Much of the city of Beloit has an average median household income of $20,001-40,000.
- The area around Beloit College has the lowest median household income at less than $20,000 due to the high concentration of students.
- Median incomes increase the further one gets from the core of Beloit.

More than any other demographic group, low-income status is the strongest indicator of a higher-than-average propensity to use transit. This is primarily because as income falls, the cost of owning and using a private vehicle becomes more burdensome, which makes transit a more

attractive option. For this reason, it is important to understand the geographic distribution of low income individuals in the travel market.

Poverty Status

Poverty status data from the U.S. Census' American Community Survey 5-Year Estimates 2008-2012 was used to define and identify low income individuals. Because disposable income is largely a factor of household size and household income, the U.S. Census considers household income and the number of members in the household in classifying a household's poverty status. The distribution of individuals with low incomes (those living in a household considered in poverty by the Census), is shown in Figure 7. A number of findings are apparent:

- Much of the poverty in Beloit is concentrated to the west and northeast of downtown Beloit, and to a slightly lesser degree downtown, to the southwest, and north. These areas are well served by multiple BTS routes.
- While there are gaps outside of the city of Beloit, most of the population living in poverty is currently served by the BTS system.

Vehicle Availability

For self-evident reasons, individuals without access to a vehicle represent a particularly strong market for transit. Identifying households without access to a vehicle helps in identifying areas that are likely to have a significant number of transit-dependent riders.

Data from the U.S. Census' American Community Survey 5-Year Estimates 2008-2012 was used to identify households who do not have regular access to a vehicle. The geographic unit of analysis for this data is the census block group.

A number of findings are apparent in Figure 8:

- Most of the zero vehicle households are located near downtown Beloit. These areas are currently served by the BTS.
- In northwest and north Beloit, and just southwest of the city, there are moderate levels of households without access to an automobile. Nearly all households within the city of Beloit are directly served by BTS service. While BTS service is not provided across the border in Illinois, it is a relatively close walking distance to BTS service.

Figure 4 Senior Population Density (65 or Older) - 2010

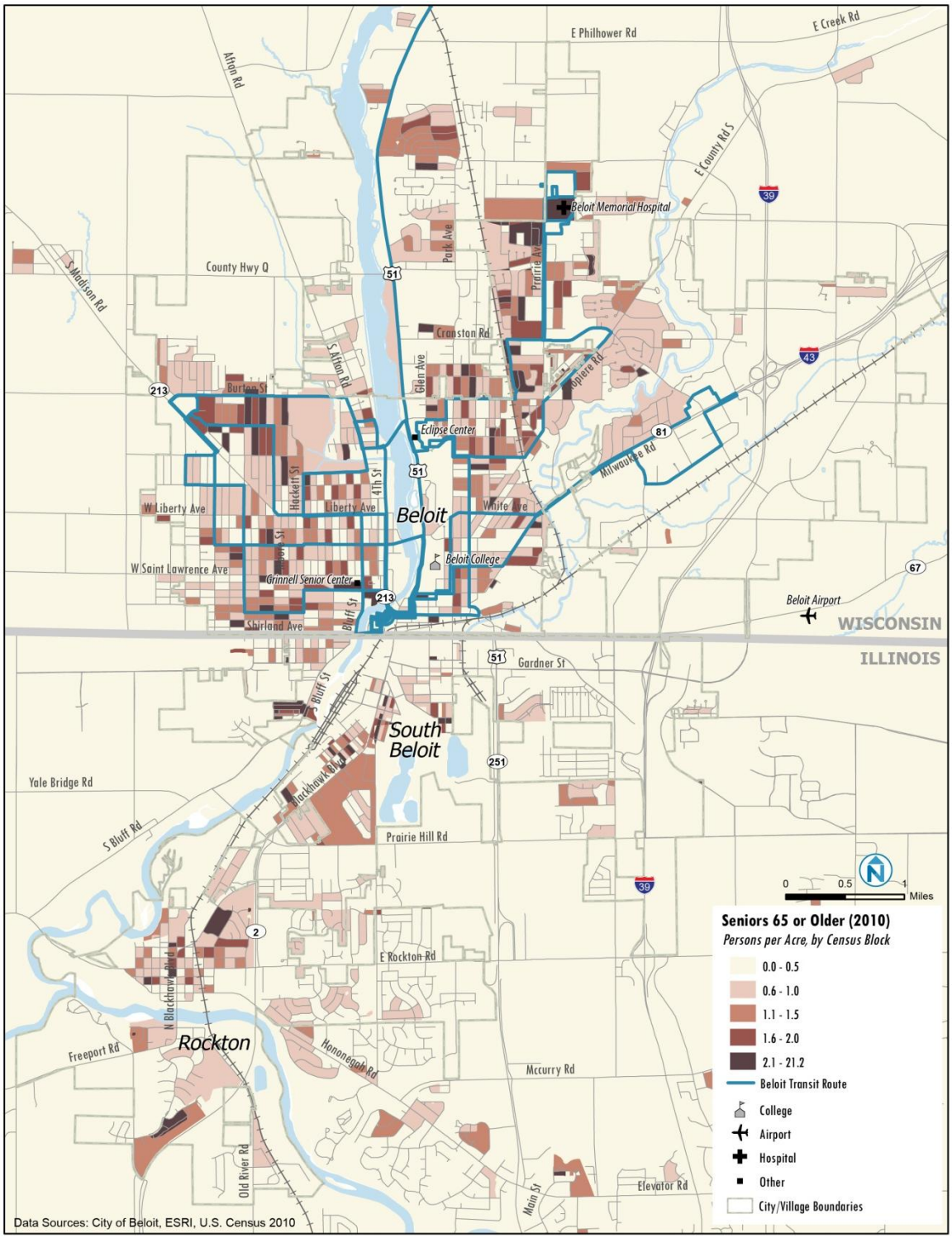


Figure 5 Youth Population Density (Ages 10 – 17) - 2010

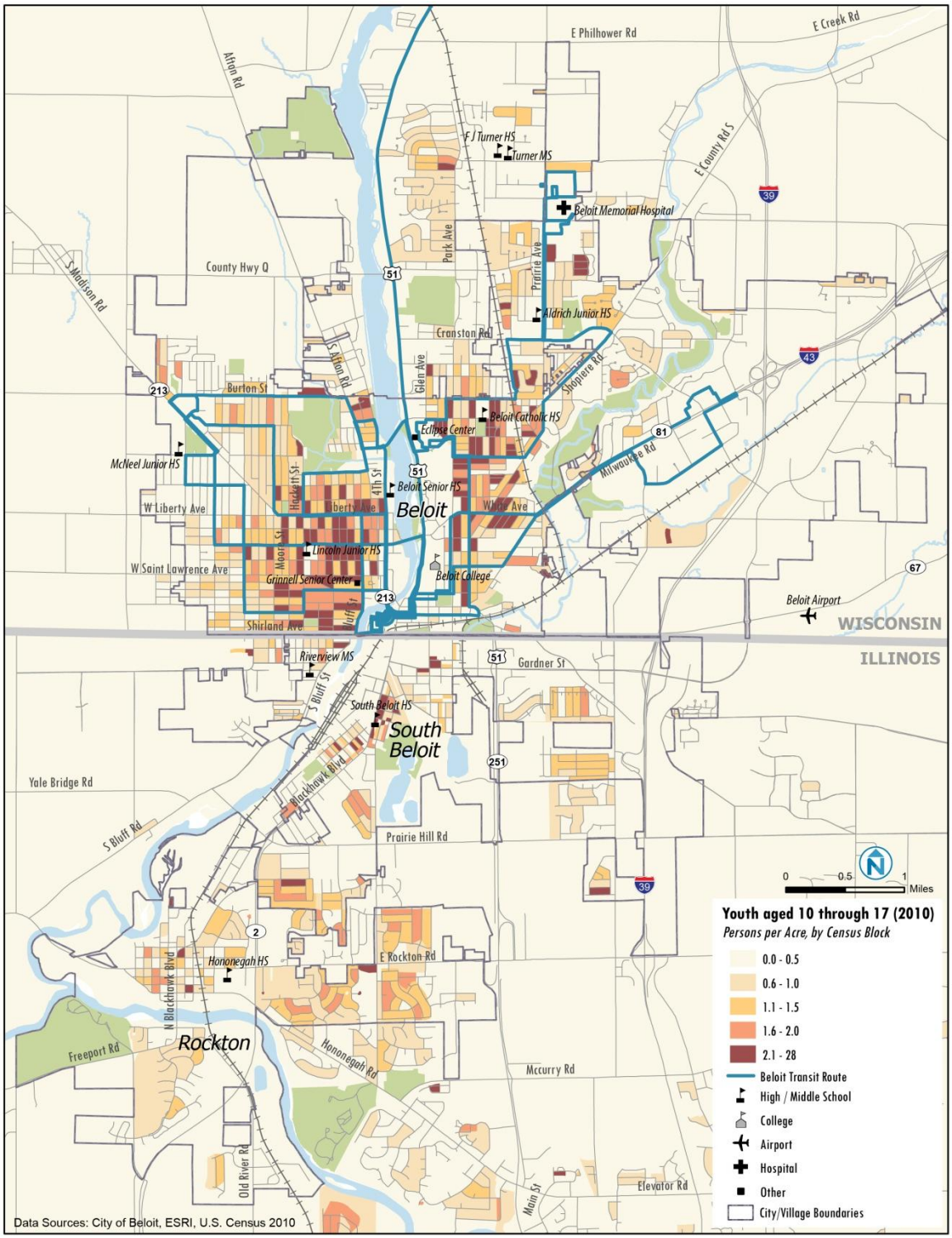


Figure 6 Median Household Income (2010)

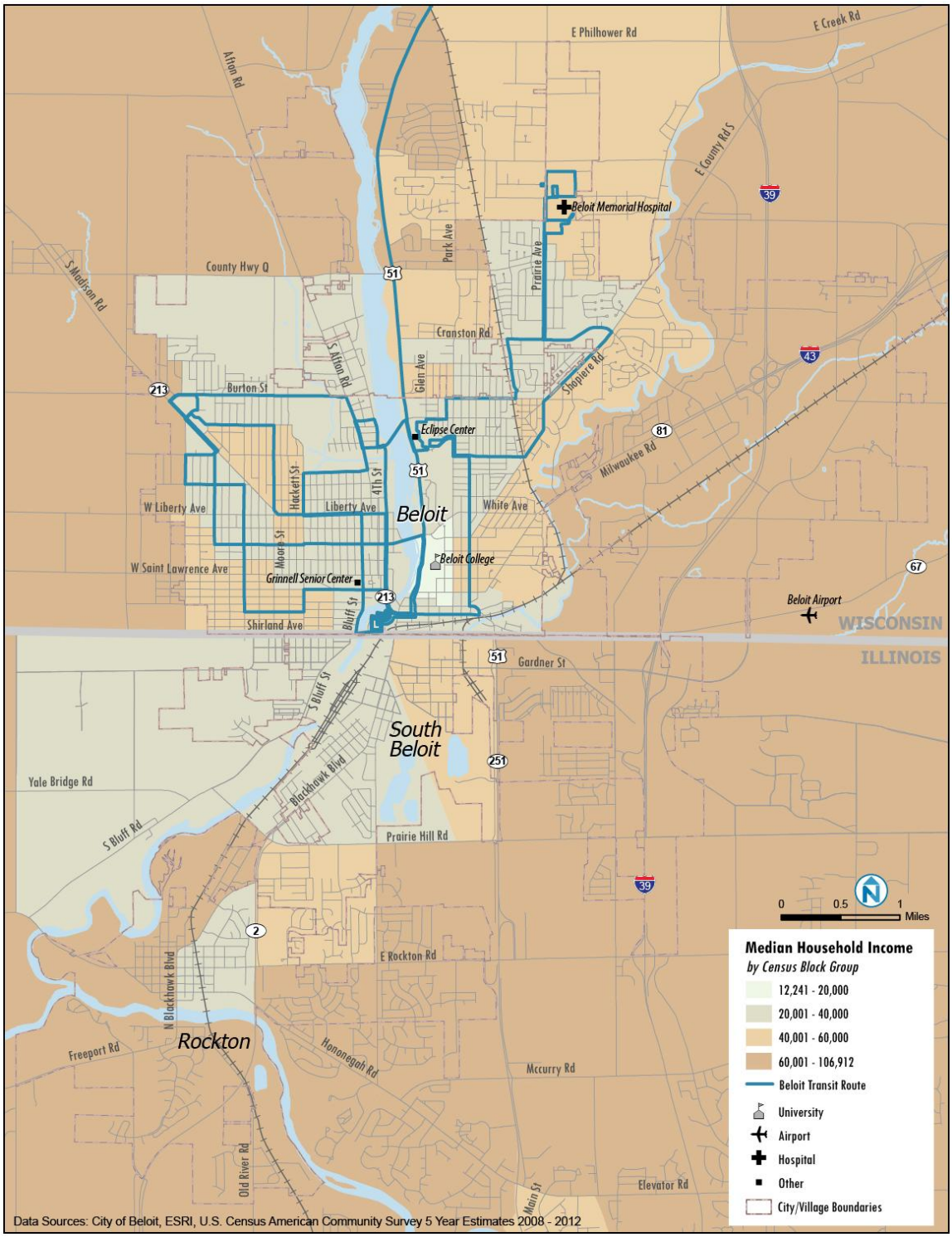


Figure 7 Population in Poverty (2010)

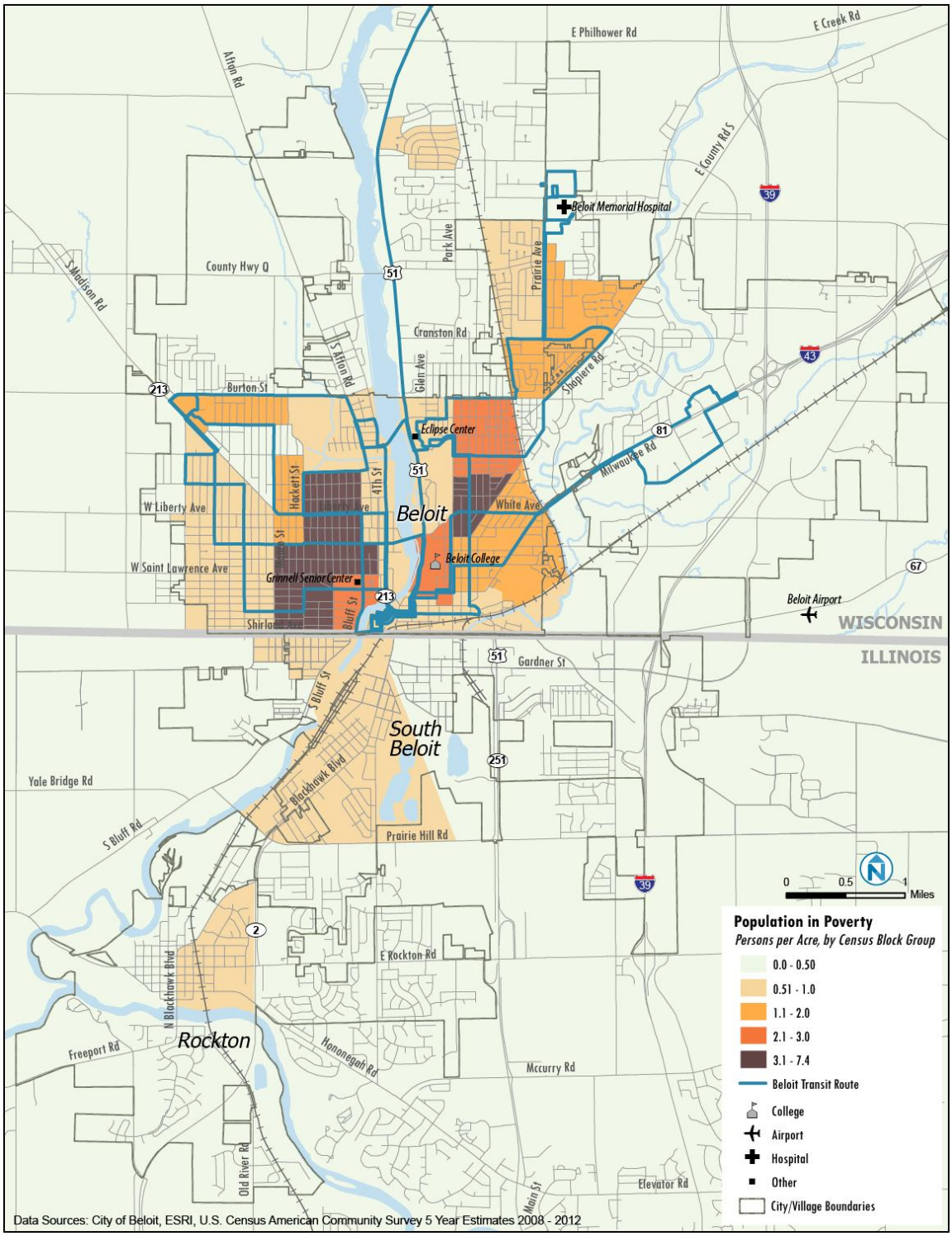
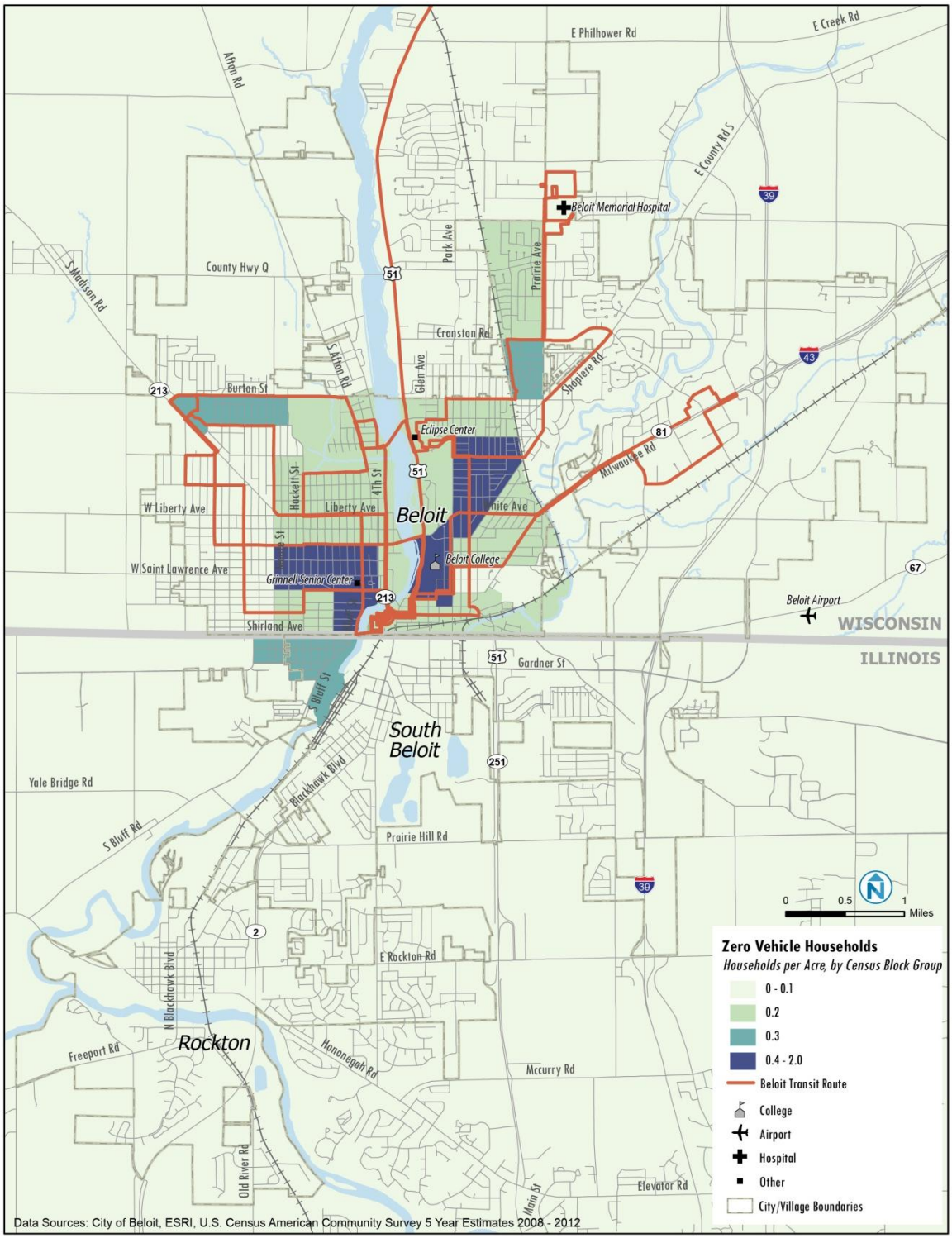


Figure 8 Zero Vehicle Households



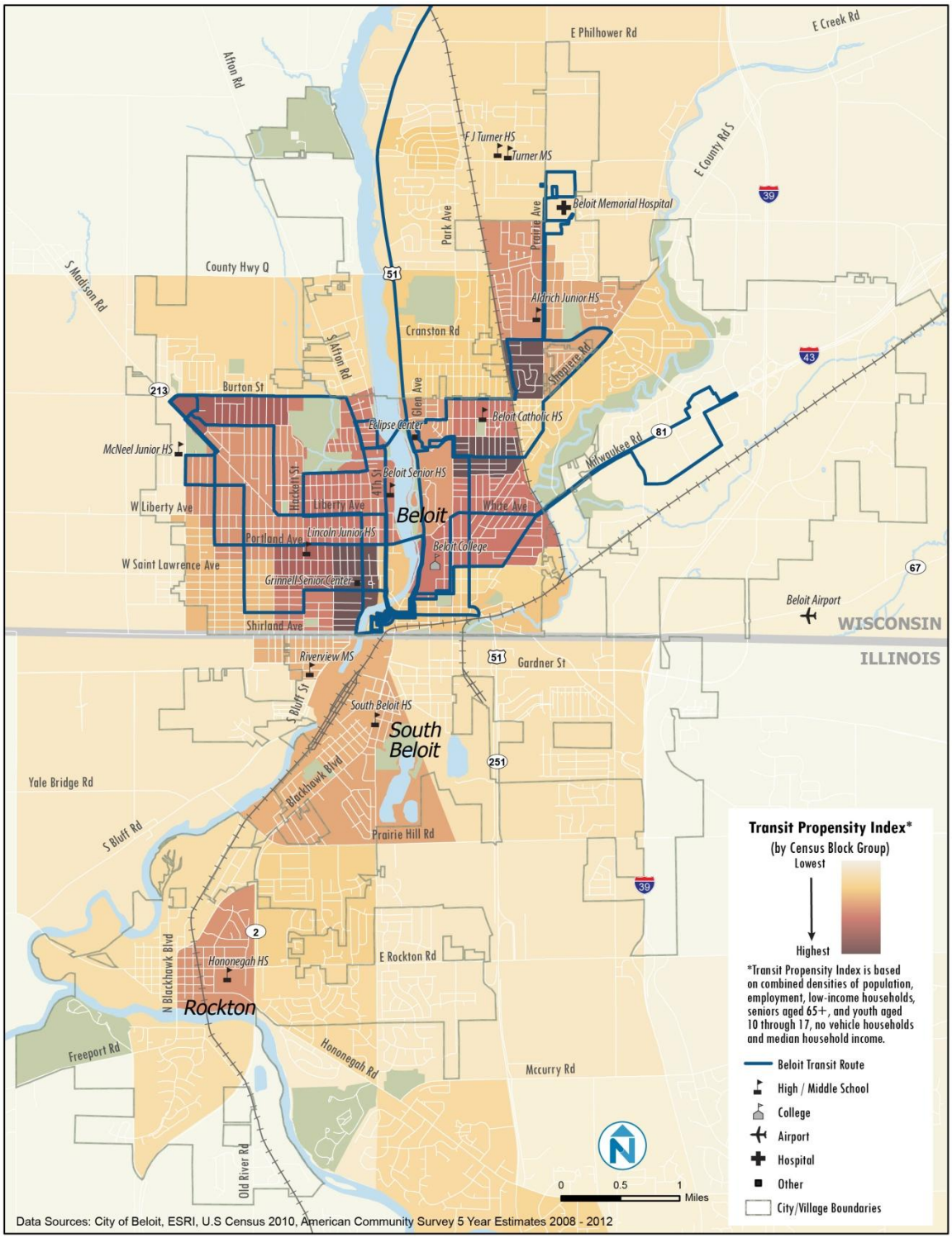
TRANSIT PROPENSITY INDEX

This section presents a measure of overall transit propensity by combining population, employment, and demographic factors to produce a transit propensity index. Note that this data provides an indication of transit demand, and not a specific determination. Ridership on individual routes and the effectiveness of individual routes can vary significantly depending on a number of factors, including the physical environment, how well service is designed, and the time and costs for competing alternatives.

This index still provides a strong indication of the relative demand for transit throughout the market area, and identifies areas where demand is highest and transit can be provided most effectively. A number of findings are apparent in Figure 9:

- The areas of highest transit propensity are west of downtown Beloit across the Rock River, east of the Eclipse Center near Merrill Elementary and Summit Park, as well as near Cranston Rd and Pioneer Dr.
- The data suggests there may be moderate demand for transit service to South Beloit and Rockton, perhaps offered as a service similar to the Beloit-Janesville Express route.
- The current BTS routes provide direct transit service to nearly all of the high propensity areas of the service area.

Figure 9 Transit Propensity Index



3 DOCUMENT AND POLICY REVIEW

The TDP considers direction from previous planning work conducted in Beloit, including the following:

- City of Beloit Comprehensive Plan (2008)
- Rock County Comprehensive Plan 2035 (2009)
- A Study of the Feasibility of a Crosstown Transit Route in the Beloit Urbanized Area (2007)
- Beloit Transit System Transit Development Plan (2011 Update)
- South Central Wisconsin Commuter Transportation Study (2008)
- Stateline Area Transportation Study (SLATS) 2035 Long-Range Transportation Plan (2011 Update)

City of Beloit Comprehensive Plan, 2008

The City of Beloit's Comprehensive Plan calls for enhancements to the city's current bikeability and walkability, while also investing in buses, ridesharing, and rail. The plan calls for a requirement that "sidewalks or pedestrian pathways are included in all new residential and commercial developments, designing neighborhoods and development with the pedestrian in mind, and considering the needs of bicyclists and pedestrians in all road improvement projects (Beloit Comprehensive Plan – 126)." The plan also calls for the promotion of the current bus system, while also considering expansion of the system to developed areas of the Beloit that are underserved. Additionally, the plan calls for new park and ride facilities, particularly along the Interstates (see Figure 10).

Figure 10 City of Beloit Comprehensive Plan Transportation System Improvements

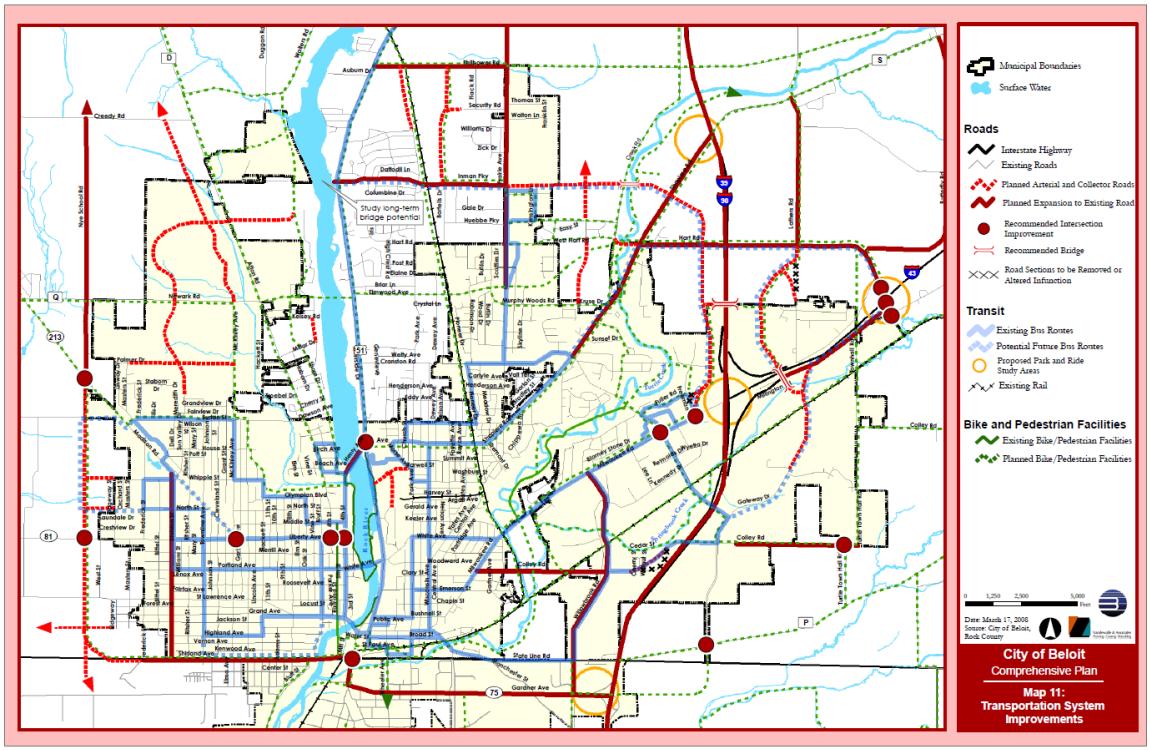


Figure 10 also identifies the proposed bus routes for Beloit. The plan identified routes to Gateway Business Park, the possible casino, and the west side of Beloit. The plan seeks a continued partnership with Janesville on express bus service, while it identifies Rockford as another potential regional transit connection.

Rock County Comprehensive Plan 2035 (2009)

Chapter 7 of the Rock County Comprehensive Plan states a need for alternative modes of transportation in the county to help alleviate congestion and vehicle emissions, in part through improved awareness of transit services offered by the Rock County Council on Aging, expansion of current fixed route service, and an increase in park and ride facilities.

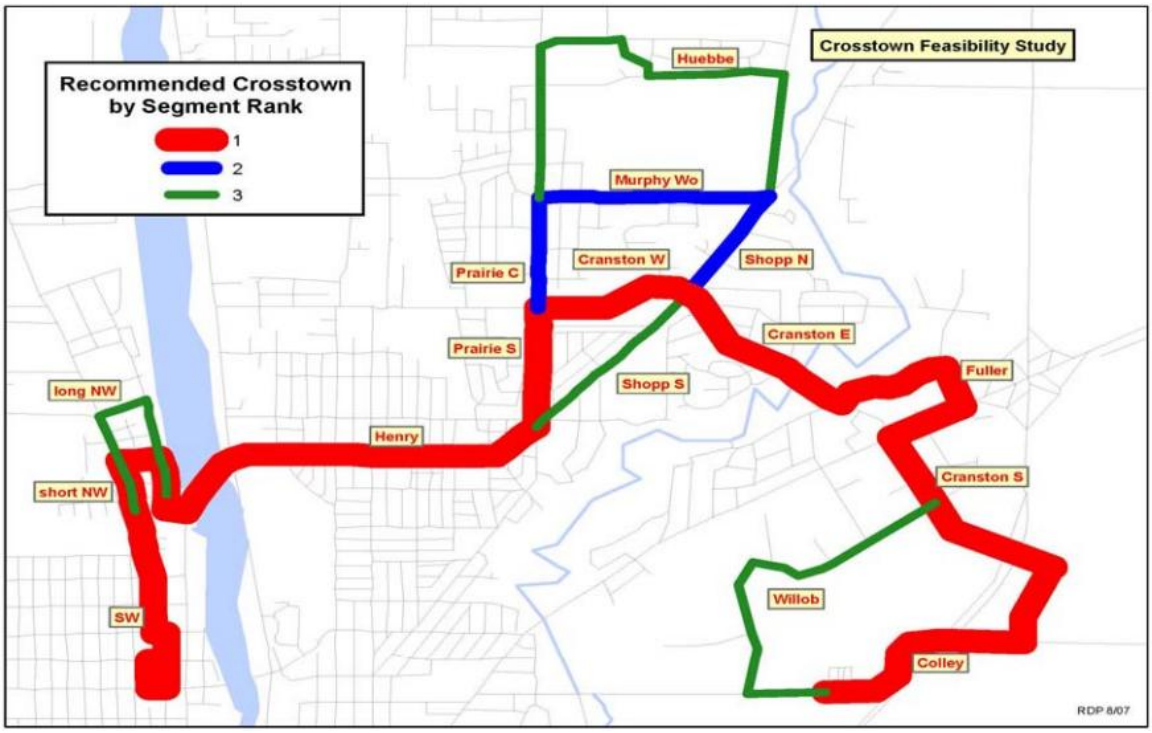
A Study of the Feasibility of a Crosstown Transit Route in the Beloit Urbanized Area (2007)

The study was conducted by SLATS to determine the feasibility of a new crosstown route in Beloit to provide more direct trips between west Beloit and east central Beloit. The study examined the current Beloit system, describing the circuitous radial pulse system pros and cons in the local context.

The study included several possible tweaks to the Beloit system. A new crosstown route would allow for the western end of Route 3 to be eliminated, shortening Route 3's trip times. Additional Route 3 recommendations include adding a deviation to serve neighborhoods west of Prairie Avenue along Hart Road and a deviation to the neighborhood south of Cranston. A new crosstown route is determined to be a large accessibility improvement for employment areas, particularly to the east, southeast, and northeast of the service area.

The study then broke down, segment by segment, demographic indicators of strong transit ridership.

Figure 11 SLATS Recommended Crosstown Route



The proposed red is depicted in Figure 11. This route would be 8.4 miles with each one-way trip taking approximately 30 minutes. While not necessary, this would allow for the route by pulse at the transfer center. It is also recommended that transfers outside of the center are timed with other routes throughout the system.

The study determined little short term capital costs because BTS had excess vehicles at the time of the study. Long-term, the route would require one vehicle to operate. Operational costs would increase as a minimum of one full-time driver would be needed to operate the route, unless it is operated on a limited basis.

Beloit Transit System Transit Development Plan (2011 Update)

The 2011 update to the BTS Transit Development Plan addresses the opportunities and needs of the system, with potential funding shortfalls taken into consideration. It was completed at a time when funding issues threatened to force BTS to make significant changes. The report outlines how to consider a reduced funding need, replace potential funding losses, and help decision-making if funding is severely cut.

The 2011 TDP's overall recommendations for BTS include the following:

- Stagger daily commencement and dismissal for students to spread peak hour demand.
- Beloit School System should provide payment to BTS for the service it provides to students.
- An investigation of how many Beloit College students use BTS.

- Human service providers should increase their overall portion of payments to BTS for paratransit trips.
- Schools and human service providers should reevaluate their transportation needs with potential BTS cuts in mind.
- Increasing transit fares should be a last resort.
- Pay and benefit cuts should be considered for BTS staff.
- During the summer, service could be reduced as much of the systems ridership is due to students.
- Schedule adjustments should be considered based on ridership data, even if requires adjustments for different times of day, month, or year. These changes should be made along with an improvement in information technology in order to ensure riders are well informed.
- Four funding forecasts were developed, with one optimistically projecting no significant cuts. One pessimistic scenario determined BTS will be deemed ineligible for Federal funding.
- If BTS loses 30-50% of its funding in the pessimistic scenarios, the system will have to (1) provide only morning, midday, and evening runs on weekdays; (2) provide only morning and evening runs on weekdays; (3) eliminate BJE service, or only peak hour service; (4) eliminate Saturday service, or only morning and evening Saturday service; (5) eliminate fixed route service and only provide paratransit service via the State Line Mass Transit District.

South Central Wisconsin Commuter Transportation Study (2008)

The government members of Beloit, Janesville, the Villages of Sharon and Clinton, Rock County, WisDOT, SLATS, and the Janesville MPO took part in an enhanced feasibility study of potential commuter connections between South Central Wisconsin and North East Illinois, which an emphasis on the Harvard Metra Station.

The study determined that while the current regional transit system is considered inadequate, there is interest in expanding regional transit to Madison and Chicago. Madison and Rockford job connections were considered more important than connections to Chicago. There was also determined to be recreational trip demand for connections to Madison and Chicago.

The report recommended new rail stations and commuter rail service along five potential corridors. An express bus service from Rockford to Madison, serving Beloit, Janesville, Edgerton, and Stoughton was proposed. The operating plan for this express bus route suggests logical segments of the route to be run as independent, coordinated routes. Additionally, a regional commuter bus fare was promoted to promote ridership throughout the region.

The study determined that Beloit and Janesville will not pursue an Alternatives Analysis for commuter rail service at the cost of $3 million as it would probably not qualify for FTA support. That said, the study encouraged re-evaluating the need for such service in the future and promoted preservation of rail lines, facilities, and rights of way. Finally, the study promotes park and ride facilities, vanpooling, ridesharing, as well as a north-south commuter bus experiment to Madison, Wisconsin.

Stateline Area Transportation Study (SLATS) 2035 Long-Range Transportation Plan (2011 Update)

The SLATS 2035 Long-Range Transportation Plan provides a background and summary of existing studies and documents related to the Beloit Transit System, in additional to several recommendations. The plan promotes the recommendations found in the Beloit Transit System Transit Development Plan from 2004, including, but not limited to, the promotion of 30 minute headways, more direct service to key destinations, reduce inefficient deviations, the construction of a new transfer site in downtown Beloit, optimized stop locations, interlining of routes, and establishing traffic signal priority.

The plan supported the continued support of the current funding mechanisms in which BTS, JTS, and Rockford Mass Transit District use intergovernmental agreements to define service parameters and funding responsibilities. The plan also promotes a similar service to the Beloit-Janesville Express that would connect Beloit and Rockford, Illinois. The plan promotes headways of at most 60 minutes with a span of service of at least 10 hours on weekdays and 8 hours on Saturday. The route would also stop in Machesney Park, downtown Roscoe, Rockton, South Beloit, and the Walmart on Rockton Road.

The plan makes no attempt to address potential growth of BTS due to projected near term funding restraints. It is recommended that BTS focus on maintaining and or replacing existing equipment and facilities so that current service levels can be maintained.

4 PEER REVIEW

This peer review provides a comparative analysis of fixed-route transit characteristics of Beloit Transit System and five other transit systems. Few transit systems have identical twins that can function as direct side-by-side comparisons. However, most systems share some characteristics with others, and those common characteristics can form a basis for comparison based on some number of compatibility factors. The federal government has required transit systems to report operating data for many years, and this data is readily available for systems all over the United States in what is called the National Transit Database (NTD). Data used in this analysis is derived from NTD, with the most recent operational statistics coming from 2013. Transit systems were compared based on performance indicators, effectiveness measures, and efficiency measures.

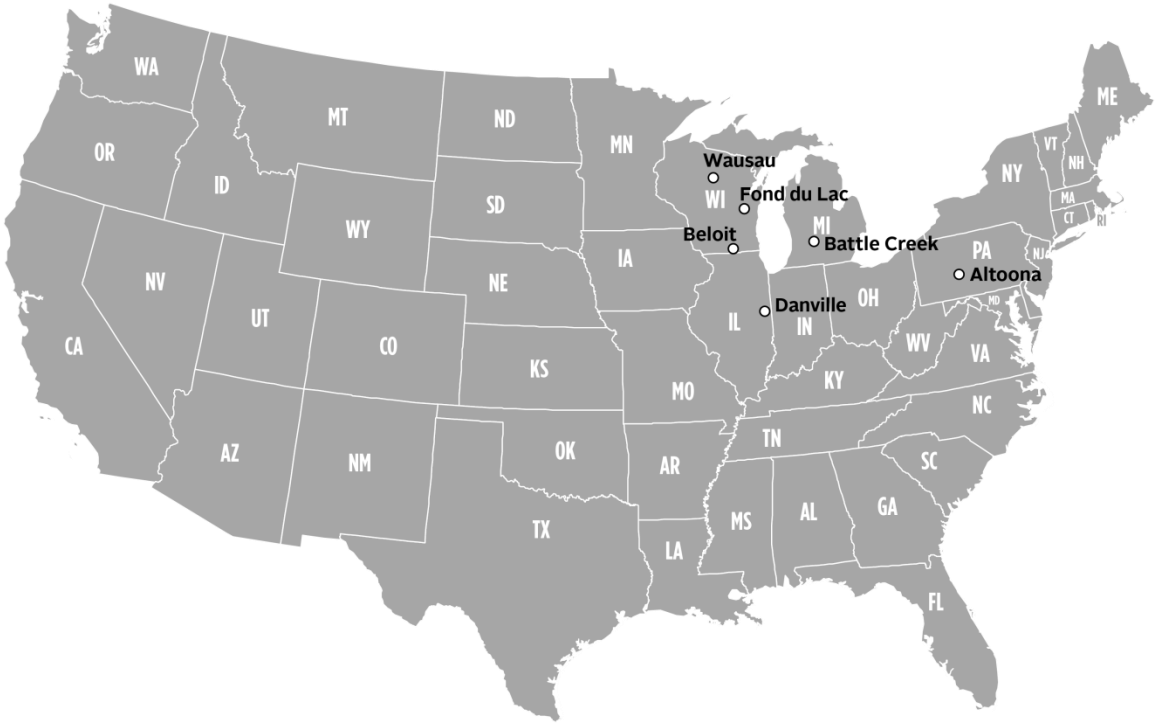
Peer systems chosen as part of this analysis are shown in Figure 12. Peer systems were chosen based on similar characteristics, such as primary city population, ridership, geographic location, system type (each system aside from Altoona Metro Transit is operated directly by a municipality). Aside from Beloit Transit System, each peer system also provides limited and varying amounts of service to surrounding cities and/or townships. A map of peer system locations is shown in Figure 13.

Figure 12 Peer Review Agencies

System Name	Location	Primary City Population	Service Area Population	Passenger Trips	Peak Vehicles (Fixed Route)
City of Beloit Transit System	Beloit, WI	36,888	36,888	251,880	9
Altoona Metro Transit	Altoona, PA	45,796	69,608	675,174	22
Battle Creek Transit	Battle Creek, MI	51,848	80,259	532,955	14
Danville Mass Transit	Danville, IL	32,523	50,996	625,351	10
Wausau Area Transit System	Wausau, WI	39,106	50,000	675,612	18
Fond du Lac Area Transit	Fond du Lac, WI	43,021	49,167	153,885	7

Source: NTD 2013 Transit Agency Profiles

Figure 13 Peer System Locations



Performance Indicators

Performance indicators include service characteristics such as passenger trips, revenue hours, and revenue miles. Beloit Transit System's performance in relation to the peer group is shown in Figure 14.

Figure 14 Performance Indicators

Measure	Beloit Transit System	Peer Group Minimum	Peer Group Maximum	Peer Group Average	Beloit Transit % from Average
Passenger Trips	251,880	153,885	675,174	485,810	-48%
Revenue Hours	20,526	10,266	41,231	26,307	-22%
Revenue Miles	287,809	137,481	548,266	397,704	-28%

Source: NTD 2013 Transit Agency Profiles

Figure 15 through Figure 17 illustrate Beloit Transit System's performance characteristics in relation to each peer agency.

- Beloit Transit ranked below average in revenue hours (Figure 16) and revenue miles (Figure 17). Likewise, Beloit Transit System had the second lowest number of passenger trips (Figure 15).
- Overall, Beloit Transit System had nearly one-half fewer passenger trips, 22% fewer revenue hours, and 28% fewer revenue miles than the peer group average.

Figure 15 Passenger Trips

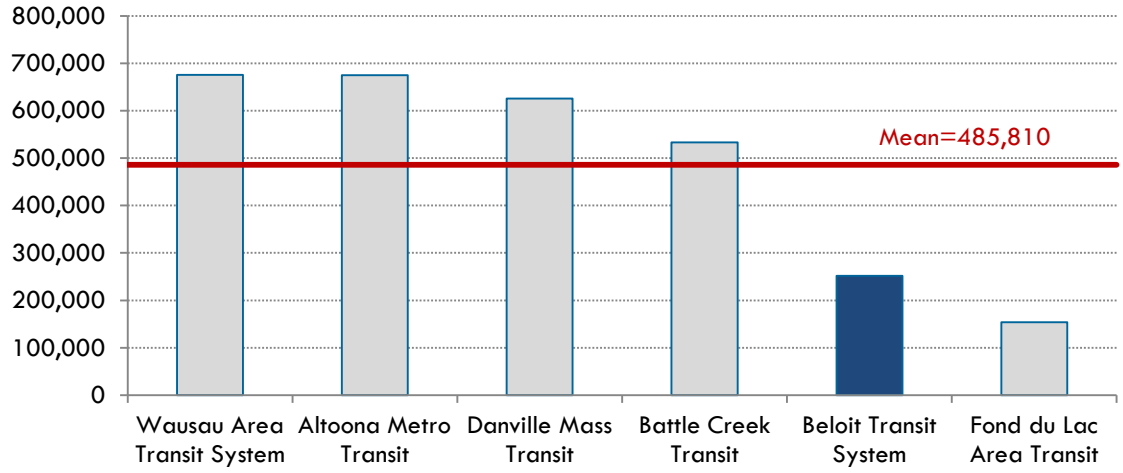


Figure 16 Revenue Hours

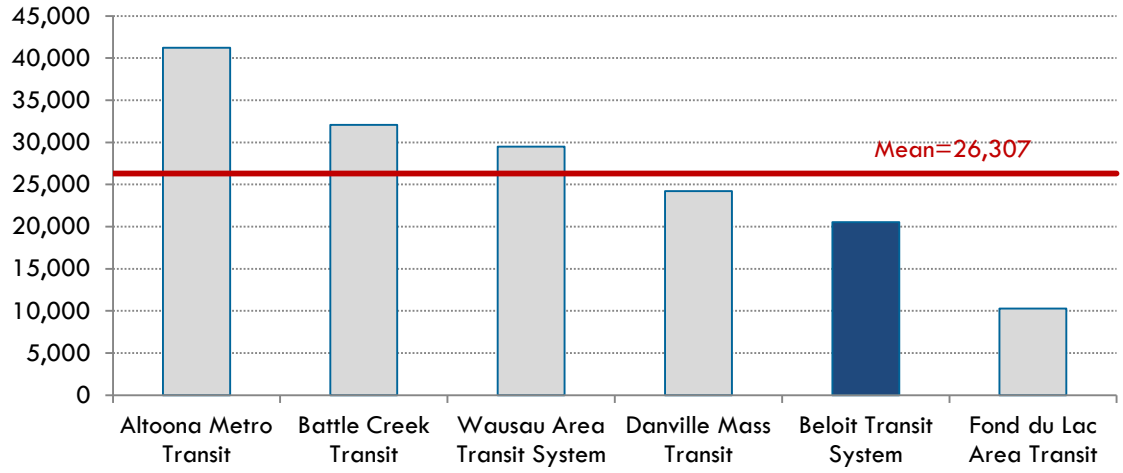
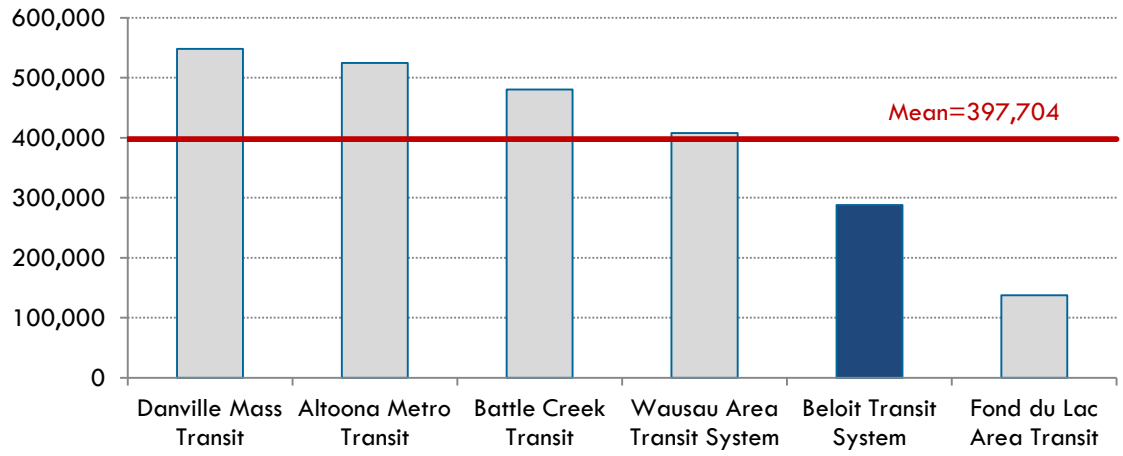


Figure 17 Revenue Miles



Effectiveness Measures

Effectiveness measures include passenger trips per revenue and average fleet age. The comparison of the Beloit Transit System's effectiveness in relation to the peer group is shown in Figure 18.

Figure 18 Effectiveness Measures

Measure	Beloit Transit System	Peer Group Minimum	Peer Group Maximum	Peer Group Average	Beloit Transit % from Average
Passenger Trips Per Revenue Hour	12.3	12.3	25.8	18.1	-32%
Average Fleet Age	9.2	1.3	18.50	8.5	8%

Source: NTD 2013 Transit Agency Profiles

Figure 19 and Figure 20 illustrate the Beloit Transit System's effectiveness measures in relation to each peer agency.

- Beloit Transit registered the second lowest number of passenger trips per revenue hour (Figure 19), an effectiveness measure reflecting ridership productivity.
- With respect to the fixed route average age of fixed-route vehicles (Figure 20), the Beloit Transit fleet is 8% above the group average. This indicates that Beloit Transit System vehicles are slightly older than others in the peer group.

Figure 19 Passenger Trips per Revenue Hour

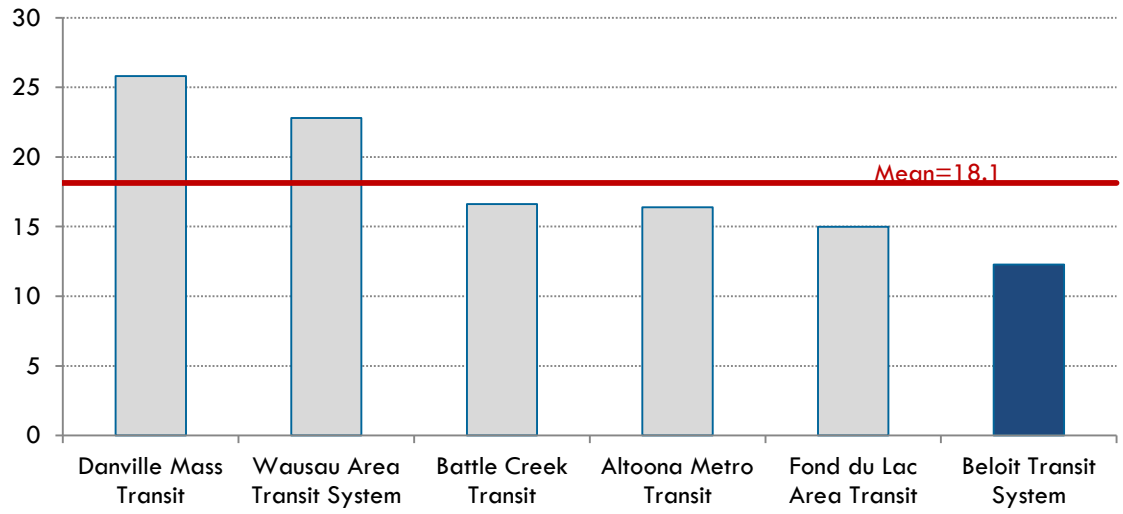
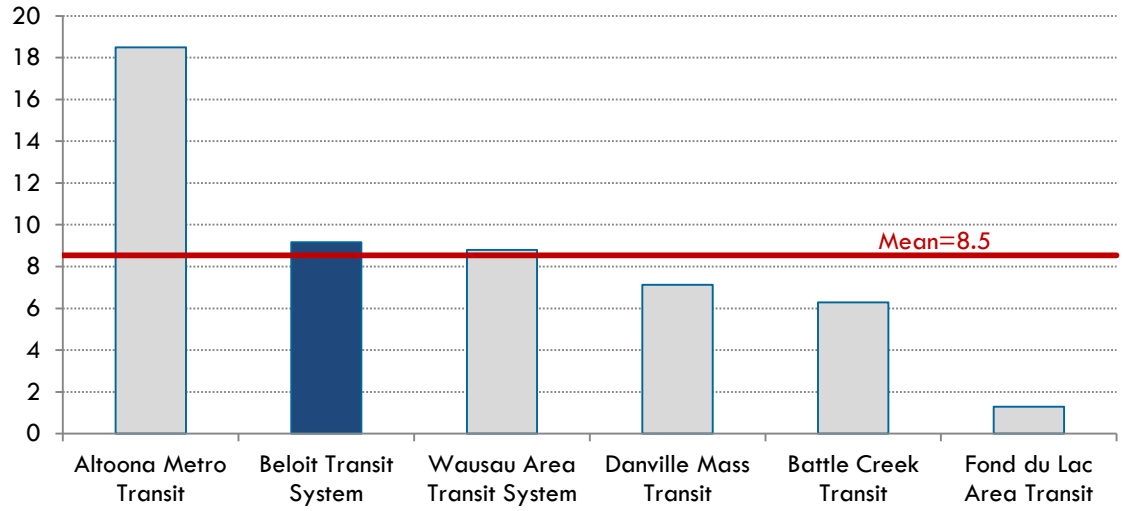


Figure 20 Average Age of Fixed-Route Vehicles



Efficiency Measures

Transit efficiency refers to minimizing operating cost ratios as well as the recouping of costs through internally generated revenue. The efficiency of Beloit Transit System in relation to the peer group can be seen through the various metrics described in Figure 21.

Figure 21 Efficiency Measures

Measure	Beloit Transit System	Peer Group Minimum	Peer Group Maximum	Peer Group Average	Beloit Transit % from Average
Operating Cost per Passenger Trip	$7.52	$4.10	$11.04	$6.81	11%
Operating Cost per Revenue Hour	$92.33	$92.33	$165.52	$115.62	-20%
Farebox Recovery	9.9%	9.9%	18.7%	13.5%	-27%

Source: NTD 2011 Transit Agency Profiles.

Figure 22 through Figure 24 illustrates Beloit Transit System's efficiency measures in relation to each peer agency.

- Operating costs per passenger trip are nearly average (Figure 22).
- Operating costs per revenue hour are the lowest of the peer group (Figure 23).
- Conversely, farebox recovery is also the lowest of the agencies studied (Figure 24).

Figure 22 Operating Cost per Passenger Trip

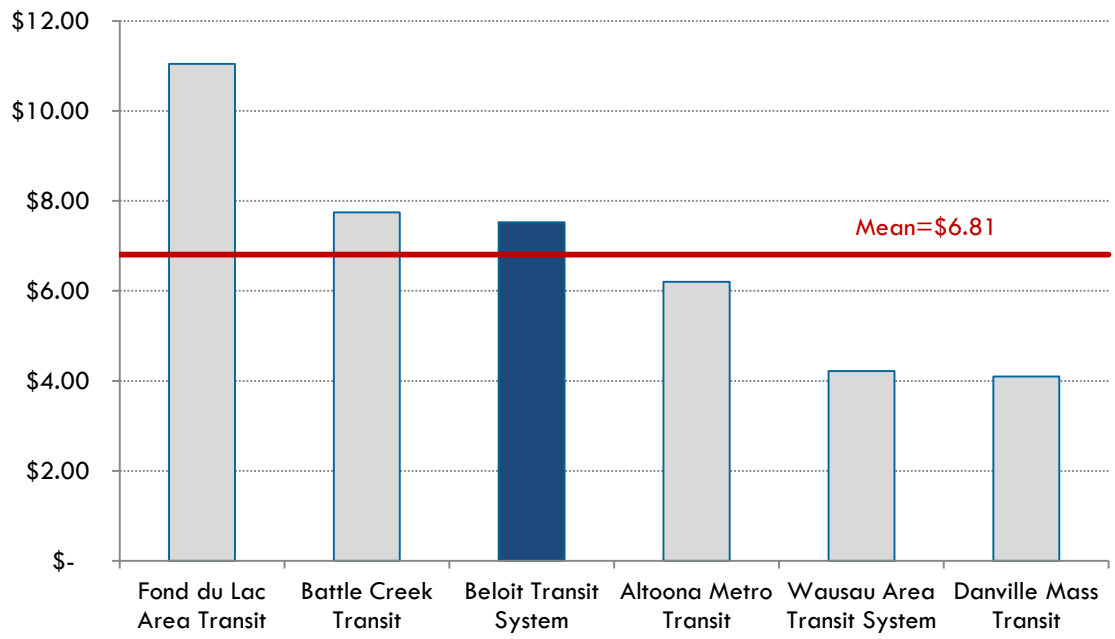


Figure 23 Operating Cost per Revenue Hour

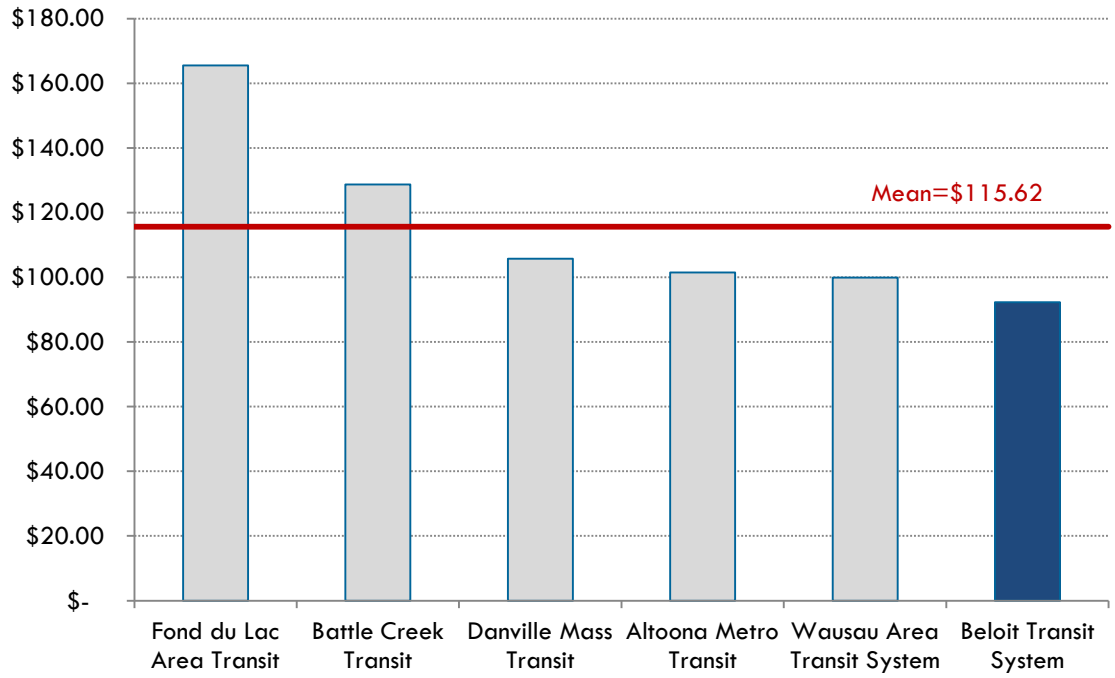
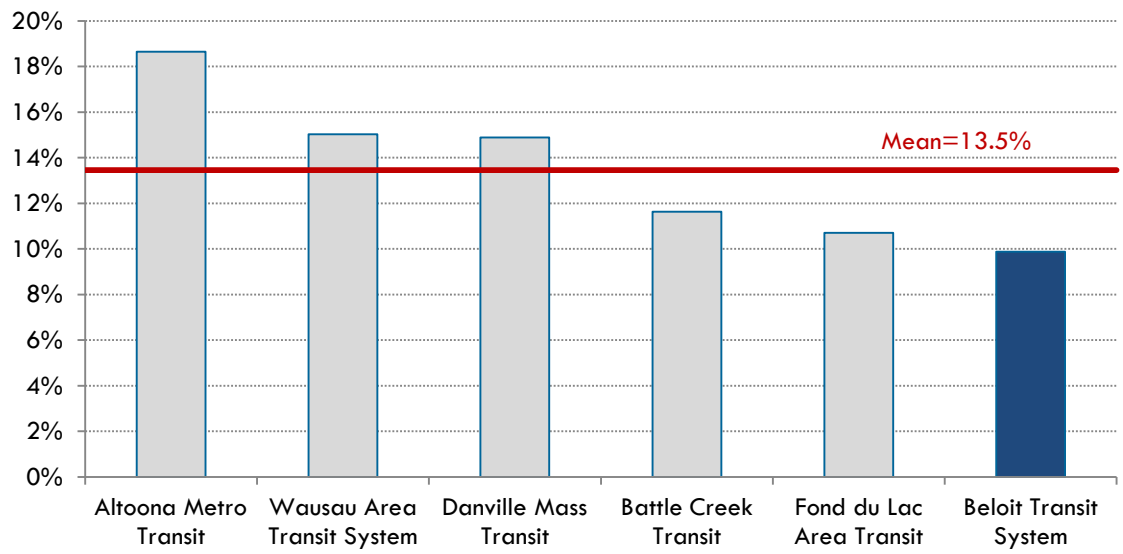


Figure 24 Farebox Recovery



SUMMARY

Overall, Beloit Transit System's measures largely fall in the low end of the peer group. As peers were chosen in part to reflect potential system achievement, the Beloit Transit System's number of passenger trips, revenue hours, revenue miles, fleet size, and the ratio of trips to revenue hours are below average when compared with selected peer agencies. Regarding capital investment, Beloit Transit fixed route vehicles are slightly older than others in the peer group. Finally, Beloit Transit System serves the smallest area and number of residents within the peer group.

Despite the most efficient cost per revenue hour of the peer group, Beloit Transit System realizes an average cost per passenger trip, further indicating low ridership. Farebox recovery of operating costs is the lowest of the selected group and total revenue is near the bottom.

Beloit Transit System currently ranks last among the peer group in number of passenger trips per revenue hour despite having a higher than average population density. However, it is important to note that BTS operates fewer peak vehicles and revenue miles than all but one peer system. In reality, BTS routes operate at consistent headways throughout the day and do not offer supplemental peak service.

5 FIXED-ROUTE SYSTEM OVERVIEW

ROUTES

BTS provides local fixed-route bus service six days a week with express service to Janesville operating Monday through Friday. Local service consists of 4 routes operating within the city of Beloit. Local routes make frequent stops while winding along both arterials and through local neighborhoods.

Route 1 operates one looping bus to the northwest from the Beloit Transfer Center, through neighborhoods, to Woodman's Market, and back in 40 minutes. One bus along Route 2 loops west from the Beloit Transfer Center, through neighborhoods, to Woodman's Market as well, and is back in 40 minutes. Two buses on Route 3 offer bidirectional service between the Beloit Clinic and Beloit Transfer Center. Outbound service travels north primarily along Fourth St, Bayliss Ave, and Prairie Ave to the Beloit Clinic. Inbound service travels along Prairie Ave, Shopiere Rd, Wisconsin Ave, and Broad St to the Beloit Transfer Center. Route 4 has one bus operating a loop pattern that primarily travels along Milwaukee Rd to the new commercial developments to the east of downtown, including Walmart.

Weekday service headway (time between buses for a particular route) and span (hours of operation) are identical for each route with service operating every 40 minutes from 6am-6pm. Route 3 requires two buses due to its 80-minute cycle time. Gillig 35-foot buses are used on each route.

On Saturday, Routes 1 and 2 are operated with one bus, resulting in 80-minute headways on each route. Route 3 operates every 80 minutes with one bus, while Route 4 operates every 40 minutes with one bus.

BTS also operates the Beloit-Janesville Express route that connects Beloit and Janesville with a number of employment and activity centers, including the following:

- Blackhawk Tech
- University of Wisconsin Rock County
- Beloit Transfer Center
- Downtown Janesville Transfer Center

In partnership with the Janesville Transit System (JTS), the BJE requires two buses in order to maintain 60 minute headways along the 120-minute service pattern. BTS and JTS each operate one bus. Service begins at 6:00 a.m. in Beloit and 6:15 a.m. in Janesville and operates until 5:55 p.m. and 6:13 p.m. respectively.

Rock County Specialized Transit offers ADA paratransit service to qualified disabled individuals during the same hours of operation as BTS.

SERVICE LEVELS

Weekday service span and headway is detailed in Figure 25. Saturday service span and headway are detailed in Figure 26.

Figure 25 Weekday Service Span and Headway

Route	Service Type	Span	Cycle Time (minutes)	Buses	Headway (minutes)		
					AM 5AM-9AM	Midday 9AM-3PM	PM 3PM-6PM
1	Local	6:00a – 5:55p	40	1	40	40	40
2	Local	6:00a – 5:55p	40	1	40	40	40
3	Local	6:00a – 5:55p	80	2	40	40	40
4	Local	6:00a – 5:55p	40	1	40	40	40
BJE	Express	6:00a – 6:13p	120-130	2	60	60-65	60

Figure 26 Saturday Service Span and Headway

Route	Service Type	Span	Cycle Time (minutes)	Buses	Headway (minutes)
1	Local	9:00a – 4:15p	40	1	80
2	Local	9:40a – 3:35p	40		80
3	Local	9:00a – 4:20p	80	1	80
4	Local	9:00a – 4:15p	40	1	40

TRANSIT CENTERS

In 2005, the Beloit Transfer Center was re-located from the Beloit Mall to the corner of Broad St and Pleasant St. A permanent transfer facility was built in 2010 south of downtown Beloit near the corner of Shirland Ave and Mill St, adjacent to the Beloit City Hall.

In addition to serving as the hub for local and express bus service, the Beloit Transfer Center includes public restrooms, indoor waiting area, driver break room, and a customer service room. Due to its location on the south end of town, BTS bus routes must travel up to an additional 5 minutes than if the center were more centrally located.

FARE STRUCTURE

The base fare for local bus service is $1.50 per one-way trip. Seniors (65+) and Disabled Passengers may ride for a reduced cash fare of $0.75 on local bus service. Up to two children age four and under may ride for free with a fare-paying adult.

BTS also sells 10 ride punch passes as well as tokens in packs and groups. The cost per ride is proportionally reduced as the packs get larger. For instance, the cost of a 10 token pack makes each trip $1.20, while a 50 token pack averages out to $1.10. Additionally, a student semester pass is available for $85.00 that allows free rides on all school days.

Fares for BJE bus service vary by distance traveled. A full BJE cash fare is $3.50, while a rider only traveling as far as Blackhawk Tech is required to pay $2.25. A full fare breakdown is shown below in Figure 27.

Figure 27 Fare Structure

Fares		
City Routes	Full Fare	Senior/Disabled
Cash Fare	$1.50	$0.75
BTS Ten Ride Punch Pass (In Town)	$12.00	-
Student Semester Pass (In Town)	$85.00	-
Pack of 10 Tokens	$12.00	-
Pack of 20 Tokens	$23.00	-
Pack of 50 Tokens	$55.00	-
Vending Machine: 4 Tokens	$5.00	-
Vending Machine: 8 Tokens	$10.00	-
Vending Machine: 17 Tokens	$20.00	-
BJE	Full Fare	Senior/Disabled
BJE Cash Fare	$3.50	$1.75
Blackhawk Tech (Cash Fare)	$2.25	$1.10
10 Ride Pass – Beloit to Janesville	$30.00	$17.50
10 Ride Pass – Beloit to Blackhawk Tech	$20.00	-

HISTORICAL TRENDS

Annual trends for systemwide boardings, revenue hours, revenue miles, operating costs, and farebox revenue between 2009 and 2013 are shown in Figure 28. For 2014, operating data is for the first two quarters of 2014. Data shown here represents all BTS fixed-route service, including the BJE route and school trippers.

Ridership declined significantly from 2009 to 2011 (see Figure 29). This was due in part to the change from 30-minute to 40-minute headways on local routes, which occurred in August 2010. Revenue hours remained roughly the same, because buses are on the street for the same period of time, but revenue miles declined significantly due to fewer trips during the day caused by longer headways. Losses in ridership led to declines in productivity measured in passengers per revenue hour (see Figure 30) and passengers per revenue mile from 2009 to 2011, but these measures have increased slightly in recent years due to increasing ridership from 2011 to 2013. Operating costs and farebox revenues are slightly higher than they were in 2009.

Based on historical data collected by BTS and submitted to the National Transit Database (NTD), it is unclear why farebox revenue per passenger increased significantly during 2010, resulting in a temporary improvement in cost efficiency. The consultant team ultimately decided to overlook this single anomaly and focus on the overall five-year operating trends.

Figure 28 Operating Trends

	2009	2010	2011	2012	2013	2009-2013
Operating Data						
Ridership	312,832	269,075	241,208	246,323	251,880	-19.5%
Revenue Hours	20,885	20,680	20,502	20,628	20,526	-1.7%
Revenue Miles	326,023	324,427	294,754	298,943	287,809	-11.7%
Operating Costs	1,742,661	1,813,063	1,869,932	1,849,380	1,872,263	7.4%
Farebox Revenue	$198,110	$260,801	$184,808	$204,981	$204,153	3.1%
Performance Indicators						
Cost Efficiency						
Operating Cost per Revenue Hour	$83.44	$87.67	$91.21	$89.65	$91.21	9.3%
Operating Cost per Revenue Mile	$5.35	$5.59	$6.34	$6.19	$6.51	21.7%
Cost Effectiveness						
Operating Cost per Passenger	$5.57	$6.74	$7.75	$7.51	$7.43	33.4%
Farebox Recovery Ratio	11%	14%	10%	11%	11%	-4.1%
Average Revenue per Passenger	$0.63	$0.97	$0.77	$0.83	$0.81	28.0%
Average Subsidy per Passenger	$4.94	$5.77	$6.99	$6.68	$6.62	34.1%
Service Productivity						
Passengers per Revenue Hour	15.0	13.0	11.8	11.9	12.3	-18.1%
Passengers per Revenue Mile	0.96	0.83	0.82	0.82	0.88	-8.8%

Figure 29 Annual Ridership, 2009 - 2013

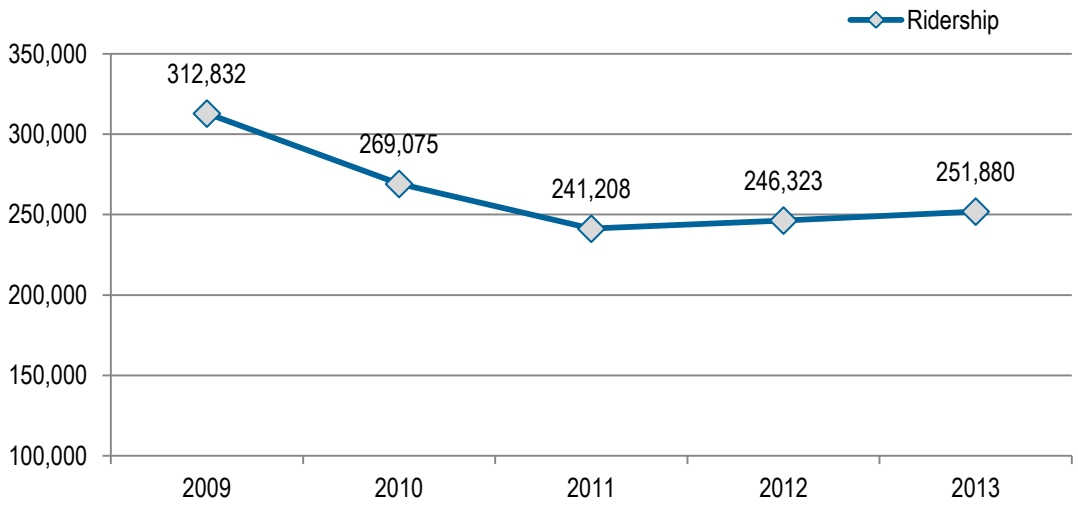
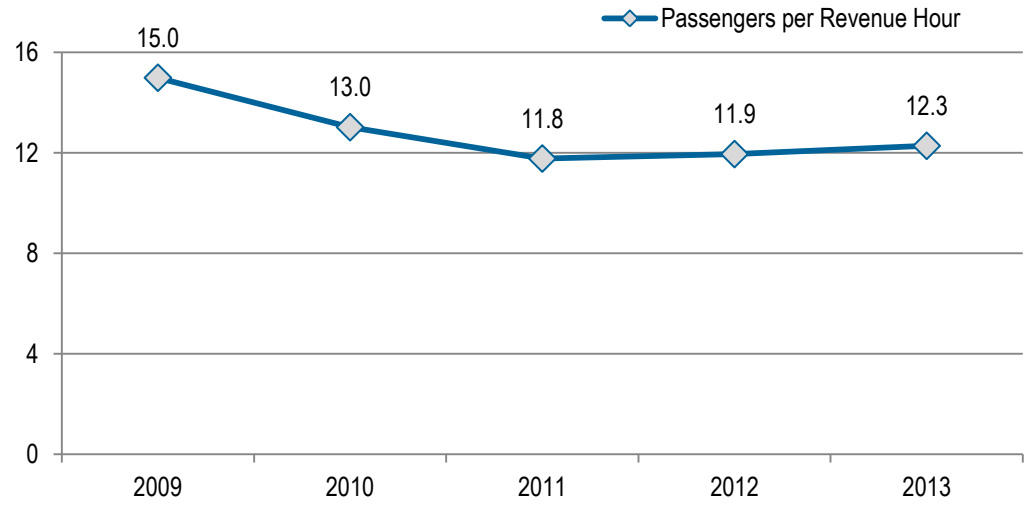


Figure 30 Passengers per Revenue Hour, 2009 - 2013



System Performance

The following charts and tables present systemwide findings based on data collected during the ridecheck effort, conducted in November 2014.

Figure 31 and Figure 32 illustrate key data for BTS routes, including total weekday boardings and boardings per service hour. The systemwide average boardings per weekday was 183.2. The systemwide average for boardings per hour was 10.3.

Figure 31 Total Weekday Boardings by Route

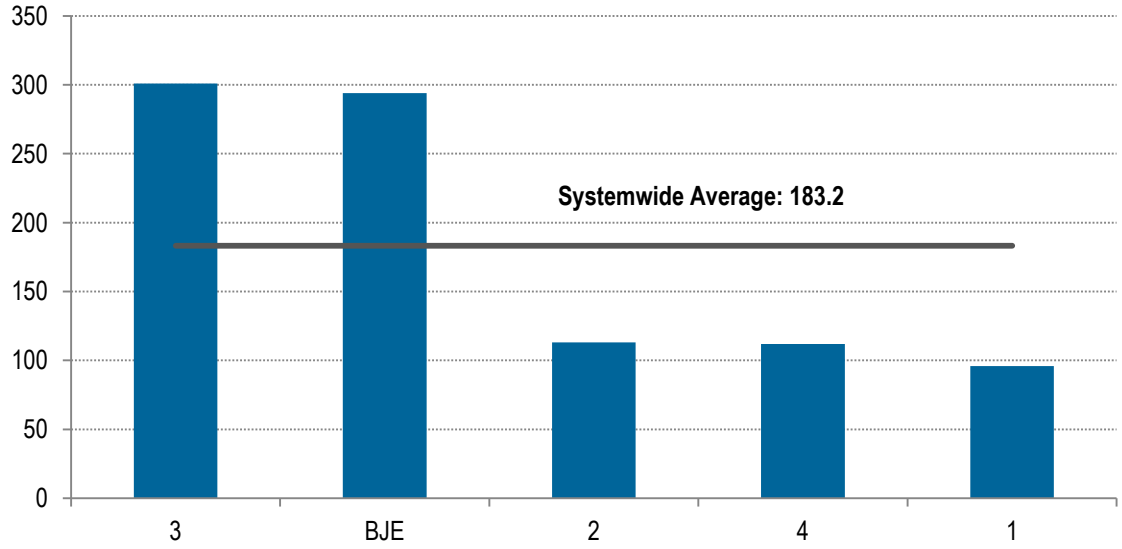


Figure 32 Total Boardings per Service Hour by Route

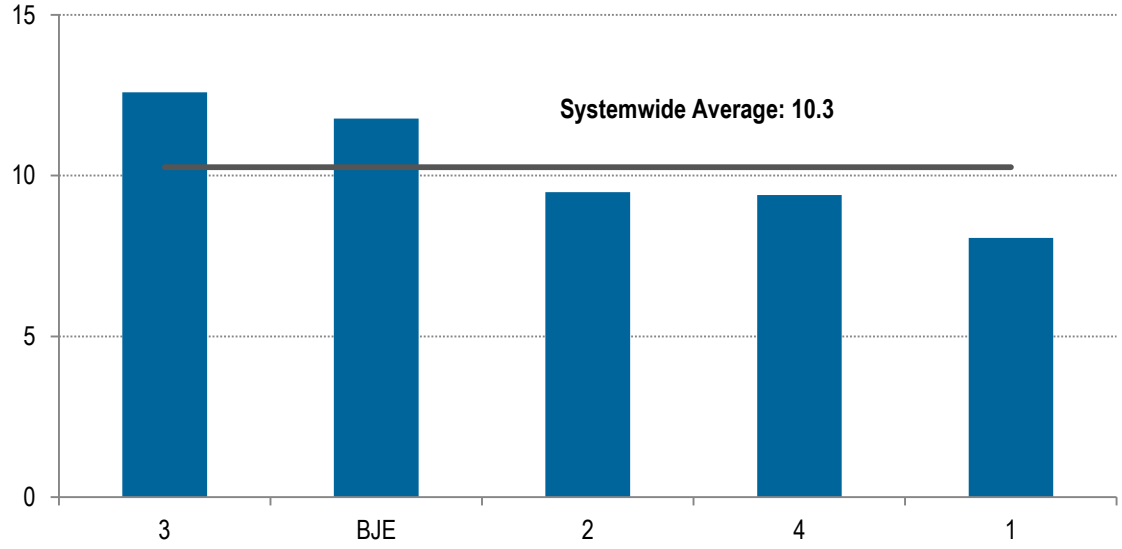


Figure 33 shows on-time performance by route. All route segments departing within 5 minutes of the schedule departure time were considered “on-time”. Segments departing more than 5 minutes after the scheduled departure time were considered “late”, and segments departing 1 or more minute before the scheduled departure time were considered “early”. It is worth noting that many routes regularly arrive early to scheduled timepoints and are forced to dwell, indicating that schedules need to be tightened on some segments. Conversely, few timepoints along trips were considered “late”.

Figure 33 On-Time Performance by Route

Route	On-time	Early	Late
1	72.0%	27.1%	0.9%
2	81.0%	19.0%	0.0%
3	70.7%	29.3%	0.0%
4	69.2%	30.8%	0.0%
BJE	81.5%	15.2%	3.3%

Figure 34 shows all weekday boardings on BTS routes. Boarding activity is concentrated in and around downtown Beloit, with little demand on the edges of town outside of a few strong trip generators, such as the Beloit Clinic and Walmart. The Transfer Center is the most significant stop by a wide margin.

Figure 35 shows all Saturday boardings. Overall ridership is much lower than on weekdays, and the only stops with more than 5 daily boardings are the Transfer Center and Walmart.

Figure 34 Systemwide Boardings - Weekday

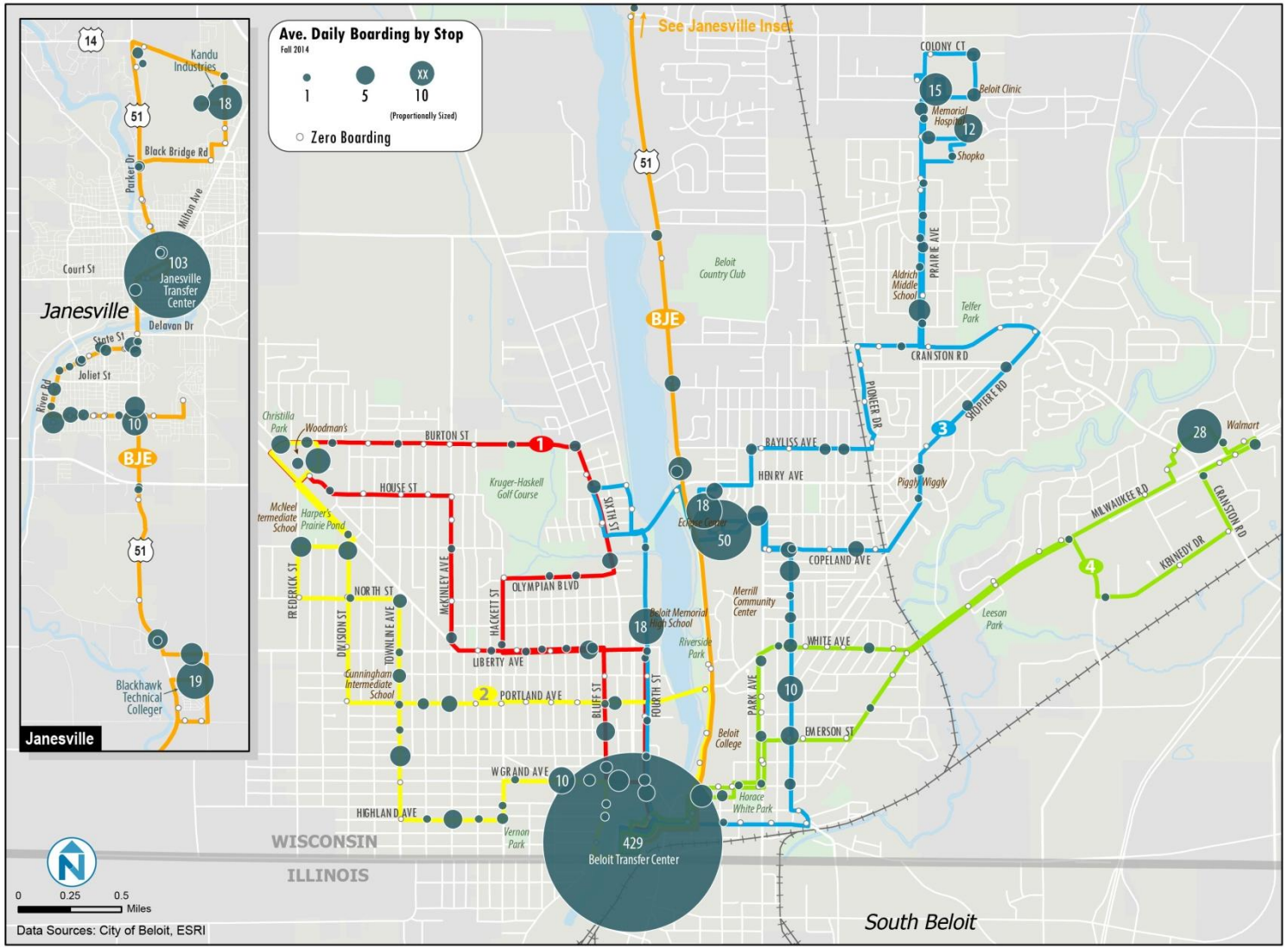
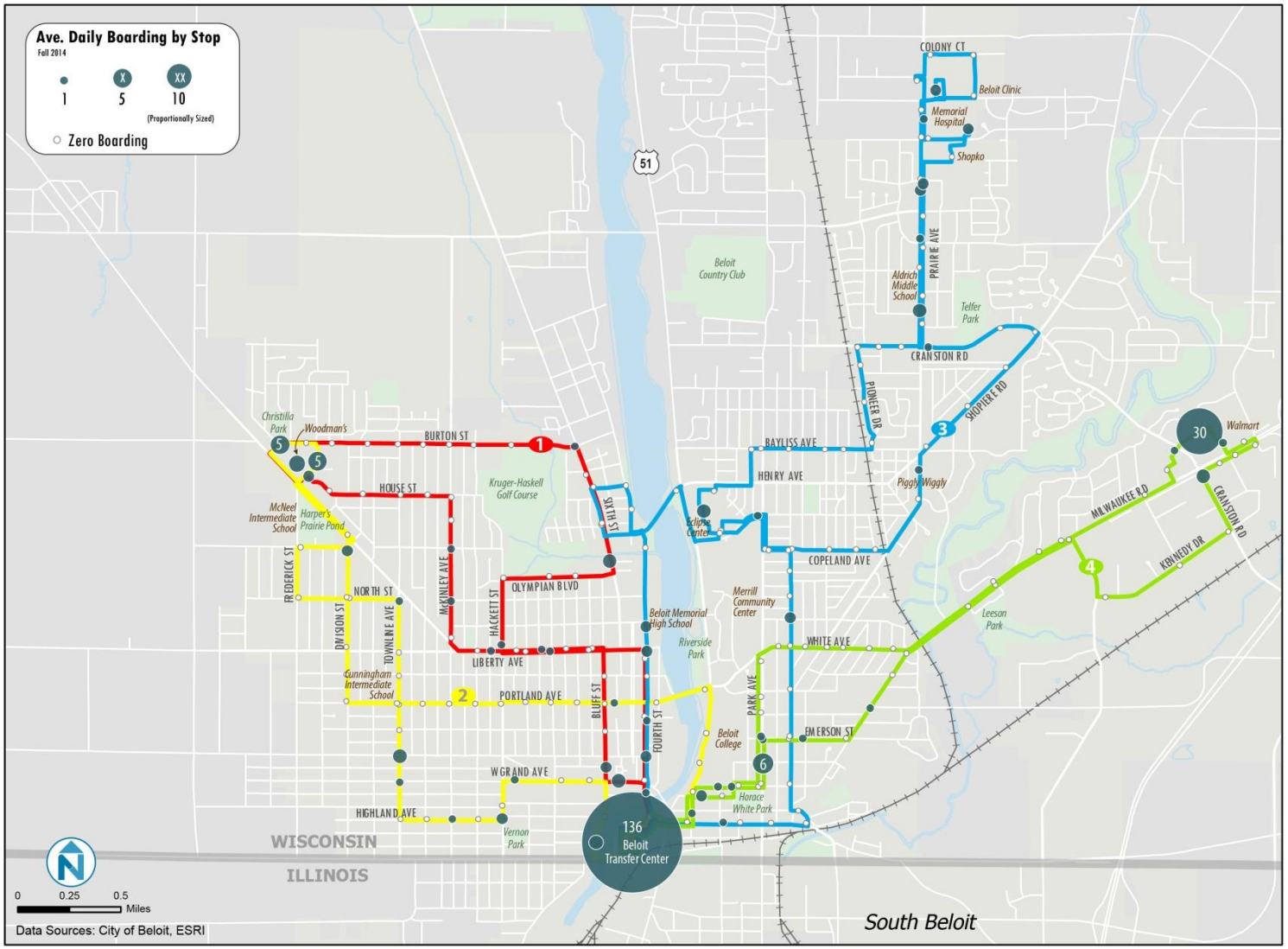


Figure 35 Systemwide Boardings - Saturday



6 ROUTE SUMMARIES

This section contains a summary of each route based on performance data and field observations. Ridership and on-time performance data was collected during November 2014. Ridership is measured in terms of average daily boardings, which refers to the number of times a passenger enters a vehicles. Route productivity is measured by dividing average daily boardings by the number of scheduled daily revenue hours, or the time in which all vehicles assigned to a route are in service for a particular level of service (i.e. weekday or Saturday).

Schedule reliability, also referred to as on-time performance, is a measure of how well a particular route adheres to its schedule. It suggests whether a customer can count on a bus being there when the schedule says it will be. For Beloit Transit System and most transit systems across the county, buses are considered on-time if they depart a designated timepoint between zero and 5 minutes later than the scheduled departure time. A significant percentage of early departures were observed on Routes 1, 3, and 4, indicating a need to adjust existing schedules to reflect actual travel times or incorporate recovery time into the endpoint(s) of each route to accommodate operator breaks and allow an opportunity to get back on schedule.

ROUTE 1

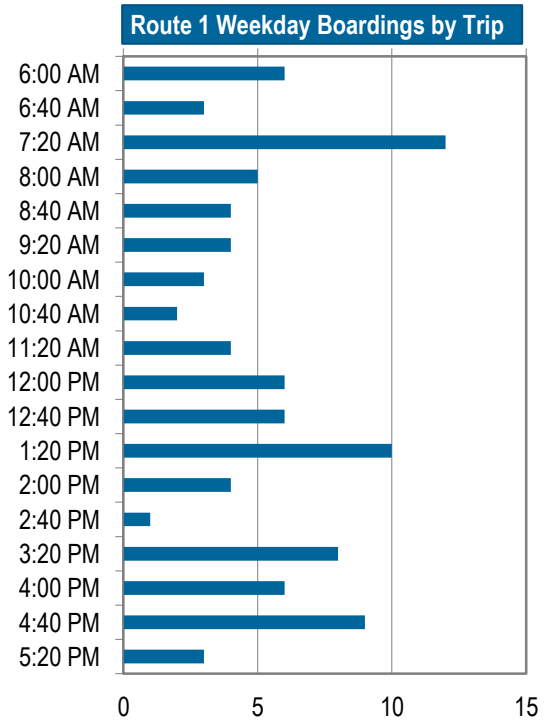
Description

Route 1 serves the west side of Beloit along a one-way loop alignment using one bus operating every 40 minutes on weekdays and every 80 minutes on Saturdays. The span of service is 6:00 a.m. to 5:55 p.m. on weekdays and 9:00 a.m. to 4:15 p.m. on Saturdays

From the Transfer Center, the route travels north on Fourth, west on Grand, north on Bluff, west on Liberty, north on McKinley, west on House, and north on Cleora to Woodman's. The route travels north on Madison for a short distance, and then west on Burton before turning south on Sixth. It then travels west on Olympian, south on Hackett, east on Liberty, and south on fourth to the Transfer Center.

Very few segments of the route are served bidirectionally, with the exception of portions of Liberty Ave. This means that most riders must travel out of direction to get to their destination.

Route Characteristics	
Stops	49
Route Length (miles)	8.43
Stop Spacing (miles)	0.17
Weekday	
Ridership	96
Productivity (boardings per hour)	9.1
On-Time Performance	72%
Saturday	
Ridership	45
Productivity (boardings per hour)	12.9
On-Time Performance	78%



Performance

Route 1 has 96 weekday boardings and 9.1 boardings per service hour, which is the lowest performance among all BTS routes. On Saturdays, the route has 45 daily boardings and 12.9 boardings per service hour.

The stops with at least seven weekday boardings and alightings include the Transfer Center, Woodman's, Woodside Terrace Apartments (Madison & Burton), Olympian & Oak, Parkview Apartments (Grand & Bluff), and Liberty & Vine. The segments along Bluff St and Liberty Ave have significantly more ridership than segments along the loop at the northern end of the route, excluding the stops mentioned above. The trip with the highest boarding activity is 7:20 a.m., with 12 weekday boardings.

On weekdays, 72% of trips arrived on-time, 27% arrived early, and 1% arrived late. On Saturdays, 78% of trips arrived on-time, 19% arrived late, and 3% arrived late.

ROUTE 2

Description

Route 2 serves the west side of Beloit along a one-way loop alignment using one bus operating every 40 minutes on weekdays and every 80 minutes on Saturdays. The span of service is 6:00 a.m. to 5:55 p.m. on weekdays and 9:00 a.m. to 3:35 p.m. on Saturdays.

From the Transfer Center, the route travels to McNeel Intermediate School via Shirland, Bluff, Grand, Hackett, Highland, Townline, North, and Frederick. It then proceeds to Woodman's via Whipple, Madison, and Burton. From there it travels back downtown via Madison, Division, Portland, and Pleasant.

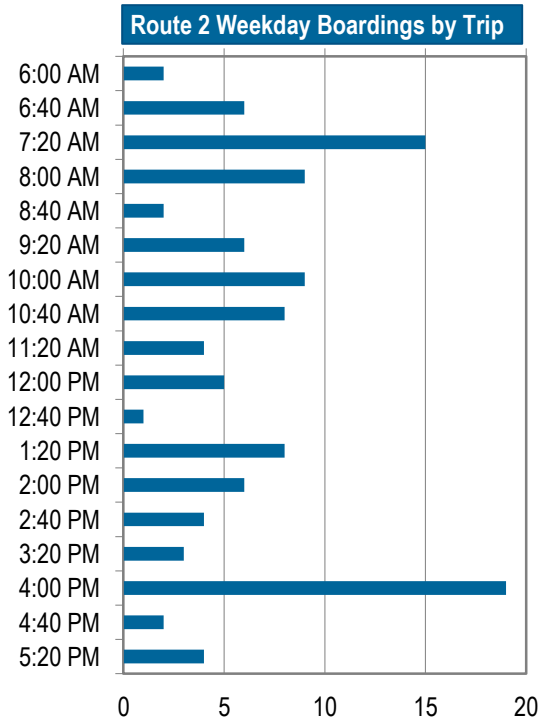
The route's one-way loop design provides coverage to most areas of west Beloit south of Portland and west of Madison, but some riders must travel out of direction to get to their destination.

Route Characteristics	
Stops	45
Route Length (miles)	9.06
Stop Spacing (miles)	0.20
Weekday	
Ridership	113
Productivity (boardings per hour)	10.8
On-Time Performance	81%
Saturday	
Ridership	29
Productivity (boardings per hour)	9.9
On-Time Performance	97%

Performance

Route 2 has 113 weekday boardings and 10.8 boardings per service hour, which third among all BTS routes in terms of performance. On Saturdays, the route has 29 daily boardings and 9.9 boardings per service hour.

Stops with the highest ridership include the Transfer Center, W. Grand & Eighth, Highland & McKinley, McNeel Intermediate School, and Woodman's. Several segments have low ridership, including Division St and portions of Portland Ave. The route has one segment in the inbound direction on the east side of the Rock River serving Pleasant Street, but it is not well utilized.



The highest ridership trips are at 7:20 a.m. and 4:00 p.m. Given the proximity to the school start and end times at McNeel, it is likely that many of the riders on these trips are students. All other trips have fewer than ten boardings per day.

On weekdays, 81% of trips arrived on-time and 19% arrived early. On Saturdays, 75% of trips arrived on-time and 25% arrived early. No late arrivals were observed.

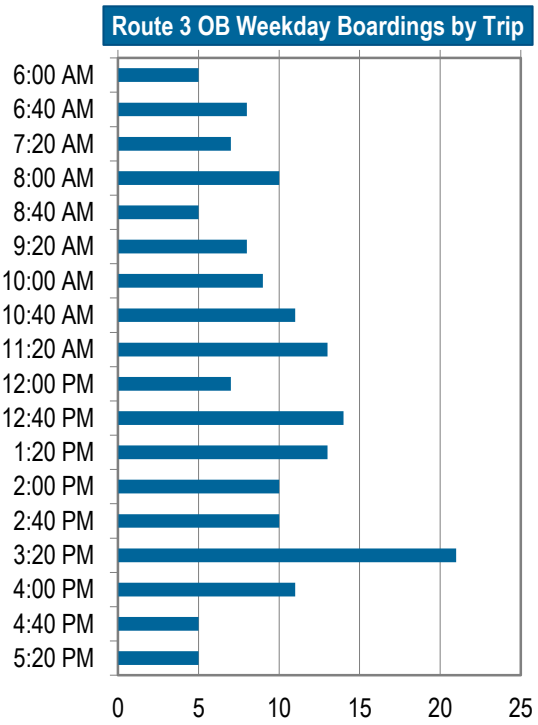
ROUTE 3

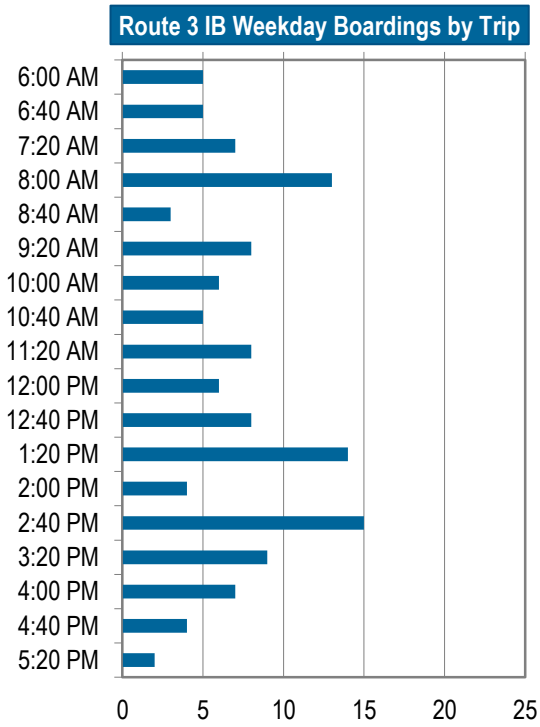
Description

Route 3 operates through central Beloit between the Transfer Center and Beloit Clinic at the north end of the city. On weekdays, the route is operated with two buses to provide 40 minute service from 6:00 a.m. to 5:55 p.m. On Saturdays, the route is operated with one bus providing service every 80 minutes from 9:00 a.m. to 4:20 p.m.

Route Characteristics	
Stops	84
Route Length (miles)	15.63
Stop Spacing (miles)	0.19
Weekday	
Ridership	301
Productivity (boardings per hour)	13.4
On-Time Performance	75%
Saturday	
Ridership	44
Productivity (boardings per hour)	6.4
On-Time Performance	73%

In the outbound direction, the route serves the west side of the Rock River along Fourth, does a loop to serve housing north of Maple, and then crosses the river to get to the Eclipse Center. From there, it operates on Henry, Church, Bayliss, Pioneer, Cranston, and Prairie before serving Shopko, Memorial Hospital and Beloit Clinic. In the inbound direction the route serves Prairie, Cranston, Shopiere, Prairie, Copeland, Eclipse Center, Wisconsin, and Broad. The only segment with bidirectional service is along Prairie Ave. The Eclipse Center is also served in both directions.





Performance

Route 3 is the highest performing route in the system with 301 weekday boardings and 13.4 boardings per hour. On Saturdays, ridership is significantly lower with many fewer trips, at 44 daily boardings and 6.4 boardings per hour.

Ridership is relatively even along the entire route with the exception of major trip generators. The highest ridership stops include the Transfer Center, Beloit Memorial High School, Eclipse Center, Memorial Hospital, Beloit Clinic, Aldrich School, and Wisconsin & Woodard. The loop deviation north of Maple Ave on the west side of the river generates little ridership.

On weekdays, 75% of trips arrived on-time and 25% arrived early. On Saturdays, 73% of trips arrived on-time and 27% arrived early. No late arrivals were observed.

ROUTE 4

Description

Route 4 operates with one bus on weekdays at 40 minute headway from 6:00 a.m. to 5:55 p.m. On Saturdays, the route also operates at 40 minute headway but has a shorter span from 9:00 a.m. to 4:15 p.m. It is the only BTS route that operates at the same headway on Saturday as it does on weekdays.

In the outbound direction, the route operates east from the Transfer Center along Shirland, State, Broad, Pleasant, Bushnell, Park, Emerson, and Milwaukee. The route serves a terminal loop along Willowbrook, Kennedy, and Cranston before completing a U-turn on Milwaukee and serving Walmart. The route then serves the Morgan Square shopping center before proceeding inbound along Milwaukee, White, Park, Bushnell, Public, Pleasant, and Broad.

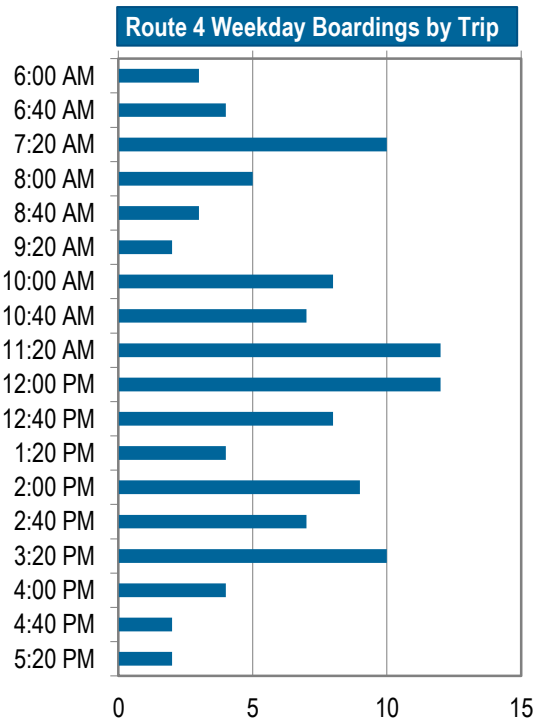
Performance

Route 4 has 112 weekday boardings and 10.7 boardings per service hour, which is the second worst among all BTS routes. Productivity is higher on Saturdays, with 83 daily boardings and 12.9 boardings per hour.

Ridership activity on the route mostly occurs at the Transfer Center at Walmart. The only other stops with more than five boardings and alightings a day on weekdays are Scoville Hall and several stops near Walmart. There is little ridership along other route segments, particularly along Emerson and Milwaukee.

On weekdays, 69% of trips arrived on-time and 31% arrived early. On Saturdays, 87% of trips arrived on-time and 13% arrived early. No late arrivals were observed.

Route Characteristics	
Stops	50
Route Length (miles)	9.46
Stop Spacing (miles)	0.19
Weekday	
Ridership	112
Productivity (boardings per hour)	10.7
On-Time Performance	69%
Saturday	
Ridership	83
Productivity (boardings per hour)	12.9
On-Time Performance	87%



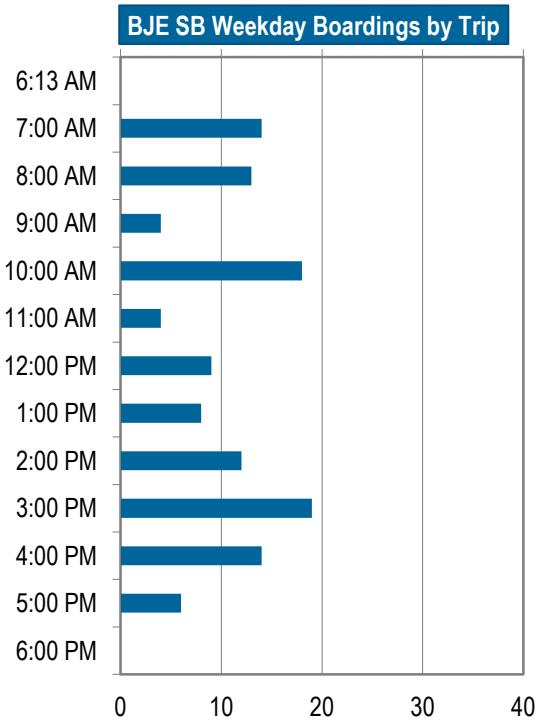
BELOIT – JANESVILLE EXPRESS

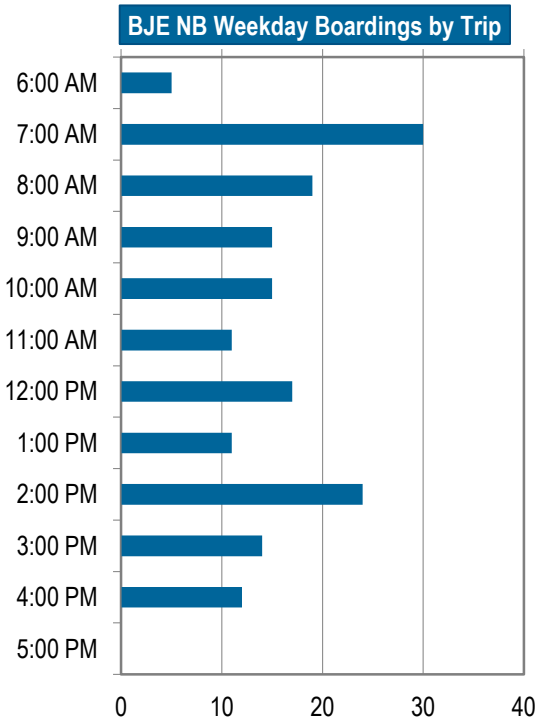
Description

The Beloit-Janesville Express is a route jointly operated by Beloit Transit System and Janesville Transit System to provide service between the two cities. Each system operates one bus on the route to provide combined sixty minute service from 6:00 a.m. to 6:13 p.m. on weekdays. Saturday service is not provided.

Route Characteristics	
Stops	95
Route Length (miles)	48.14
Stop Spacing (miles)	0.51
Weekday	
Ridership	294
Productivity (boardings per hour)	12.8
On-Time Performance	82%

Within Beloit, the route operates on Pleasant St/Riverside Dr (Hwy 51). Between Beloit and downtown Janesville, the route serves several major destinations, including Blackhawk Tech, Industries, and the Rock County Job Center. In north Janesville, major destinations include KANDU Industries and the Rock County Complex. Rock Valley Community Programs, KANDU





Performance

The BJE route has 294 weekday boardings and 12.8 boardings per revenue hour, which is comparable to BTS Route 3. The two most significant stops on the route are Beloit Transfer Center and Janesville Transfer Center, indicating that many riders are destined for the city downtowns or transferring to other routes. Other stops with significant ridership activity include

Blackhawk Tech, the Rock County Job Center, Rock Valley Community Program, University of Wisconsin – Rock County, and KANDU Industries.

The route was observed operating on-time 82% of the time, early for 12%, and late for 3%. Operators have indicated that it is difficult for certain trips to operate on time, particularly 8:00 a.m. and 2:00 p.m.

7 SCHOOL TRIPPER ANALYSIS

OVERVIEW

BTS operates a series of tripper routes providing service to schools in Beloit. Each route operates with one trip per time period, with the exception of Route 3X, which operates in the AM only. This section describes the performance of the four tripper routes, and boardings and alighting for each route are shown in Figures 36 and 37.

- Route 1X (McNeel Intermediate School) – AM and PM
- Route 2X (Cunningham Intermediate School) – AM and PM
- Route 3X (Beloit Memorial High School) – AM only
- Aldrich Route (Aldrich Middle School) – AM and PM

ROUTES

Route 1X

Route 1X provides service to and from McNeel Intermediate School. In the morning, the route operates from the Transfer Center to McNeel, primarily on Bluff, Liberty, and Madison. In the afternoon, the route follows a much different route, starting at McNeel, serving neighborhoods in west Beloit and the library, and then traveling across town to serve Spring Brook Village mobile home park on Colley Road.

Overall ridership is low to moderate, with 6 average daily boardings in the morning and 9 average daily boardings in the afternoon. In the morning, riders board at the Transfer Center and at several other stops, and all riders alight at McNeel. In the afternoon, the route is serving two ridership patterns. About 5 to 6 riders board at McNeel, and all riders generally alight at several different stops in west Beloit so that the load is zero before serving the library stop. At the library, an average of three riders a day board the bus and ride to Spring Brook Village mobile home park.

Route 2X

Route 2X provides service to and from Cunningham Intermediate School. In the morning, the route operates from the Transfer Center to Cunningham Primarily via Bluff, Grand, Hackett, Highland, and Townline. In the afternoon, the route travels from Cunningham to the Transfer Center via Portland and Pleasant.

Ridership on the route is low, with just four average daily boardings in the morning and one boarding in the afternoon. In the morning, almost all riders board at the Transfer Center and alight at Cunningham, and in the afternoon, almost all riders board at Cunningham and alight at the Transfer Center.

Route 3X

Route 3X provides service to Beloit Memorial High School in the morning only with an alignment that is significantly different than the regular Route 3. Route 3X starts at Freeman Parkway Apartments, serves Spring Brook Village mobile home park, and then stops along Wisconsin, Grand, and Fourth before ending at Beloit Memorial High School.

The route generates moderate ridership with an average of 11 boardings per trip. The stops responsible for most of the ridership are Spring Brook Village Mobile Home Park and Wisconsin & Copeland.

Aldrich Tripper

The Aldrich Tripper provides service between the Transfer Center and Aldrich Middle School and serves many of the same streets that Route 3 inbound does. From the Transfer Center, the route operates primarily on Grand, Wisconsin, Henry, Shopiere, Cranston, and Prairie to Aldrich Middle School. The routing is almost identical in the afternoon, but it operates in the reverse direction.

The route has moderate performance, with 11 average daily boardings in the morning and 13 boardings in the afternoon. In the morning, ridership comes from the Transfer Center, Wisconsin & Keeler, and Wisconsin & Harvey stops. In the afternoon, riders board at Aldrich and alight at Wisconsin & Copeland/Harvey/Alice/Keeler, as well as the Transfer Center.

Figure 36 Total Daily Boardings – School Trippers (AM)

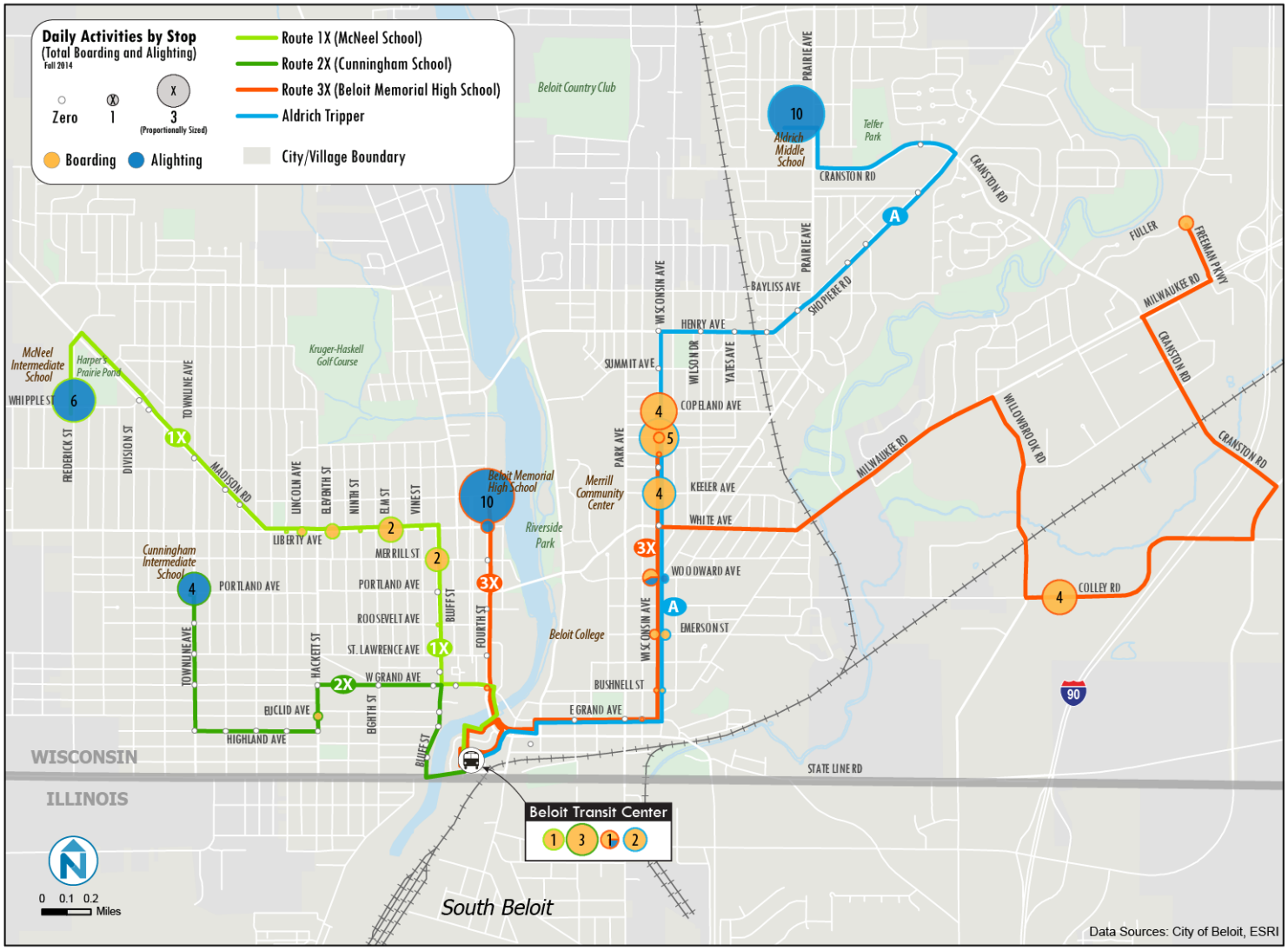
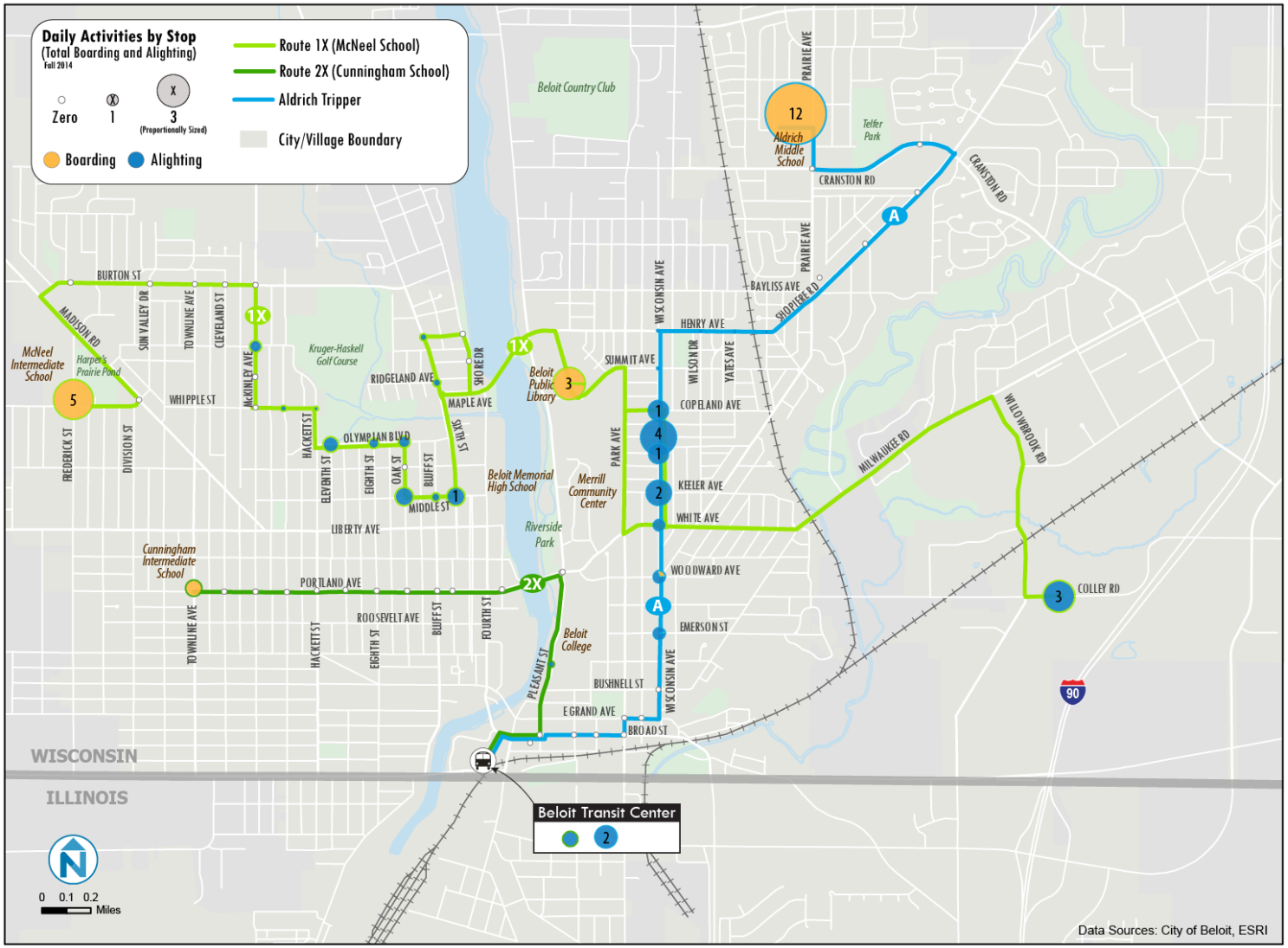


Figure 37 Total Daily Activities – School Trippers (PM)



8 OPERATOR FEEDBACK

To help the consulting team better understand the BTS system and the operating environment in Beloit, BTS operators were interviewed to gain their insights. The following is a summary of the comments that are most relevant to this planning effort.

General Comments

- **Service Characteristics**
  - Some riders want a direct connection to Walmart to make shopping more convenient.
  - More service to areas near Park Ave & Henry Ave may be warranted.
  - Customers have requested more Saturday service.
- **Fares**
  - Riders need more pass options, and a day pass should be considered
  - There should be a change machine in the Transfer Center, similar to what they have in Janesville.
- **Passenger Amenities**
  - Consider adding a shelter on Fourth at Family Dollar
  - Consider adding a shelter near Charter Communications on Cranston Road
- **Rider Characteristics**
  - There is a significant Spanish-speaking population riding the bus.
- **Trip Characteristics**
  - The system has significant transfer activity between routes.

Route-Specific Comments

- **Route 1**
  - The route has adequate time in the schedule.
  - Consider serving Shore Dr with Route 1 instead of Route 2.
- **Route 2**
  - Evaluate the routing on Route 2 and consider operating on Shirland and Madison
  - The Woodman's stop is in a bad location and should be reevaluated
  - Stops on Bluff St. can be difficult to serve when there is snow.
- **Route 3**
  - It is difficult to stay on schedule on Route 3, particularly when the bus serves Caritas.
  - Consider not going into the Piggly Wiggly parking lot.

  - It can be difficult to get through the Maple & 4th and Wisconsin & White intersections.
  - Consider serving more of Henry Avenue.
  - The one-way loop design is inconvenient for some passengers because they have to ride out of direction.
  - Passengers don't like walking across the parking lot to the Hospital from the bus stop because it is a long distance.
  - Ambulances sometimes block the bus at the cancer center
  - Consider adding shelter on Cranston Road near Cable office
  - Consider adding shelter on Henry
  - It is a long way to walk to the front door of the hospital from the bus stop
- **Route 4**
  - It is difficult to stay on schedule on this route.
  - Walmart is a major destination on the route, and people also ride to Central Christian Church, Hormel, Frito Lay, the BTS facility, and Kettle Foods.
- **BJE Route**
  - Certain trips on the BJE route can be difficult to maintain on-time, particularly the 8:00 a.m. and 2:00 p.m. trips.
  - Customers request Saturday service on the BJE.
  - The BJE Route is often held up in Janesville because it needs to wait for transferring riders from JTS buses that are running late.
  - BJE fares are confusing for some people because they are different than normal fares. More information should be provided to riders about fares.

9 COMMUNITY INPUT

Obtaining an understanding of community perceptions, needs, and priorities related to public transit in Beloit was an important step of the TDP process. This chapter summarizes results from an on-board surveys and findings from stakeholder discussions. Collectively, these inputs along with ridership, operational and market research data were used to develop service alternatives.

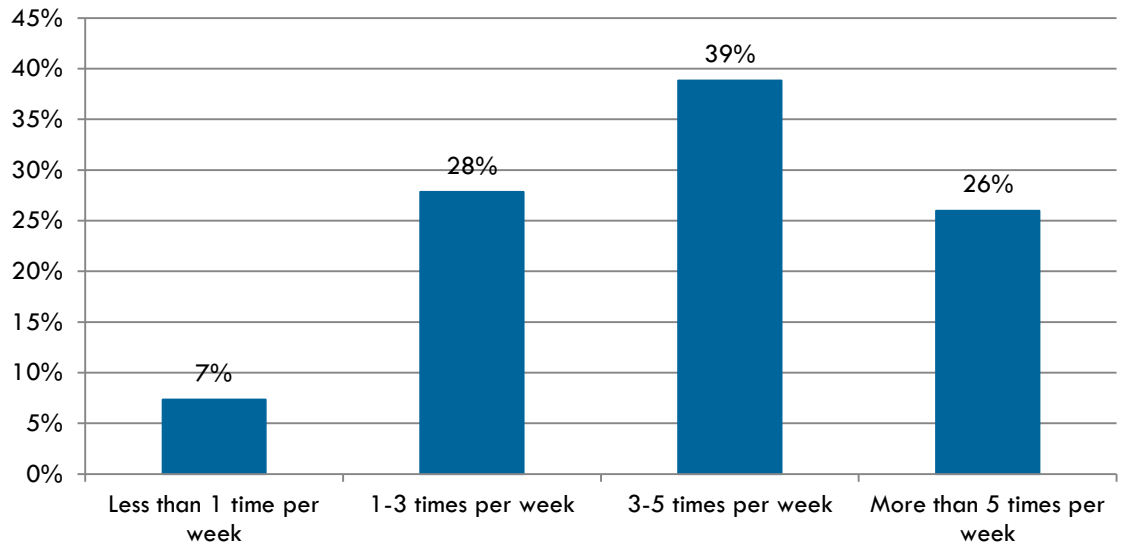
ON-BOARD SURVEY

An on-board survey of BTS riders was conducted in the spring of 2014 by BTS staff to better understand user patterns and perceptions of the system. A total of 327 respondents answered the 13 question survey.

Findings

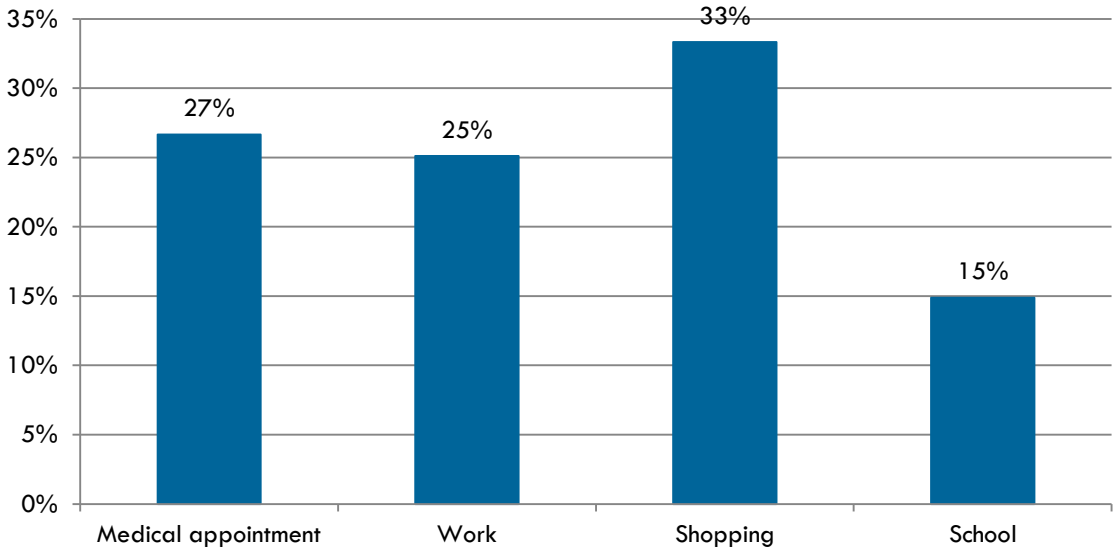
Most of the respondents indicated they are frequent riders with 39% riding 3-5 times per week and 26% riding more than 5 times per week.

Figure 38 Frequency of Use



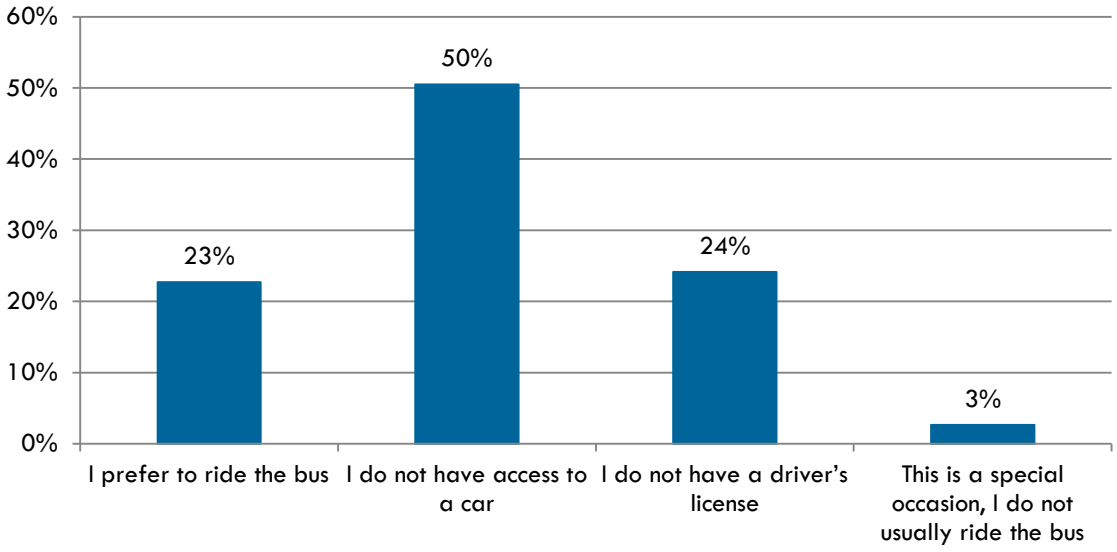
The purpose of rider's trips are diverse, with 26.7% riding for medical appointments, 25.1% for work, 33.3% for shopping, and 14.9% for school. In most transit systems, medical-related trips typically rank behind shopping and work.

Figure 39 Trip Purpose



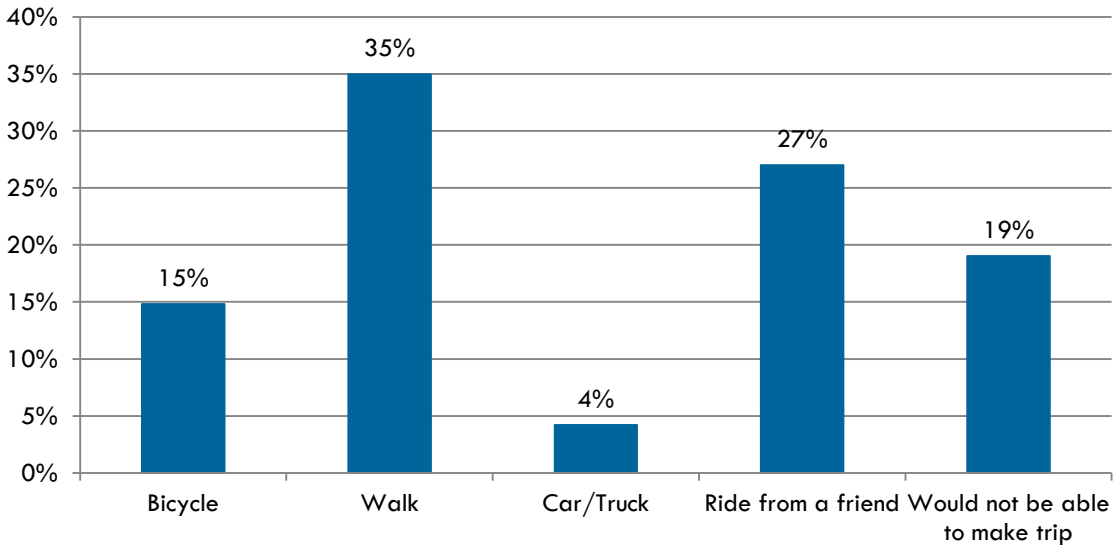
According to the survey, most riders are what would be classified as dependent riders (riders with little to no other options), as 50.5% do not have access to a car, while an additional 24.2% do not have a license to operate a vehicle.

Figure 40 Reason for Riding Bus



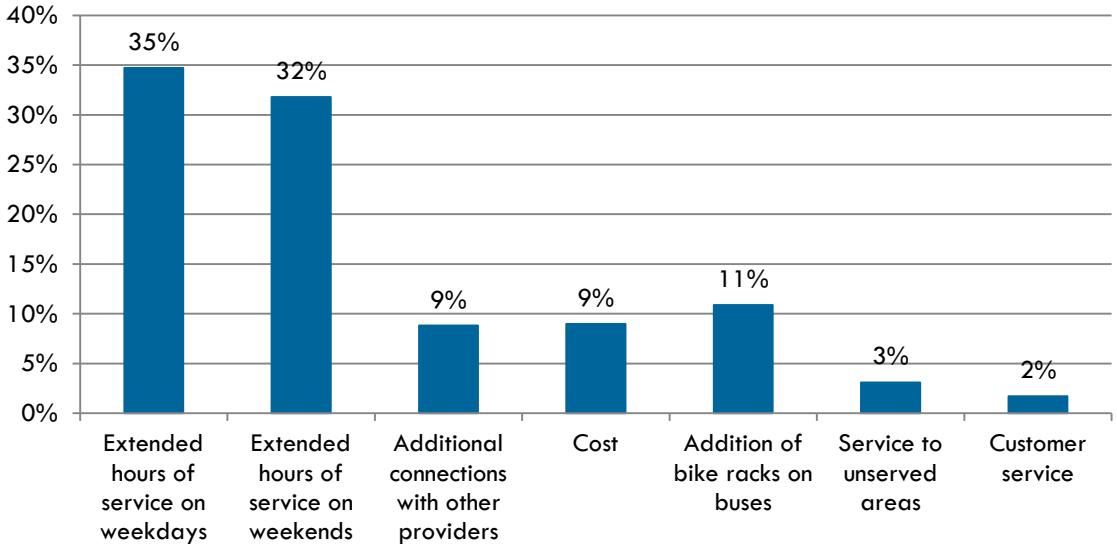
Nineteen percent of respondents indicated they would not be able to make their trip if the BTS system did not exist. With 35% of respondents, walking was the most likely travel alternative for users, although the distance of such trips is unknown.

Figure 41 How would you Make this Trip if the City Bus was Not Available?



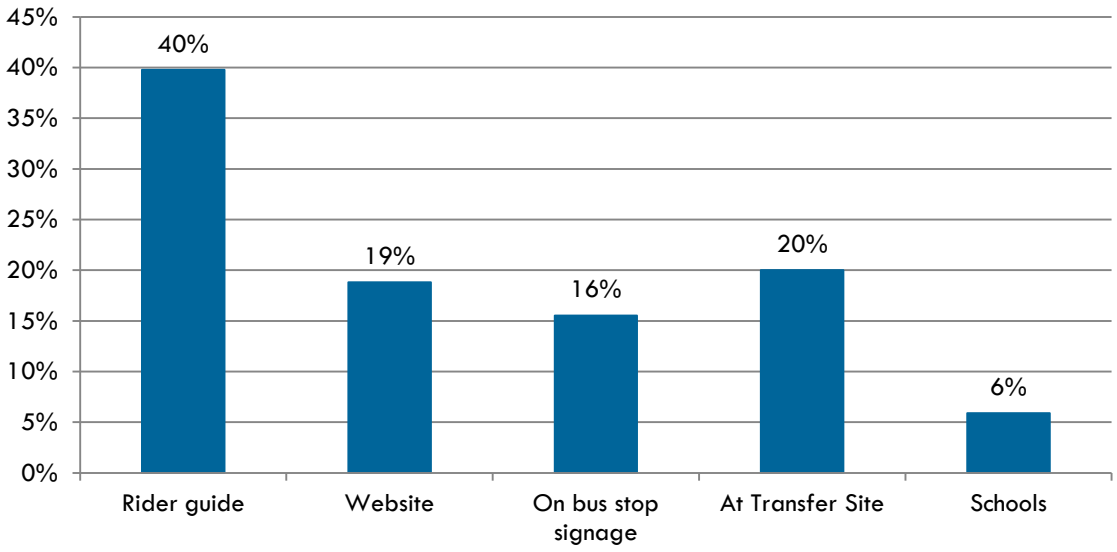
Extended hours for both weekday (34.7%) and weekend (31.8%) service are by far the most desirable service improves respondents would like to see made to the BTS. The addition of new services did not rank highly on the desires of survey respondents. Only 8.8% would like to see improved connections with other transit systems and only 3.1% want service added to new areas.

Figure 42 Potential Service Improvements



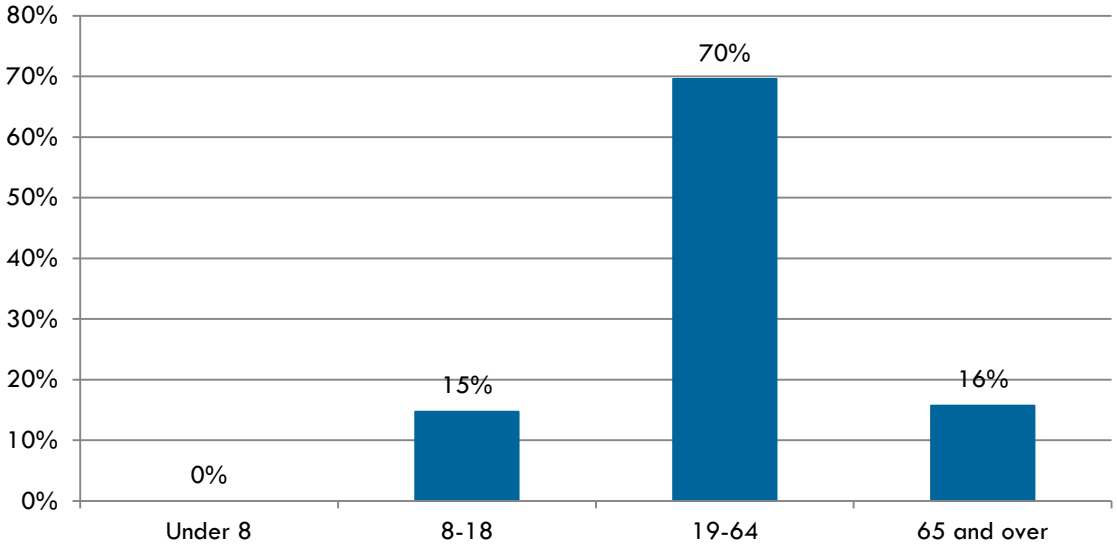
When asked how they would like to obtain information about BTS, the most popular answers were rider guide (40%), at transfer site (20%), and website (19%). This indicates that the rider guide is the most important component of rider information to focus on.

Figure 43 How would you Like to Obtain Information Related to BTS?



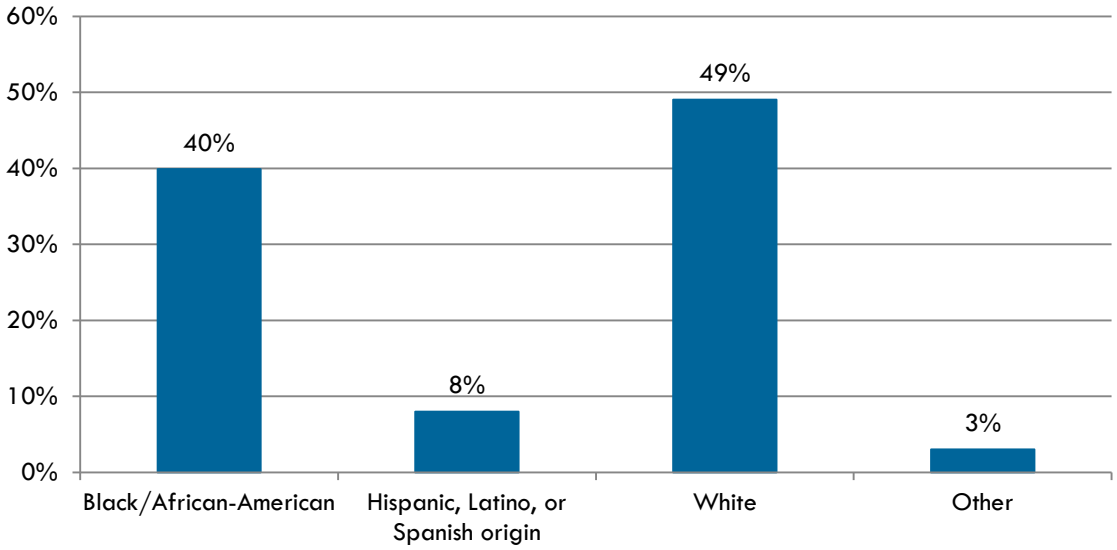
The vast majority of riders who took the survey (70%) were adults between the ages of 19 and 64. Of the rest, 16% were 65 and over and 15% were 8-18.

Figure 44 Age



Respondents were diverse, with 49.0% of respondents identifying as white, 39.9% as Black/African-American, 8.0% as Hispanic/Latino, and 3.0% other.

Figure 45 Race/Ethnicity



IDENTIFICATION OF COMMUNITY STAKEHOLDERS

To better understand community perceptions, needs, and priorities related to public transit, a list of potential stakeholders was developed by BTS staff with the assistance of community leaders familiar with local and regional organizations. Several different segments of the community were encouraged to participate in the stakeholder discussions, including organizations that serve seniors, people with disabilities, students, persons living in poverty or without a home, and several other community organizations.

The consultant team also considered the need for transit access to major employment centers by identifying employers (200 or more employees) located within the City of Beloit, as shown in Figure 46.

Figure 46 Major Employers within the City of Beloit

Employer	Product or Service	Currently Served by BTS	Number of Employees
Beloit Health System	Medical Services	Yes	1,550
School District of Beloit	Public Education Grades K-12	Yes	1,006
Kerry Americas	Dehydrated Food Products	No	690
Frito-Lay	Snack Foods	Yes	685
City of Beloit	Municipal Services	Yes	475
Beloit College	4-year Liberal Arts College	Yes	413
ABC Supply Co.	Roofing, Siding and Building Products	Yes	406
Fairbanks Morse Engines	Diesel Engines & Accessories	Yes	373
Walmart Super Store	Retail Department Store	Yes	300
Hormel Foods	Canned Meat Products	Yes	300
Staples Fulfillment Center	Office Supply Distributor	No	220
Serta Mattress Co.	Mattresses	Yes	210

The majority of major employers located within the City of Beloit are currently served by Beloit Transit System, with the exception of Kerry Americas and Staples Fulfillment Center, which are located east of Interstate 90.

Ultimately, the project team concluded to not create a stakeholder group comprised of major employers due to low historical ridership caused by warehouse work shifts not aligning to the limited operating hours provided by BTS. However, the project team determined that the service planning process should include an emphasis on improving direct access from residential areas with high transit demand to major employers situated within the Beloit Industrial Park. Currently, the majority of riders traveling to Beloit Industrial Park must connect at the Beloit Transfer Center due to the current Route 4 alignment.

STAKEHOLDER DISCUSSIONS

Two stakeholder discussions were held on November 5th, 2014 at the Eclipse Center. A total of 17 individuals representing a wide variety of organizations participated in the stakeholder meetings. Organizations represented in the stakeholder discussions are listed in Figure 47.

Figure 47 Stakeholder Participants

Name	Organization
Gary Bersell	KANDU Industries
Regina Dunkin	Merrill Community Center
Tammy DeGarmo	Project 16:49 / Robin house
Donna Goldsmith	Rock-Walworth Comprehensive Family Services Head Start
Patty Hansberry	Retired and Senior Volunteer Program of Rock County
Marline Holmes	Women's Fund of the Stateline Community Foundation
Steve Howland	Interested Citizen
Jeff Hoyt	Hands of Faith
Chuck Kincaid	Beloit City Council
Sandra Kincaid	Women's Fund of the Stateline Community Foundation
Janelle Marotz	School District of Beloit
Stacy Nemetz	School District of Beloit
Cecilia Ramirez	Latino Service Providers Coalition
Travis Schueler	Rock Valley Community Programs
Robin Stuht	School District of Beloit
Carol Wickersham	Duffy Community Partnerships
Shirley Williams	Interested Citizen

At the start of each stakeholder discussion, participants were given a brief overview of the study, its goals, and the purpose of the stakeholder meeting. Participants were asked to describe the services offered by their organization or agency, and to discuss what they viewed as the top transportation issues or challenges in Beloit. They were then asked to discuss their views on local transit services in Beloit, its strengths and weaknesses, and key transit needs.

Major Themes

A number of major themes emerged during the stakeholder discussion meetings. Rather than attribute comments to an individual or a stakeholder group in isolation, the major themes have been summarized below.

Cost of Transit

- Many BTS riders are low-income and the cost to ride may be an impediment to riding the bus more. Stakeholders have heard of riders only shopping one day a week because they can only afford to ride the bus one day a week.
- Appleton and Janesville have free or reduced transit costs for students. Stakeholders would like BTS to provide a more discounted fare for students. A discounted semester pass is available as well as ten ride punch passes, but it can be difficult to come up with the money in advance for those items. One idea is to spread the cost of a yearly pass over four terms instead of two semesters.
- BTS should consider more low income passes and fare media that make it more affordable to make frequent trips. The system should examine if there are revenue neutral ways to increase ridership.

Evening Service

- Consider evening service in Beloit, like Janesville, which has deviated fixed route service in the evenings. This service has allowed KANDU Industries to expand.
- The last BJE trip arrives in Beloit at 6:00 p.m., but there is no local service to take riders to other parts of town at that point, because there is no evening service.
- Some students at Beloit College can't get to jobs and internships because of transportation issues, particularly in the evening. A student fee to fund additional service is worth exploring.
- Transportation at night is a concern for everyone, because most jobs are outside the community. Look at shift change times for opportunities to serve workers.
- Getting to urgent care at night is an issue.
- Many kids don't do school activities at night because they have no transportation home due to the lack of evening service.
- Many teenagers can't work because they don't have transportation in the evenings due to a lack of bus service.

Service Design

- Some feel that bus stops are too far from where people live and where they want to go. Others feel that the routes do a good job of covering the city.
- The one-way loop structure can make the routes slow and time consuming due to out of direction travel.
- There are pockets residents in Beloit Township that would benefit from service.
- Consider operating service to Staples Fulfillment Center and Frito Lay.

- The infrequent service on the BJE route is an issue. Some wish it were more frequent. In addition, it can be time consuming to make a transfer because the BJE operates every 60 minutes but the other routes operate every 40, so transfers are not timed.

Passenger Information

- Many people don't know that maps and information about the system exist.
- Some people have a hard time understanding and reading maps, making it difficult to understand the system.
- Language is a barrier for some people riding the bus. BTS should consider providing materials in Spanish.
- Leverage partnerships with organizations to provide information to the community.
- It would be nice to have someone explain how the system works to kids. The school district has to explain to people how to use the bus, and it can be confusing. Students tend to learn from other students. In the past, schools have had outings in the city where they used the bus, and that showed students how to use it. There could be a summer class on how to use the bus.
- Showing stop locations on the route map would be helpful.
- Google Transit will help, but not everyone has Internet access.
- People often don't know where bus stops are because the signs are difficult to spot.
- Have some kind of connection with social media to attract young people.

Passenger Amenities

- Passenger amenities are poor at most stops, with no bench and no shelter.
- Shelters should be installed in places where there are lots of riders.
- The Transfer Center feels isolated to some people. Consider improving the landscaping to enhance it visually, and make it more like a park.

Public Outreach

- Surveying students is a good idea, to find out about their needs and family needs. There are kids who would want to do sports, but can't because they don't have transportation.
- Find places where people naturally congregate to get input.

Other

- Safety is a concern for people walking to and from the bus stop at night.
- The plan should consider that the city needs better infrastructure for ridership. Sidewalks and lighting are an issue, and there should be sidewalks along all bus routes.
- The transit system should make a map of which areas need capital improvements.
- Many places in the city don't have sidewalks, and the sidewalks that do exist are often covered with snow in the winter.
- Enhance the aesthetic value of transit, and ridership and support will increase.
- Advertising may be a way to get more funds for transit.
- Seek diversity among bus drivers.

10 SERVICE ALTERNATIVES AND PUBLIC FEEDBACK

COST-CONSTRAINED SERVICE ALTERNATIVES

Two alternatives for fixed-routes in Beloit were developed based on service and demographic analyses, stakeholder input, and customer feedback. Both alternatives were cost-constrained, meaning they would cost the same to operate as the existing system.

Alternative A, which is illustrated in Figure 48, had the following characteristics:

- *Improved crosstown access:* Modified Route 4 would improve directness of service for many customers by creating a one-seat ride to major destinations, such as Walmart, Beloit Memorial High School, and the Eclipse Center, which would increase ridership.
- *Maintains service headway:* Buses would come every 40 minutes like they do today.
- *Maintains coverage:* Maintains service to most neighborhoods that are currently served.

Alternative B, which is illustrated in Figure 49, had the following characteristics:

- *Improved crosstown access:* Modified Route 4 would make it easier to travel between the westside of Beloit and locations on the eastside, including Walmart and the Eclipse Center.
- *Improves service headway:* Buses would run every 30 minutes instead of every 40 minutes. This would make it more convenient to connect to the BJE route, which runs every hour. Improving frequency to 30 minutes has resulted in 20% increases in ridership in other systems due to decreased waiting times and better connections.
- *Reduces coverage:* In order to have 30 minute headway, buses would not serve as many streets. Certain streets that are served today and in Alternative A, such as Olympian Blvd and Colony Ct, would not be served

The public had the opportunity to review the two cost-constrained alternatives using both the traditional public meeting format and an online survey. Feedback from each outreach effort is described in this chapter.

Figure 48 Alternative A Route Alignments

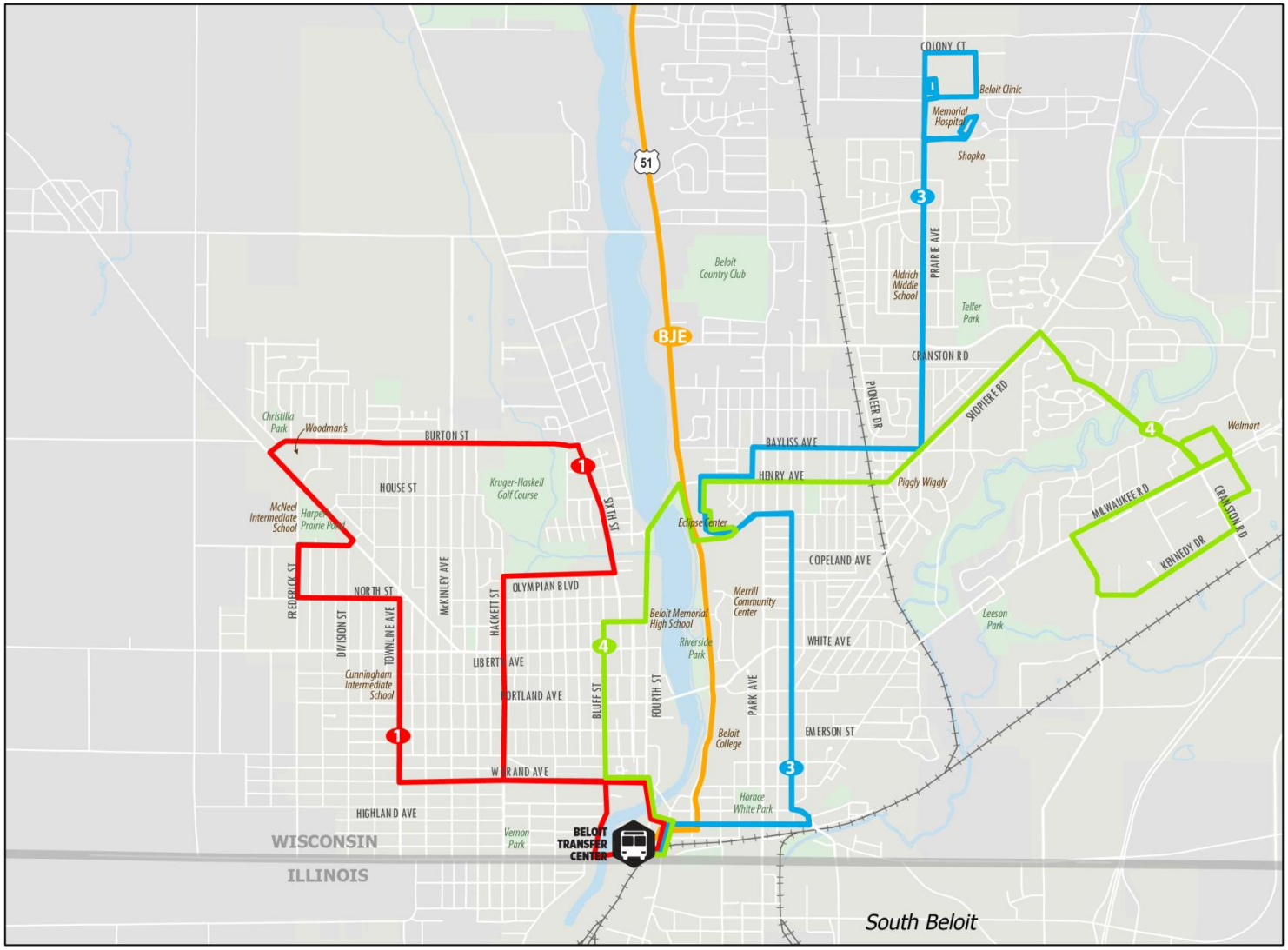
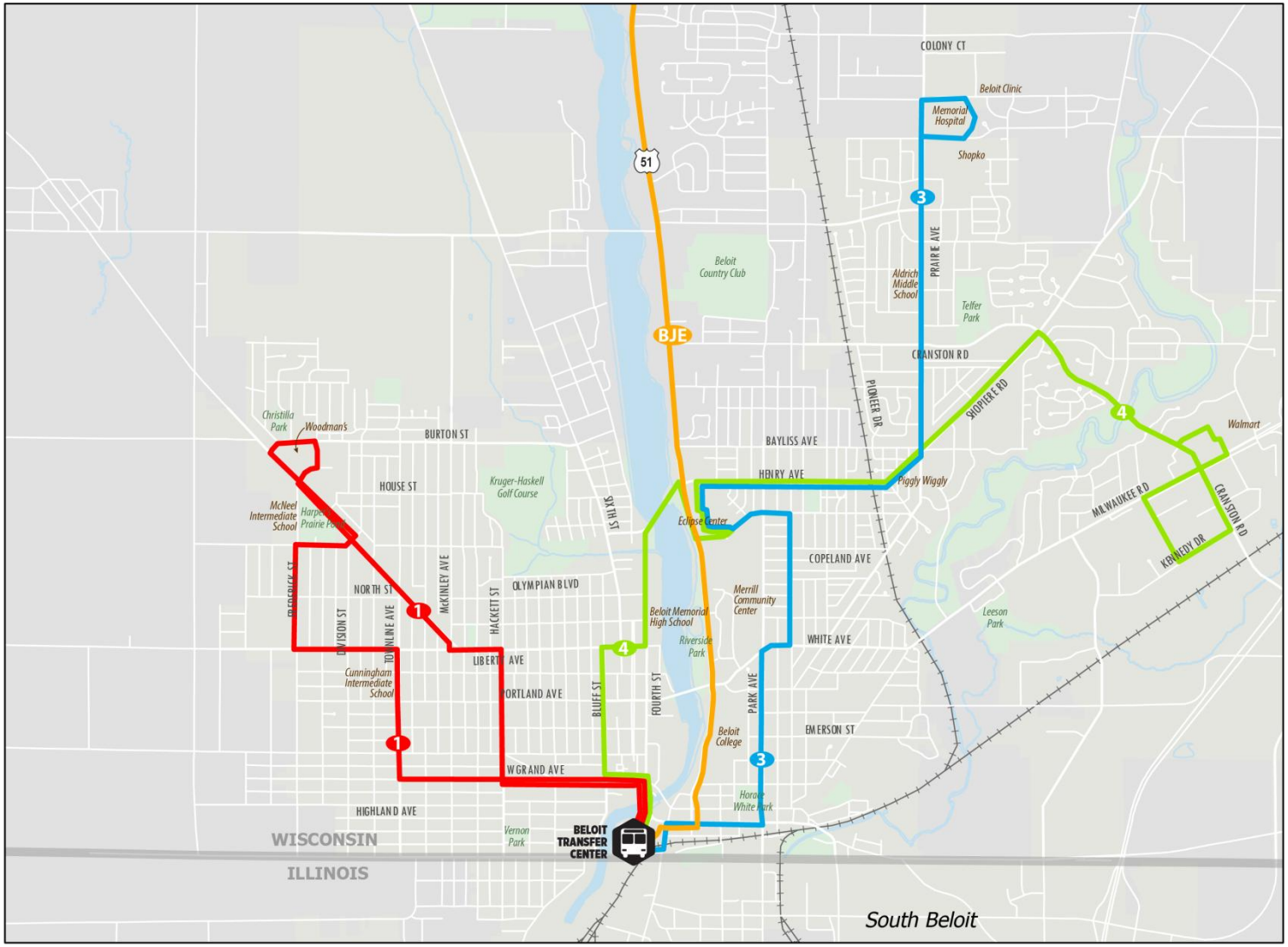


Figure 49 Alternative B Route Alignments



SERVICE REDUCTION ALTERNATIVE

Decreased funding for the Beloit Transit System at the state level is a possibility within the next five years. As a result, a two-step service reduction alternative was developed as worst-case scenario. Service reduction is not recommended and therefore, was not presented to the public.

Service Reduction Phase 1

Should such a catastrophic situation occur, the least damaging service reduction would be to eliminate Saturday service, reducing service to 19,550 annual hours.

Figure 50 Service Reduction Phase 1

Route	Recommendation	Annual Hours	Peak Vehicles
1 Cranston	Discontinue Saturday service	6,545	2
2 Prairie	Discontinue Saturday service	6,545	2
3 Madison	Discontinue Saturday service	3,315	1
Beloit-Janesville Express	No changes	3,145	1
		19,550	**6**

Service Reduction Phase 2

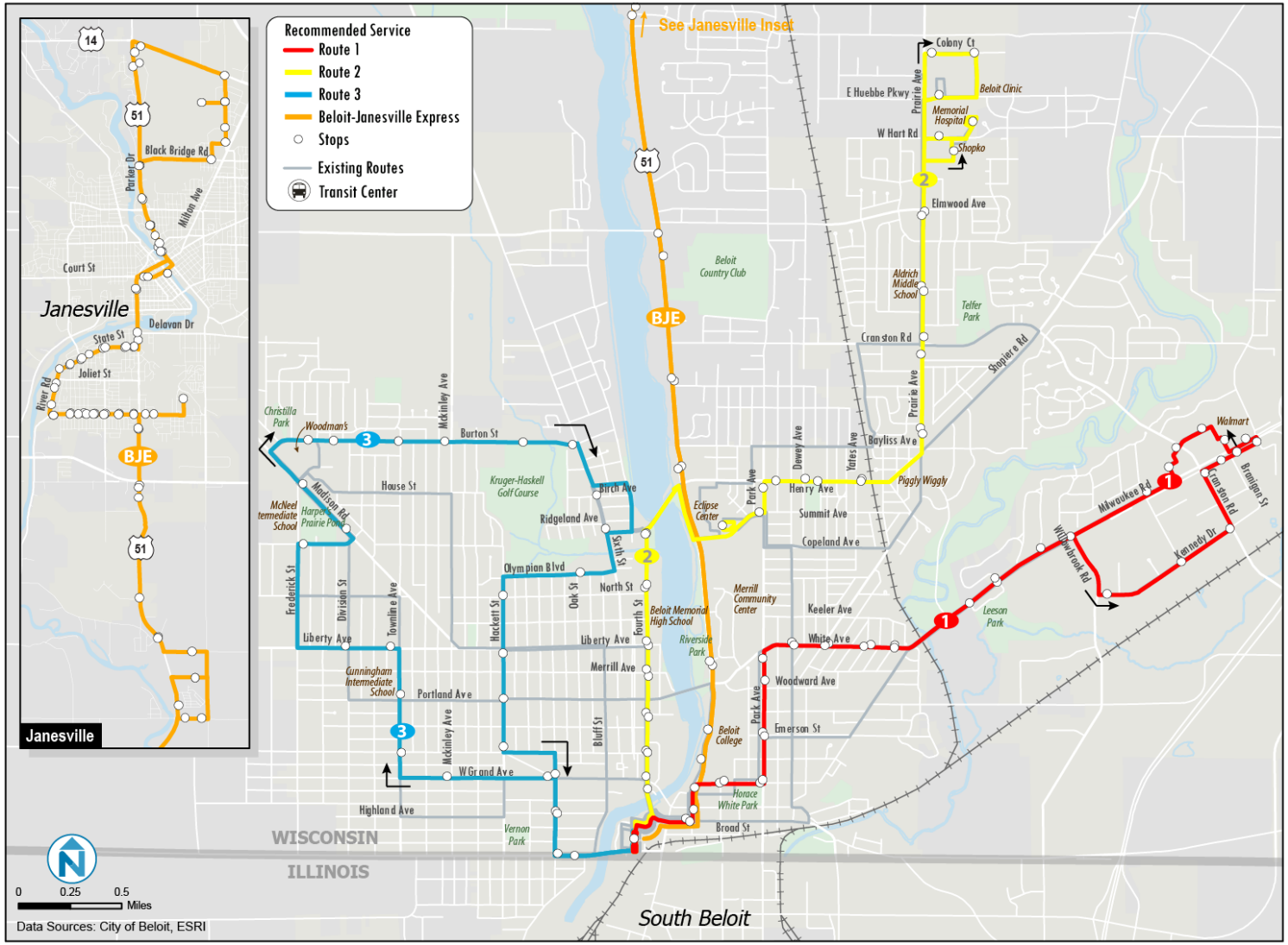
If greater reductions are necessary after eliminating Saturday service, a modified route network utilizing four peak vehicles would provide skeletal bus service. This route network would maintain coverage to most neighborhoods currently served, reducing service to 16,320 annual hours.

- 1 Milwaukee – A route serving East Beloit, including Milwaukee Rd and Walmart. This route would be very similar to the existing Route 4, but would be operated bi-directionally other than the terminal loop.
- 2 Prairie – A route serving Central and North Beloit, including Beloit High School, Eclipse Center, and Beloit Memorial Hospital. This route would be operated with two vehicles and would follow an alignment similar to the existing Route 3, but would be operated bidirectionally.
- 3 Madison – A loop route serving West Beloit, this is the same route alignment included in the Phase 1 recommendations.

Figure 51 Service Reduction Phase 2

Route	Recommendation	Annual Hours	Peak Vehicles
1 Milwaukee	New route East Beloit, similar to existing Route 4	3,315	1
2 Prairie	New route serving Central and North Beloit	6,545	2
3 Madison	Loop route serving West Beloit	3,315	1
Beloit-Janesville Express	No changes	3,145	1
		16,320	**5**

Figure 52 Service Reduction Phase 2 Route Network



PUBLIC MEETINGS

BTS customers and members of the public were engaged in the TDP process on February 18 when service alternatives were introduced. Open house meetings were held at the Beloit Transfer Center from 10:00 a.m. to 2:00 p.m. and at the Beloit Public Library from 4:00 p.m. to 6:00 p.m. Both meetings were advertised on buses and at the transit center.

The open house at the Beloit Transfer Center had over 30 participants, 18 of whom provided responses to a four-question intercept survey. Poster boards depicting existing ridership patterns and two varying scenarios were provided to foster discussion. Participation primarily consisted of existing customers that use the service on a regular basis for shopping and medical trips. Additional participants consisted of customers with work schedules that do not align well with existing bus schedules (i.e., shift workers and temporary employees) and non-riding citizens interested in transit.

The open house at the Beloit Public Library was sparsely attended with five participants. Poster boards and a brief slideshow presentation were provided to inform participants of the TDP process and potential outcomes.

In addition to learning about the cost-constrained service alternatives, meeting attendees were asked to fill out a survey to help the project team prioritize potential service improvements. The results of this survey are illustrated in Figure 53. When asked about service headway versus coverage, 71% favored maintaining service in all areas currently served and operating every 40 minutes, and 29% favored reducing service in low ridership areas and operating every 30 minutes. When asked about stop spacing, 79% favored spacing bus stops every other block to minimize walking distance, while 21% favored spacing stops every 3-4 blocks to minimize travel time.

When asked about service span versus headway, 88% favored extending service from 6:00 p.m. to 9:00 p.m., while 12% favored improving headway to 30 minutes. When asked about days of service, 50% favored providing more weekday service, while 41% favored adding Sunday service.

Figure 53 Public Meeting Tradeoff Exercise

Tradeoff	Choices	% of Responses
Headway and Coverage	Reduce service in low ridership areas and operate every 30 minutes	29%
	Maintain service in all areas and operate every 40 minutes	71%
Service Expansion	Improve headway to 30 minutes	12%
	Extend evening service to 9:00 p.m.	88%
Service Expansion	Provide more weekday service	59%
	Add Sunday service	41%
Access and Directness	Space bus stops every other block to minimize walking distance	79%
	Space bus stops every 3-4 blocks to minimize travel time	21%

ONLINE SURVEY

An online survey was conducted to gather feedback about the cost-constrained service alternatives. The survey was advertised on buses, on the BTS website and through email communications. A total of 26 people took the survey. Results are shown in figures 54 to 61, and major findings are summarized below:

- When asked which service alternative they prefer, respondents overwhelmingly chose Alternative A (85% of respondents) over Alternative B (15% of respondents), indicating that service coverage is more important than headway improvements. This finding is consistent with feedback received at the open house that was held at the Beloit Transfer Center.
- The most popular potential service improvements were increasing service headway from 40 minutes to 30 minutes, followed by extending weekday service to run until 9:00 p.m., and providing more Saturday service. Despite the majority preference to retain a 40-minute system over a more compact 30-minute system, headway improvements are important to customers.
- The most popular capital improvement was bike racks on buses, followed by improved lighting.
- Just over half (56%) of respondents are regular riders.
- About 80% of respondents are in the 25 – 64 age group.
- About half (52%) of respondents are employed full-time or part-time, 39% are unemployed, and 9% are retired. Only one student responded.
- About two-thirds (68%) of respondents have a smartphone with Internet access.

Figure 54 Which Service Alternative Do You Prefer?

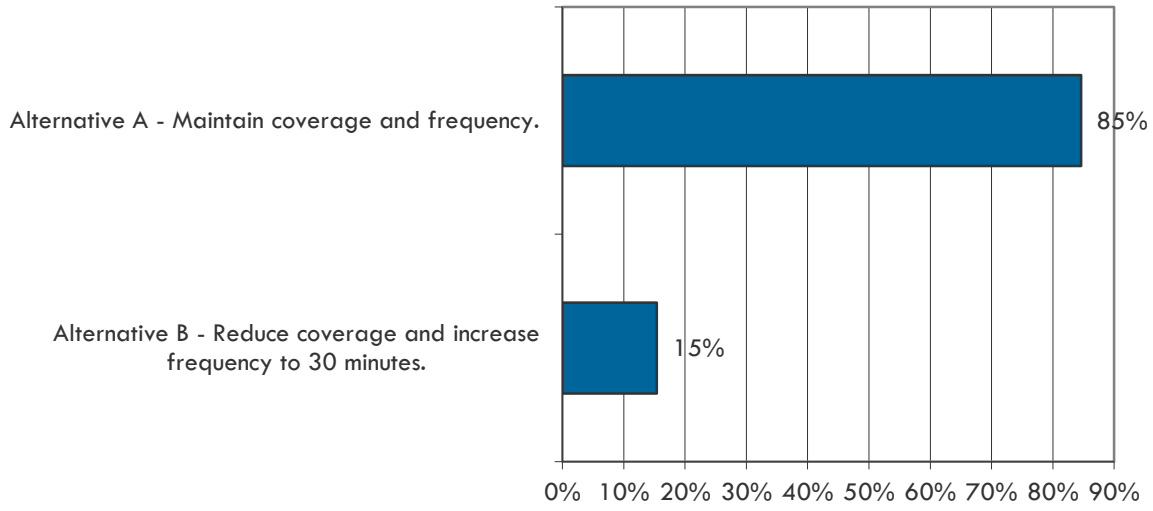


Figure 55 Rating of Potential Service Improvements

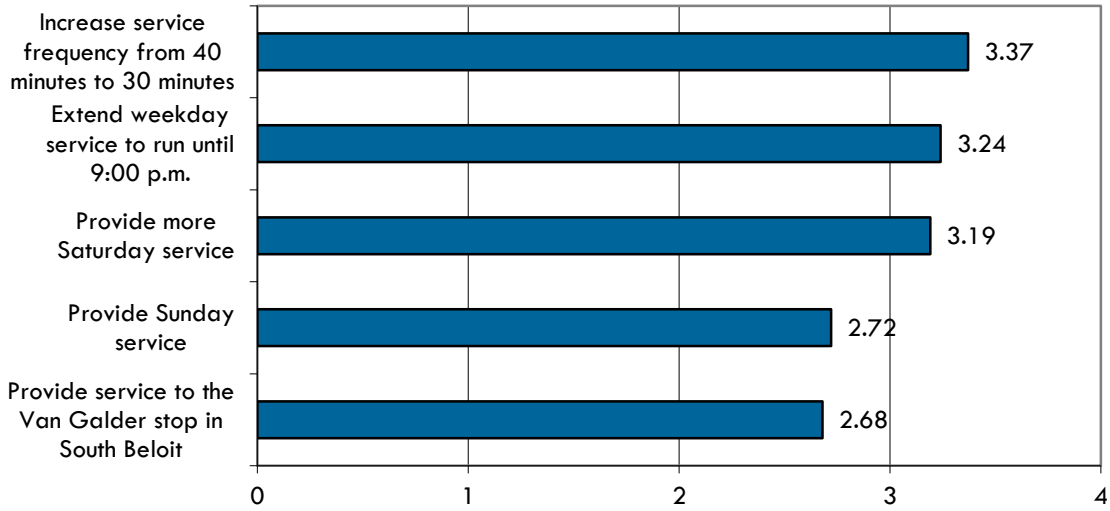


Figure 56 Rating of Potential Capital Improvements

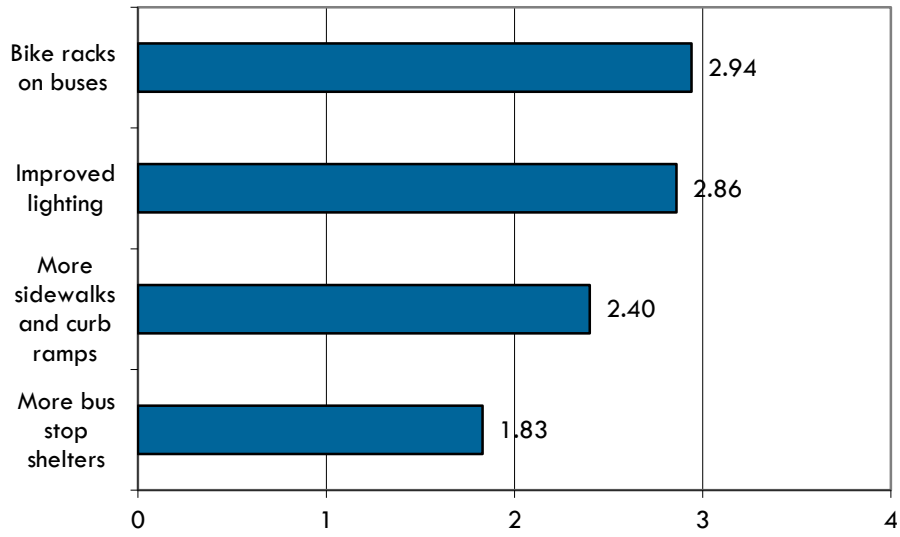


Figure 57 Frequency of Riding BTS

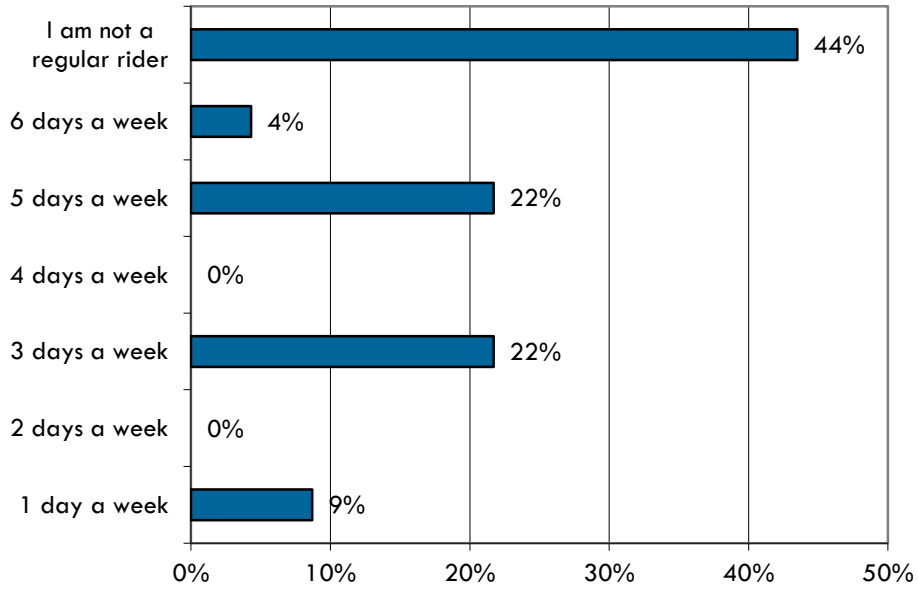


Figure 58 Routes Frequently Used by Survey Respondents

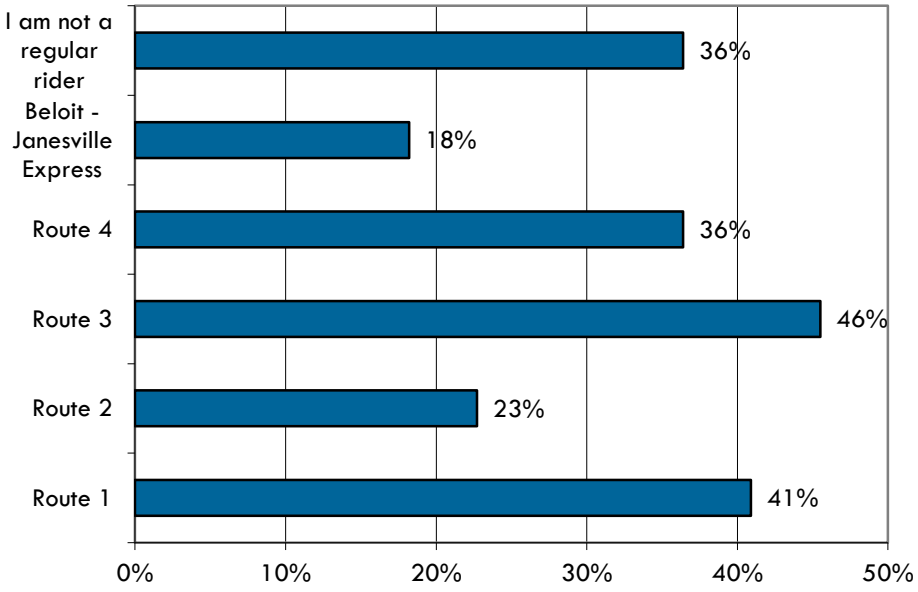


Figure 59 Age of Respondents

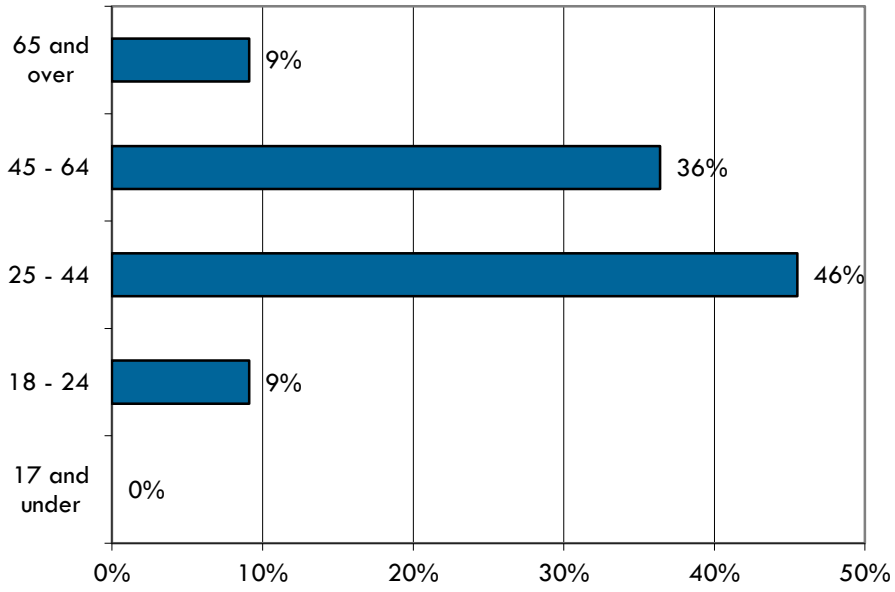


Figure 60 Employment Status of Respondents

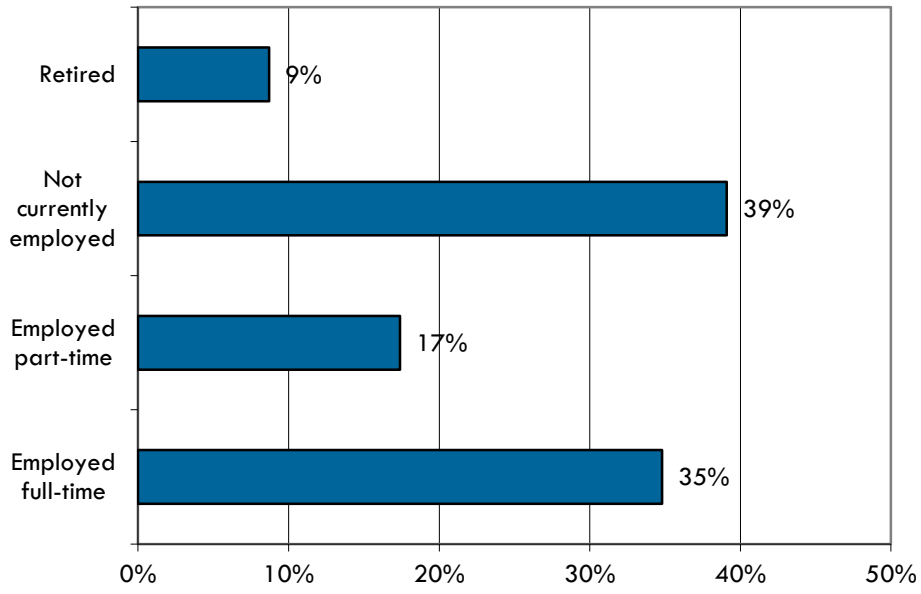


Figure 61 Student Status of Respondents

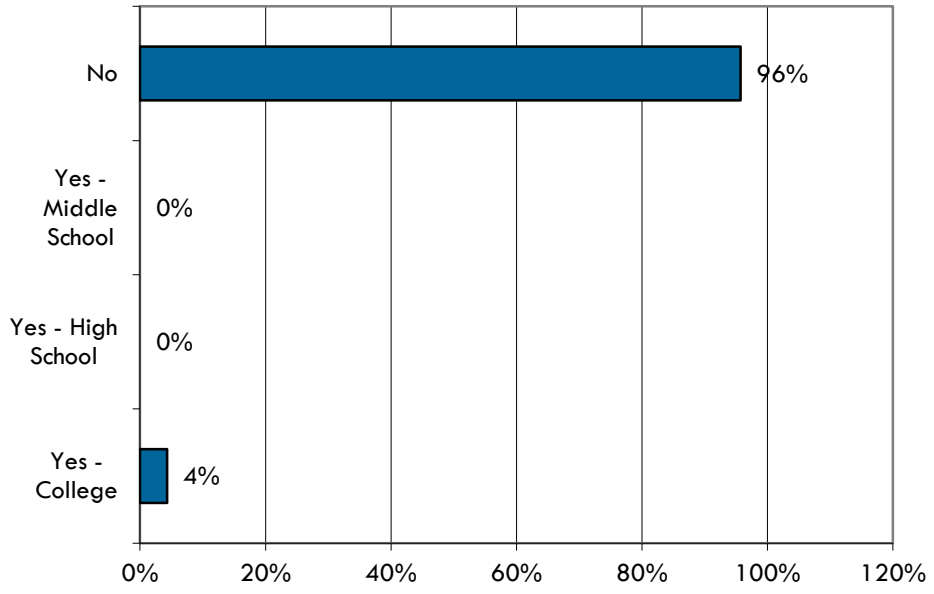
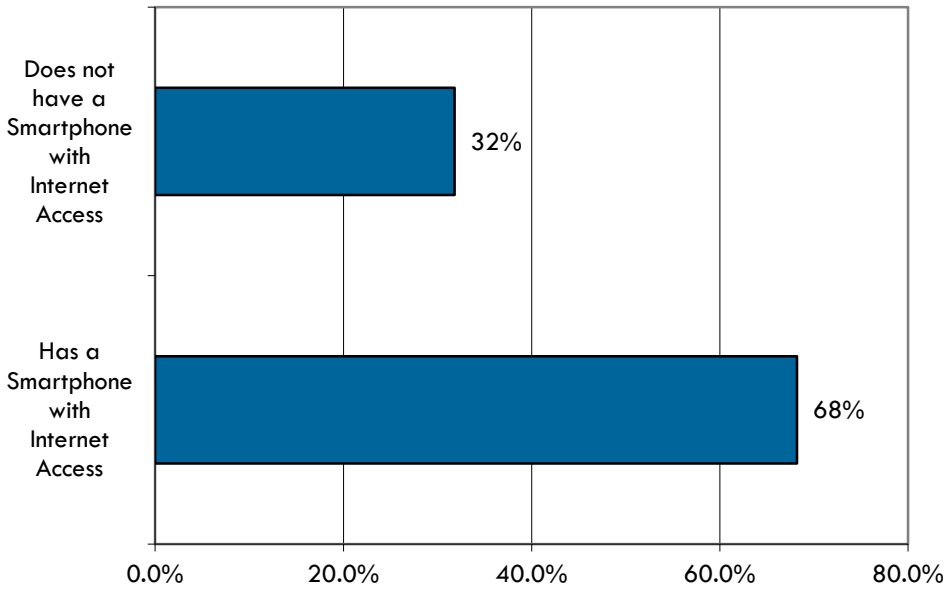


Figure 62 Smartphone Access



11 RECOMMENDED SERVICE CHANGES

SERVICE RECOMMENDATION INPUTS

Service recommendations were developed based on a number of inputs, including:

- Ridership distribution at the bus stop and route segment level
- Route design
  - Trip directness
  - Route connectivity outside of Beloit Transfer Center
- Route schedules
  - Trip level ridership
  - On-time performance
  - Relationship between existing service span and work schedules
- Socio-economic characteristics
  - Areas of high transit demand
- Bus operator feedback
  - Operational issues
  - Customer requests and comments
- Customer feedback obtained via on-board survey, online survey, and public meetings
- Stakeholder and BTS staff input

KEY ISSUES ADDRESSED

Service recommendations specifically focus on resolving the following issues:

- **Indirect service/reliance on transfers.** The lack of bi-directional service on Routes 1, 2, and 3 results in inconvenient travel times due to loop alignments. Most customers riding to Walmart connect to Route 4 at Beloit Transfer Center.
- **Schedule constraints.** The early end time of service on weekdays and Saturdays precludes employees working late shifts from riding the bus home.
- **Underserved areas.** Route recommendations focus on improving service to residential areas with a high demand for transit service.
- **Operational issues.** Recommended route alignments minimize turns at unsignalized intersections and shift service from residential streets to arterial corridors.

Indirect Service/Reliance on Transfers

Route 1 and 2 can be classified as "coverage" routes serving the western half of Beloit. While the large loop on Route 1 and convoluted alignment of Route 3 provide bus access within walking distance of most residences in West Beloit, neither provides convenient service to the Beloit Transfer Center. Many customers must walk several blocks to or from their stop and/or ride around the loop depending on the direction they are traveling.

Route 3 offers bi-directional service north of Cranston yet operates on both sides of the Rock River between the Beloit Transfer Center and Eclipse Center, bypassing Beloit Memorial High School in the inbound direction. Furthermore, Route 3 splits again between the Eclipse Center and Cranston, serving several residential streets instead of familiar and accessible arterial corridors.

The only stop with significant ridership along Route 4 is Walmart, which is the second-highest ridership stop outside of the Transfer Center on weekdays and the highest ridership stop outside of the Transfer Center on Saturdays. The lack of residential origins along Route 4 suggests that most customers traveling to Walmart connect from other local routes at the Transfer Center. Transfers are particularly inconvenient for customers shopping for groceries or other large items.

Although Beloit Transfer Center is climate-controlled and well-maintained with restrooms and fare token vending machines, the ability to reach major destinations such as Beloit Memorial High School and Walmart without transferring would significantly improve service to existing customers.

Scheduling Constraints

The primary limitation regarding route schedules is the lack of evening service, which came up as a high priority service improvement during public meetings and stakeholder meetings. It should be noted that customers returning to Beloit on the last trip of the Beloit-Janesville Express are not able to connect to any BTS routes due to their limited service span.

While the addition of evening trips would not likely increase ridership productivity (measured as boardings per revenue hour) as transit ridership tends to decrease after 4pm on any system, it would improve job access and has the potential to attract new riders.

Another major scheduling is the minimal level of service on Saturdays. In addition to a limited service span for the entire system, Routes 1, 2, and 3 operate at 80-minute headways, further reducing the viability of using transit for employment or medical appointments.

Underserved Areas

Stop level ridership reveals low ridership along several corridors, including Burton, House, McKinley, Pioneer, and Milwaukee. Conversely, higher ridership is observed along several residential corridors, including Townline, Bluff, Grand, and Wisconsin. Each of these areas also exhibited a high propensity towards transit based on the market analysis.

The reallocation of resources from low ridership areas enables the creation of bi-directional service to high demand areas, which would likely generate increased ridership.

Operational Issues

BTS local routes have evolved into the current alignments over the years due modifications prompted by customer requests and new development. In conjunction with these changes, several turns have been added, resulting in reduced travel speeds. The operation of 35' buses on narrow residential streets also creates hazards in the form of bus-to-auto conflicts, tight turns, and limited pedestrian visibility.

The streamlining of routes will reduce the number of operational issues and increase travel speeds for customers. Faster service will also result in increased recovery time between trips, which should have a positive impact on schedule reliability.

SERVICE RECOMMENDATIONS

While passenger loads on BTS routes do not indicate a need for supplemental service during any time of the day, the return to 30-minute headways would improve customer experience and increase ridership. Unfortunately, BTS would have to significantly reduce service coverage by shortening routes (not recommended) or increasing the number of peak vehicles by two and redesign the system, which requires a significant capital investment and a commitment to ongoing operating costs, to achieve 30-minute headways.

Practical service improvement options that would increase the availability and attractiveness of BTS service for current and potential customers include:

- Increased span (hours of operation) to improve job access and BJE connections
- More frequent service on Saturday
- The addition of Sunday service

The initial phase of service changes consist of a system restructure that is cost-neutral in terms of revenue hours and peak vehicles. The intent of the system restructure is to maximize the limited resources (revenue hours) allocated to BTS service while laying the foundation for future growth as additional funding become available. Implementation of each phase of the service plan shall coincide with subsequent fiscal years to maintain a steady level of system growth.

The recommended local route system consists of three routes, as opposed to the current four route system. Key benefits of the service recommendations are:

- New crosstown service connecting west, central, and east Beloit
- Improved route directness and increased schedule flexibility
- Improved access to Cranston Rd employment and shopping destinations
- Increased service to the Eclipse Center and Public Library
- Continued direct access to medical facilities and senior housing/activities
- Elimination of inefficient Milwaukee Rd segment
- High probability of increased ridership

Descriptions of each recommended route is included in this section. A system map depicting each local route along with the Beloit-Janesville Express is provided in Figure 63.

Route 1 Cranston

Route 1 will serve as a crosstown route linking the Beloit Transfer Center and several neighborhoods with major destinations such as Grinnell Hall Senior Center, Beloit High School, the Eclipse Center, Beloit Public Library, Piggly Wiggly, and Walmart. The route will operate bidirectionally between Beloit Transfer Center and Walmart along arterial streets such as Bluff St, 4th Street, Henry Ave, Shopiere Rd, and Cranston Rd.

Due to accessibility challenges along Milwaukee Rd, the route will loop around Kennedy Dr and Willowbrook Rd to access employment, medical, and education facilities. The Eclipse Center/Beloit Public Library will be served directly in both directions. Walmart is a second off-street deviation that will be served in the inbound direction only.

Recommended Service Levels

	Weekday			Saturday			Sunday		
Period	Headway	Vehicles	Service Span	Headway	Vehicles	Service Span	Headway	Vehicles	Service Span
Phase 1	40	2	6:00am-6:40pm	40	2	9:20am-4:00pm	-	-	-
Phase 2	40	2	6:00am–8:00pm	40	2	9:20am-4:00pm	-	-	-
Phase 3	40	2	6:00am–8:00pm	40	2	8:00am-6:00pm	-	-	-
Phase 4	40	2	6:00am–8:00pm	40	2	8:00am-6:00pm	40	2	8:40am-4:00pm
Phase 5	40	2	6:00am–8:00pm	40	2	8:00am-6:00pm	40	2	8:40am-4:00pm

Route Statistics	
Distance (miles)	14.9
Cycle Time (minutes)	80
Average Speed (miles per hour)	11.2

Route 2 Prairie

Route 2 will provide bidirectional service between Beloit Transfer Center and several medical facilities in the vicinity of Prairie Ave and Huebbe Pkwy. The route will also provide direct access to neighborhoods along Park Ave, Wisconsin Ave, Henry Ave, and Prairie Ave. Other major destinations served by Route 2 include Scoville Center Apartments, Eclipse Center, and Shopko, each of which requires short deviations from the primary alignment.

Recommended Service Levels

	Weekday			Saturday			Sunday		
Period	Headway	Vehicles	Service Span	Headway	Vehicles	Service Span	Headway	Vehicles	Service Span
Phase 1	40	2	6:00am-6:40pm	40	2	9:20am-4:00pm	-	-	-
Phase 2	40	2	6:00am–8:00pm	40	2	9:20am-4:00pm	-	-	-
Phase 3	40	2	6:00am–8:00pm	40	2	8:00am-6:00pm	-	-	-
Phase 4	40	2	6:00am–8:00pm	40	2	8:00am-6:00pm	40	2	8:40am-4:00pm
Phase 5	40	2	6:00am–8:00pm	40	2	8:00am-6:00pm	40	2	8:40am-4:00pm

Route Statistics	
Distance (miles)	13.6
Cycle Time (minutes)	80
Average Speed (miles per hour)	10.2

Route 3 Madison

Route 3 will operate a clockwise loop in west Beloit, providing direct access to several residential areas. Major destinations served by Route 3 include Woodman's and McNeel Intermediate School. Route 3 has a shorter cycle time (40 minutes) than Routes 1 and 2 (80 minutes), allowing it to be operated by a single bus at all times.

Recommended Service Levels

	Weekday			Saturday			Sunday		
Period	Headway	Vehicles	Service Span	Headway	Vehicles	Service Span	Headway	Vehicles	Service Span
Phase 1	40	1	6:00am-6:40pm	40	1	9:20am-4:00pm	-	-	-
Phase 2	40	1	6:00am–8:00pm	40	1	9:20am-4:00pm	-	-	-
Phase 3	40	1	6:00am–8:00pm	40	1	8:00am-6:00pm	-	-	-
Phase 4	40	1	6:00am–8:00pm	40	1	8:00am-6:00pm	40	1	8:40am-4:00pm
Phase 5	40	1	6:00am–8:00pm	40	1	8:00am-6:00pm	40	1	8:40am-4:00pm

Route Statistics	
Distance (miles)	9.4
Cycle Time (minutes)	40
Average Speed (miles per hour)	13.8

Beloit-Janesville Express

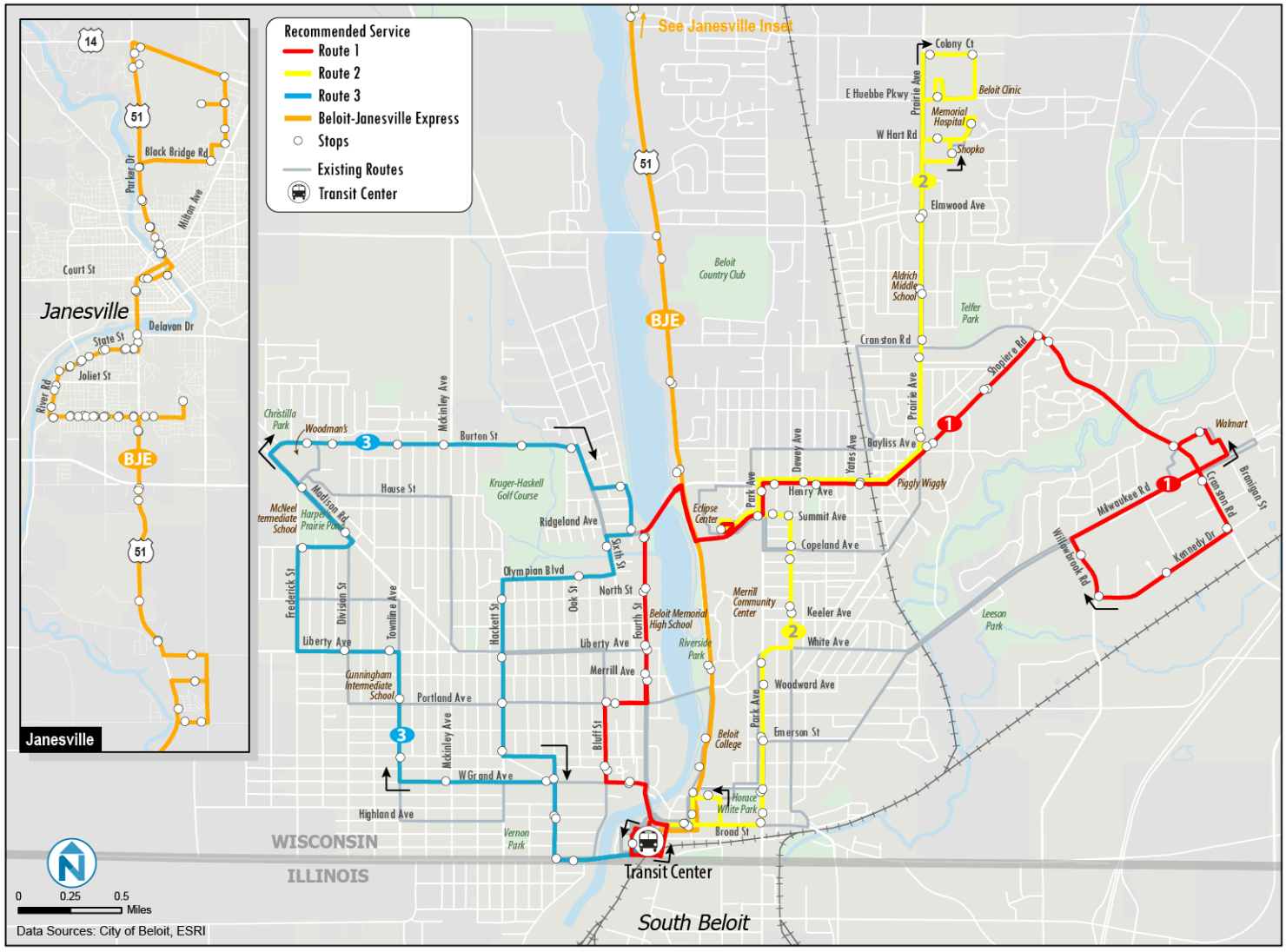
No route alignment changes or schedule modifications are proposed to the Beloit-Janesville Express. BTS and Janesville Transit System (JTS) should continue to operate one vehicle to the route. Due to schedule constraints, particularly during the afternoon period, no additional time stops or deviations should be added to the route without a redesign that maintains the current 120-minute cycle time.

Recommended Service Levels

	Weekday			Saturday			Sunday		
Period	Headway	Vehicles[1]	Service Span	Headway	Vehicles	Service Span	Headway	Vehicles	Service Span
Phase 1	60	1	6:00am-6:00pm	-	-	-	-	-	-
Phase 2	60	1	6:00am–6:00pm	-	-	-	-	-	-
Phase 3	60	1	6:00am–6:00pm	-	-	-	-	-	-
Phase 4	60	1	6:00am–6:00pm	-	-	-	-	-	-
Phase 5	60	1	6:00am–6:00pm	-	-	-	-	-	-

[1] BTS and JTS each operate one vehicle

Figure 63 Proposed Local and Intercity Routes



SCHOOL TRIPPER RECOMMENDATIONS

Currently, four tripper routes provide service targeted to school in Beloit. It is recommended that all tripper routes be discontinued in conjunction with Phase 1 of the local route changes. The new BTS route network will provide comparable or improved service to Beloit Memorial High School, Aldrich Middle School, McNeel Intermediate School, and Cunningham Intermediate School. The future Fran Fruzen Middle School can potentially be served by proposed Route 1 along Milwaukee Road. Students residing in hazard areas designated by the School District of Beloit are eligible for school-provided bus transportation.

SUMMARY OF RECOMMENDED SERVICE CHANGES

The following figures summarize the resources necessary to implement the initial system restructure as well as future expansion phases.

Figure 64 Current Resource Requirements

Route	Annual Hours	Peak Vehicles
Route 1	3,383	1
Route 2	3,347	1
Route 3	6,728	2
Route 4	3,567	1
Beloit-Janesville Express	3,145	1
Aldrich Tripper	240	1
1X Tripper	210	1
2X Tripper	210	1
3X Tripper	225	1
	21,055	**10**

Figure 65 Summary of Phase 1 Recommendations

Route	Recommendation	Annual Hours	Peak Vehicles
1 Cranston	New route serving West, Central, and East Beloit	7,297	2
2 Prairie	New route serving Central and North Beloit	7,297	2
3 Madison	New loop route serving West Beloit	3,700	1
Beloit-Janesville Express	No changes	3,145	1
Aldrich Tripper	Discontinue route	-	-
1X Tripper	Discontinue route	-	-
2X Tripper	Discontinue route	-	-
3X Tripper	Discontinue route	-	-
		21,439	**6**

Figure 66 Summary of Phase 2 Recommendations

Route	Recommendation	Annual Hours	Peak Vehicles
1 Cranston	Extend weekday evening service to 8:00 p.m.	7,977	2
2 Prairie	Extend weekday evening service to 8:00 p.m.	7,977	2
3 Madison	Extend weekday evening service to 8:00 p.m.	4,040	1
Beloit-Janesville Express	No changes	3,145	1
		23,139	**6**

Figure 67 Summary of Phase 3 Recommendations

Route	Recommendation	Annual Hours	Peak Vehicles
1 Cranston	Extend Saturday service to 8:00 a.m. – 6:00 p.m.	8,343	2
2 Prairie	Extend Saturday service to 8:00 a.m. – 6:00 p.m.	8,343	2
3 Madison	Extend Saturday service to 8:00 a.m. – 6:00 p.m.	4,223	1
Beloit-Janesville Express	No changes	3,145	1
		24,054	**6**

Figure 68 Summary of Phase 4 Recommendations

Route	Recommendation	Annual Hours	Peak Vehicles
1 Cranston	Add Sunday service	9,168	2
2 Prairie	Add Sunday service	9,168	2
3 Madison	Add Sunday service	4,645	1
Beloit-Janesville Express	No changes	3,145	1
		26,126	**6**

Figure 69 Summary of Phase 5 Recommendations

Route	Recommendation	Annual Hours	Peak Vehicles
1 Cranston	No changes	9,168	2
2 Prairie	No changes	9,168	2
3 Madison	No changes	4,645	1
Beloit-Janesville Express	No changes	3,145	1
Beloit-Rockford Express	New limited stop route between Beloit, South Beloit, Rockton, Roscoe, and Rockford	3,145	1
		29,271	**7**

A summary of annual hours and peak vehicle requirements for Phases 1-5 for the entire BTS system is provided in Figure 70.

Figure 70 Summary of Phase 1-5 Recommendations

Phase	Recommendation	Annual Hours	Peak Vehicles
1	Restructure local routes; discontinue tripper routes	21,439	6
2	Extend weekday evening service to 8:00 p.m.	23,139	6
3	Extend Saturday service to 8:00 a.m. – 6:00 p.m.	24,054	6
4	Add Sunday service	26,126	6
5	New route between Beloit, South Beloit, Rockton, Roscoe, and Rockford	29,271	7

SERVICE EQUITY ANALYSIS

Methods

A service equity analysis was conducted to determine if the proposed service changes would have a disparate impact on environmental justice populations. Transit providers that operate 50 or more fixed route vehicles in peak service and are located in an urbanized area of 200,000 or more in population must evaluate service and fare changes. BTS is below these thresholds and thus is not subject to this requirement, but must still ensure that service and fare changes do not result in disparate impacts.

Potential disparate impacts were analyzed based on the census blocks and block groups that would lose service with the proposed changes. The minority population analysis utilized data from the 2010 census at the census block level, which is the most precise data available. The low-income population analysis utilized data from 2008 – 2012 American Community Survey (ACS) 5-year estimates at the block group level, which is the smallest geography available for ACS data. The use of census block groups for the low-income population analysis encompasses more census blocks and therefore, results in higher population totals, thereby making it less accurate than the minority population analysis. The transit accessible population was defined as persons residing within ¼ mile of existing local routes. School trippers and the BJE express route were excluded from the analysis due to their classification, which is standard industry practice.

Results

Figure 71 presents the results of the minority population analysis when considering local routes only. The affected census blocks that will lose service are 30% minority, compared to 36% minority for the entire transit accessible population. Results for the low-income analysis are shown in Figure 72. The affected census block groups that will lose service are 12% low income, compared to 21% low income for the entire service area.

Figure 71 Minority Population Affected: Census Blocks within ¼ Mile of Local Routes

Category	Non-Minority		Minority		Total
Affected Census Blocks that Lose Service	3,344	70%	1,402	30%	4,746
Transit Accessible Population	23,535	64%	13,456	36%	36,991

Figure 72 Low Income Population Affected: Census Block Groups within ¼ Mile of Local Routes

Category	Non Low-Income		Low Income		Total
Affected Census Block Groups that Lose Service	3,454	88%	451	12%	3,905
Transit Accessible Population	38,044	79%	10,128	21%	48,172

Conclusions

When analyzing local routes alone, the affected census blocks and block groups have lower percentages of environmental justice populations (minority and low-income) than the service area as a whole. Thus, it does not appear that the proposed service changes would have a disparate impact on environmental justice populations.

SERVICE CHANGE PROCESS

In addition to the implementation of new services, regularly scheduled service changes allow an opportunity to modify route alignments due to changes in infrastructure or development, adjust schedules based on actual running times, add or remove bus stops, and implement fare adjustments. Service changes occur at least annually or semi-annually.

The service change process spans approximately six to nine months from proposed development to implementation for major service changes and four to six months for minor service changes. Major service changes include proposals to add a new route, discontinue and existing route, adjust fares, significantly alter the alignment of a route, or decrease the number of revenue hours of a route by 25% or more. Minor service changes include schedule adjustment to improve on-time performance and minor alignment modifications to improve customer access, operational safety, or on-time performance. Essential service change actions are included in Figure 73.

Figure 73 Service Change Checklist

Phase	Action(s)	
	Major Service Change	**Minor Service Change**
Proposal Development	□ Service & ridership analysis □ Review of customer and operator input □ Cost estimates □ Service equity analysis □ Initial routes and timing □ Customer outreach □ Public meetings □ Proposal revisions □ City Council approval	□ Passenger Notice & Comment □ Comment Period □ Final recommendations □ Passenger Notices
Implementation Preparation	□ Schedule development □ Operator work assignments □ Marketing and communication materials □ Capital upgrades (bus stops, facilities, etc.) □ IT updates (website, Google Transit, etc.)	
Implementation		

12 FINANCIAL AND CAPITAL PLAN

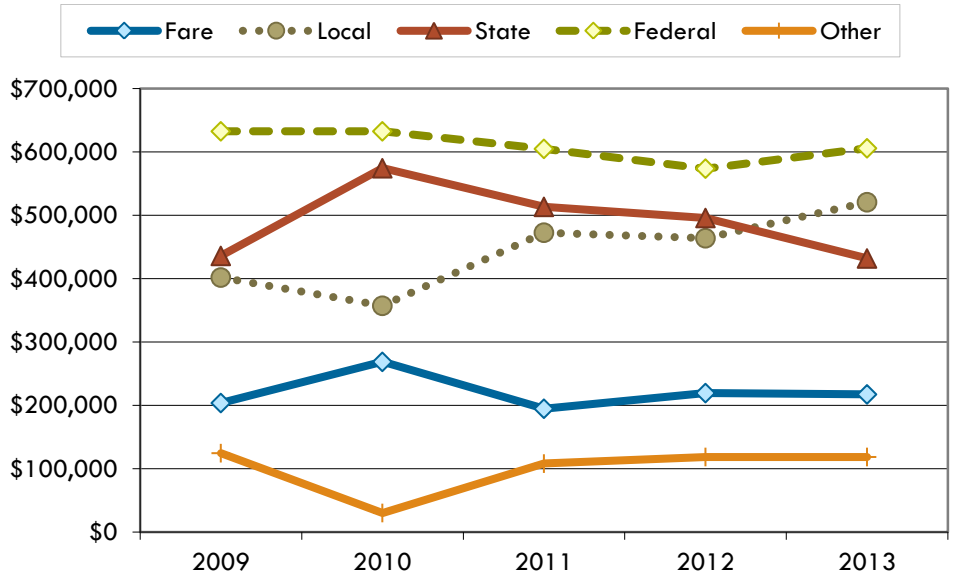
Current and Historical Funding

Beloit Transit System's operating funding is derived from federal, state, and local support, fares, and other sources:

- Federal: Section 5307 Urbanized Area Formula Program
- State: State Urban Mass Transit Operating Assistance Program
- Local: Local government sources
- Fares: Farebox revenue and pass/token sales
- Other: Other sources, such as advertising.

The level of funding from these sources from 2009 to 2013 is illustrated in Figure 74 below. Revenues from fares and other sources have stayed relatively constant other than an anomaly in 2010, but federal, state, and local funding has varied considerably. Federal and state funding, which historically have been the two largest funding sources, have declined somewhat over the past several years, and local funding has increased to offset that. The overall BTS operating budget has increased slightly over the years, from 1.8 million in 2009 to 1.9 million in 2010.

Figure 74 BTS Funding Sources



Source: National Transit Database

FARE STRUCTURE

The BTS fare structure is summarized below in Figure 75. The regular cash fare is $1.50, while the senior/disabled cash fare is $0.75. There are several ways to save money by purchasing fare media in bulk, including a punch pass and tokens. There is also a semester pass available for students.

Figure 75 BTS Local Route Fare Structure

Fare Type	Price	Unit Price
Regular Cash Fare	$1.50	$1.50
Seniors, Disabled Cash Fare	$0.75	$0.75
BTS Ten Ride Punch Pass (In Town)	$12.00	$1.20
Student Semester Pass (In Town)	$85.00	-
Pack of 10 Tokens	$12.00	$1.20
Pack of 20 Tokens	$23.00	$1.15
Pack of 50 Tokens	$55.00	$1.10
Vending Machine: 4 Tokens	$5.00	$1.25
Vending Machine: 8 Tokens	$10.00	$1.25
Vending Machine: 17 Tokens	$20.00	$1.18

BJE fares are more expensive than local route fares, as shown in Figure 76 below.

Figure 76 BJE Fare Structure

Fare Type	Price	Unit Price
BJE Cash Fare	$3.50	$3.50
BJE Seniors, Disabled Cash Fare	$1.75	$1.75
Blackhawk Tech (Cash Fare)	$2.25	$2.25
Blackhawk Tech (Senior, Disabled Cash Fare)	$1.10	$1.10
10 Ride Pass – Beloit to Janesville	$30.00	$3.00
10 Ride Pass – Beloit to Janesville (Senior, Disabled)	$17.50	$1.75
10 Ride Pass – Beloit to Blackhawk Tech	$20.00	$2.00

Fare Recommendations

Overall, the fare structure and technology used by BTS appears to be serving the system well. The BTS regular cash fare of $1.50 is comparable to the fare in other transit systems in Wisconsin. Many systems also have a $1.50 fare, and only one, Oshkosh, has a lower fare ($1.00). Several systems have higher fares and are generally in the $1.75 - $2.00 range. In 2014, Janesville increased its fare to $1.75, and a fare increase for BTS was proposed in the 2015 budget. However, the Beloit City Council decided to maintain the current fare of $1.50, in part because an increased fare would not generate very much additional revenue, and the increase would place an additional financial burden on bus riders.

One fare product that is available in some other communities, including Janesville, is a day pass. These passes are generally priced at or slightly above the cost of two regular fares, and allow for unlimited riding over the course of a day. Day passes can be very useful for riders going to multiple places over the course of a day. Introducing a day pass could have a positive impact on BTS ridership while making the bus more affordable for some people. A summary of fare recommendations for BTS service is depicted in Figure 77.

Figure 77 Summary of BTS Fare Recommendations

Fare Type	Current Price	Recommended Price
Regular Cash Fare	$1.50	$1.50
Seniors, Disabled Cash Fare	$0.75	$0.75
Day Pass	Not available	$3.00
BTS Ten Ride Punch Pass (In Town)	$12.00	$12.00
Student Semester Pass (In Town)	$85.00	$85.00
Pack of 10 Tokens	$12.00	$12.00
Pack of 20 Tokens	$23.00	$23.00
Pack of 50 Tokens	$55.00	$55.00
Vending Machine: 4 Tokens	$5.00	$5.00
Vending Machine: 8 Tokens	$10.00	$10.00
Vending Machine: 17 Tokens	$20.00	$20.00
BJE Cash Fare	$3.50	$3.50
BJE Senior, Disabled Cash Fare	$1.75	$1.75
BJE to Blackhawk Tech Cash Fare	$2.25	$2.25
BJE to Blackhawk Tech Senior, Disabled Cash Fare	$1.10	$1.10

As smartphone usage has increased, new payment options using smartphones have emerged. Vendors now offer transit agencies the ability to sell fare products such as day passes and monthly passes through smartphone apps, with the vendor receiving a small percentage of each transaction. The passes are displayed on the smartphone screen, and operators visually check the screen to ensure the pass is valid when the rider boards. BTS should explore the use of options like this to expand its fare options.

POTENTIAL FUNDING SOURCES

Universal Pass (U-Pass)

Many transit providers around the country negotiate with a university (or large employer) for a universal pass agreement. These types of arrangements give all students and/or affiliates unlimited access to the transit system. The transit provider and the institution may negotiate a fare (usually discounted), and the institution pays annually based on the actual number of transit trips taken. Universities may also include the cost of the U-Pass within student fees, typically ranging from $50-100 per semester. In many cases, institution of a U-pass agreement has led to increased transit ridership.

Beloit Transit System and Beloit College have recently had discussions regarding implementation of a Universal Pass. An example of a successful U-Pass program in a similar-sized city in Wisconsin is the partnership between University of Wisconsin La Crosse and Municipal Transit Utility, which is funded by student fees and voluntary employee pre-tax payroll deduction.

BELOIT-JANESVILLE EXPRESS FUNDING

Current Funding Arrangement

The Beloit-Janesville Express (BJE) has a unique funding structure that is different from other routes. As shown in Figure 78, fare revenue accounts for 16% of funding, the local share is 28.45%, and state and federal funding accounts for the rest. A variety of organizations contribute to the local share, as shown in Figure 79.

Figure 78 BJE Funding

Source	Share	Percent
State Share	$189,032	23.55%
Federal Share	$202,506	32.00%
Fare Revenue	$101,252	16.00%
Local Share	$180,041	28.45%
Total	**$672,831**	**100.00%**

Source: 2014 BJE Projection

Figure 79 BJE Local Share

Organization	Share	Percent of Local Share
Kandu	37,636	21%
Blackhawk Tech	27,919	16%
UW-Rock Co	6,316	4%
RCHSD (Job Center)	36,437	20%
County Institutions	13,311	7%
Rock Valley Comm.	32,227	18%
Riverfront	8,097	4%
SWWDB	8,922	5%
City of Janesville	9,177	5%
Total	**180,041**	**100%**

Source: 2014 BJE Projection

Beloit-Janesville Recommendations

While the BJE has been successful, the current funding arrangement is somewhat tenuous. If one of the consortium members drops out, a new member must be recruited, or the other organization members must increase their contribution to make up for the loss of funding. The consortium does not have written bylaws to govern how the service is operated and funded. The creation of bylaws would achieve more sustainable funding for the BJE service. It may be advantageous to require notification at least one year in advance if an organization will be leaving the consortium to allow the remaining members to determine how the lost funding can be replaced.

CAPITAL PLAN

The operation of fixed-route and paratransit bus service in Beloit requires supporting capital in the form of buses, amenities, and technology. This chapter summarizes capital needs required to maintain and expand bus service over the next five years.

Current Fleet

Beloit Transit System fixed-route fleet consists of 12 low-floor 35-foot buses (Figure 80). Characteristics of the current fixed-route fleet are detailed in Figure 81.

Figure 80 Typical BTS 35-Foot Low Floor Bus

Figure 81 Current Fixed-Route Fleet Information

Bus	Make	Model	Year	Seated Capacity	Wheelchair Capacity	Mileage	Average Annual Mileage
4325	Gillig	35ft Low Floor	2002	32	2	329,732	25,364
4326	Gillig	35ft Low Floor	2002	32	2	331,910	25,532
4327	Gillig	35ft Low Floor	2002	32	2	357,760	27,520
4328	Gillig	35ft Low Floor	2002	32	2	419,934	32,303
4333	Gillig	35ft Low Floor	2006	32	2	373,182	41,465
4334	Gillig	35ft Low Floor	2006	32	2	431,204	47,912
4336	Gillig	35ft Low Floor	2007	32	2	305,068	38,134
4337	Gillig	35ft Low Floor	2007	32	2	339,762	42,470
4338	Gillig	35ft Low Floor	2007	32	2	321,446	40,181
4341	Gillig	35ft Low Floor	2011	32	2	222,511	55,628
4342	Gillig	35ft Low Floor	2014	32	2	38,826	38,826
4343	Gillig	35ft Low Floor	2014	32	2	61,182	61,182

Vehicle Useful Life Assumptions

The minimum useful life of transit vehicles is based on Federal Transit Administration *Circular 5010.1D – Useful Life Policy*. The minimum useful life of large, heavy duty buses with a length of 35-45' is 12 years or 500,000 miles, whichever comes first. A table summarizing the useful life of all vehicle types based on years of service and mileage accumulated is provided in Figure 82.

Figure 82 Minimum Useful Life of Transit Vehicles

Category	Length	Years	Miles
Large, heavy-duty transit buses including over the road buses	35-45'	12	500,000
Small size, heavy-duty transit buses	30'	10	350,000
Trolley-replica buses	30'	10	350,000
Medium-size, medium-duty transit buses	25-35'	7	200,000
Medium-size, light-duty transit buses	25-35'	5	150,000
Other light-duty vehicles such as vans and sedans	N/A	4	100,000

Peak Vehicle Requirements

Due to the recommended reduction in school trippers, the peak vehicle count for fixed-route service will be reduced upon implementation of Phase 1 recommendations. A comparison of current and Phase 1 peak vehicle requirements is depicted in Figure 83.

Figure 83 Peak Vehicle Requirements

Current		Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Route	Peak Vehicles	Peak Vehicles	Peak Vehicles	Peak Vehicles	Peak Vehicles	Peak Vehicles
1	1	2	2	2	2	2
2	1	2	2	2	2	2
3	2	1	1	1	1	1
4	1	-	-	-	-	-
BJE	1	1	1	1	1	1
BRE	-	-	-	-	-	1
School Trippers	3	-	-	-	-	-
Subtotal	**9**	**6**	**6**	**6**	**6**	**7**
Spares (20%)	**3**	**2**	**2**	**2**	**2**	**2**
Vehicles Required	**12**	**8**	**8**	**8**	**8**	**9**

Vehicle Replacement Plan

Based on the FTA Vehicle Useful Life policy, four older model (2002) BTS buses have exceeded the minimum vehicle age. However, it is common for transit providers to continue operating vehicles with low mileage beyond twelve years. Due to the reduced peak vehicle requirement associated with the elimination of tripper routes, 2002 model buses can be retired upon implementation of Phase 1. BTS may consider retaining retired vehicles until 2018 as a contingency should capital funding for vehicle procurements not become available.

Based on current and projected mileage, the five 2006 and 2007 model buses will need to be replaced by 2020. BTS and SLATS have included the purchase of a replacement vehicle in year 2016 of the 2016-2019 SLATS Transportation Improvement Program (TIP). That vehicle will likely be needed when one of the 2006 buses reaches the end of its useful life. BTS and SLATS have also included the purchase of three replacement buses in year 2018 of the TIP.

The potential addition of a Beloit-Rockford route will require an expansion vehicle during Phase 5 or the delayed retirement of a 2007 model bus. The five-year vehicle replacement plan depicted in Figure 84 is based on peak vehicle requirements of the recommended service plan and characteristics (age and mileage) of the existing fleet.

Figure 84 Vehicle Replacement Plan

Category	Current 2015	Phase 1 2016	Phase 2 2017	Phase 3 2018	Phase 4 2019	Phase 5 2020
Peak Vehicles	9	6	6	6	6	7
Spares	3	2	2	2	2	2
Vehicles Required	**12**	**8**	**8**	**8**	**8**	**9**
Vehicles Retired	-	4	-	3	-	2
Vehicles Purchased	-	-	-	3	-	3

OPERATING AND CAPITAL BUDGET

The projected operating and capital budget for Beloit Transit System for the 2016-2020 period is depicted in Figure 85. An annual increase of 2.3% (as projected by WisDOT) was used for expenses not related to service expansion. Local and Federal funding fluctuate based on capital expenses. State funding is assumed to grow proportionally to increased non-capital expenses.

Figure 85 Beloit Transit System Operating and Capital Budget (2016-2020)

Category	2016	2017	2018	2019	2020
Revenue					
Local share	$644,719	$686,444	$1,006,595	$748,387	$828,396
State Urban Mass Transit Operating Assistance	$505,433	$593,364	$614,759	$646,908	$686,678
Federal 5307 Formula Funding	$880,265	$751,653	$1,960,355	$819,481	$1,005,860
Paratransit Grant	$21,575	$21,575	$21,575	$21,575	$21,575
Fare Revenue	$151,000	$154,473	$158,026	$161,660	$165,379
BJE Consortium	$94,000	$96,162	$98,374	$100,636	$102,951
Other Revenue (Rent, Advertising, etc.)	$51,130	$52,306	$53,509	$54,740	$55,999
Total Revenue	**$2,348,122**	**$2,355,977**	**$3,913,193**	**$2,553,387**	**$2,866,837**
Staff Expenses					
Bus Operators	$527,325	$582,229	$619,174	$687,977	$788,522
Administrative Staff	$300,760	$307,677	$314,754	$321,993	$329,399
Part-Time Staff	$130,987	$141,650	$147,383	$157,372	$160,992
Overtime	$25,000	$25,575	$26,163	$26,765	$27,381
Other (Tool Allowances, Uniforms, Physicals, etc.)	$23,319	$23,855	$24,404	$24,965	$25,540
Professional Fees (Seminars, Dues, Travel, etc.)	$16,410	$16,787	$17,174	$17,569	$17,973
Medical Insurance	$321,305	$328,695	$336,255	$343,989	$351,901
Wisconsin Retirement System/VEBA	$67,516	$69,069	$70,657	$72,283	$73,945
Worker's Compensation	$66,586	$68,117	$69,684	$71,287	$72,927
Social Security/Medicare	$75,996	$77,744	$79,532	$81,361	$83,233
Unemployment	$5,000	$5,115	$5,233	$5,353	$5,476
Life Insurance	$4,245	$4,343	$4,443	$4,545	$4,649
Vehicle and Facility Maintenance Expenses					
Fuel	$130,000	$132,990	$136,049	$139,178	$142,379
Parts and Materials	$66,740	$68,275	$69,845	$71,452	$73,095
Building Maintenance	$15,420	$15,775	$16,137	$16,509	$16,888
Utilities (Electricity, Gas/Heat, Water, Sewer, etc.)	$50,690	$51,856	$53,049	$54,269	$55,517
Other Expenses					
Bond Repayment	$125,845	$128,739	$131,700	$134,730	$137,828
Insurance (Fire, Fleet, Physical Damage, Liability)	$46,493	$47,562	$48,656	$49,775	$50,920
Paratransit Contract	$27,756	$28,394	$29,047	$29,716	$30,399
Telephone/Radio/Communications	$12,219	$12,500	$12,788	$13,082	$13,383
Marketing/Public Notices	$5,500	$5,627	$5,756	$5,888	$6,024
Office Supplies/Postage	$3,010	$3,079	$3,150	$3,223	$3,297
Capital Expenses					
Vehicle Replacement	-	-	$1,477,000	-	-
Operations Facility - New roof and parking lot resurface	-	-	-	-	$170,000
Operations Facility - New fuel system and vehicle wash	$300,000	-	-	-	-
Total Expenses	**$2,553,716**	**$2,355,977**	**$3,913,193**	**$2,553,387**	**$2,866,837**

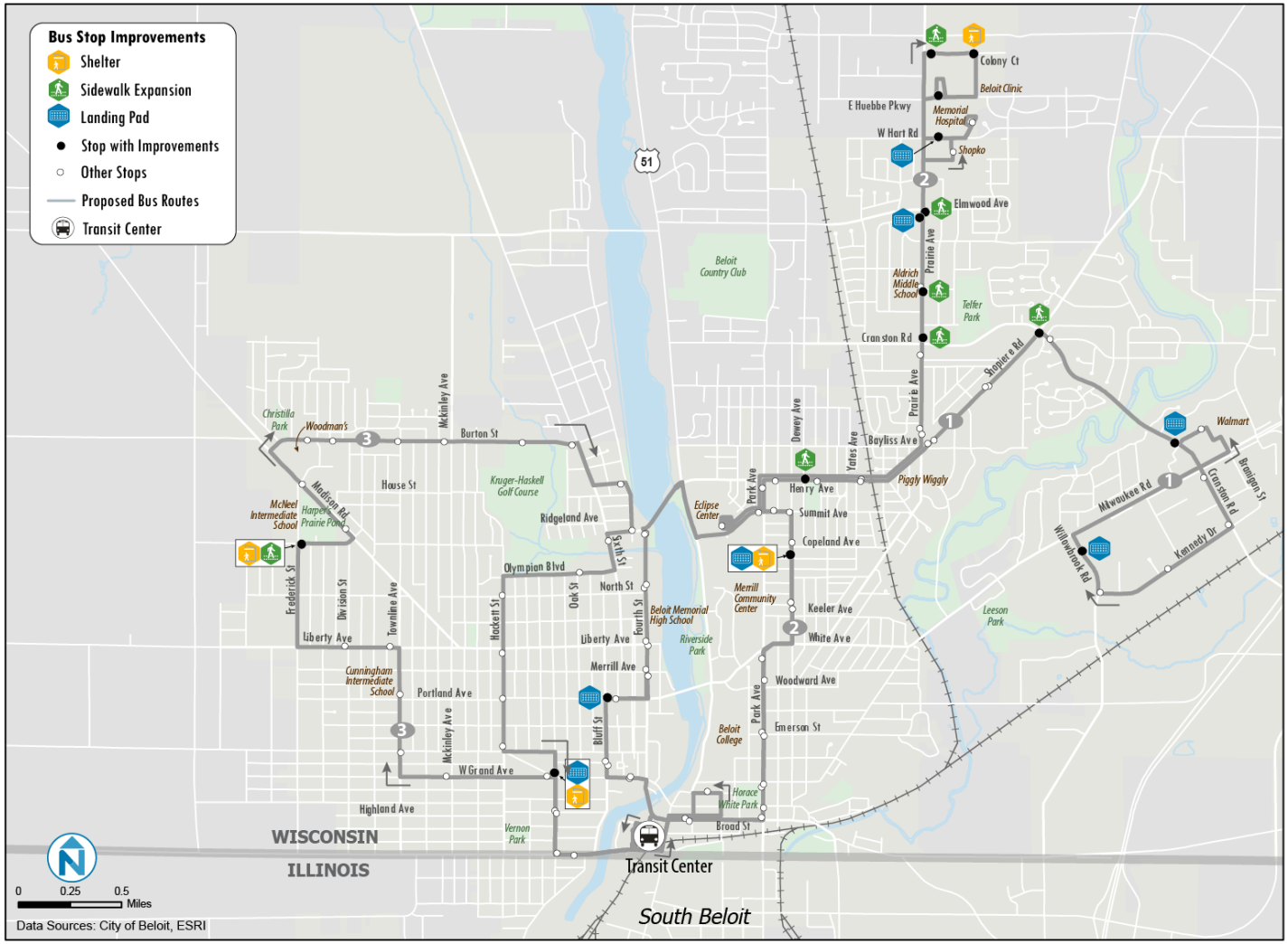
ADDITIONAL CAPITAL IMPROVEMENTS

Bus Stop Improvements

A high percentage of BTS bus stops fail to meet ADA accessibility standards, which require a bus stop landing pad with a minimum width of 60 inches and minimum depth of 96 inches. Bus stops should also connect to adjacent sidewalks or pedestrian paths. Many transit systems go beyond ADA minimums and provide a landing pad for the rear door of the bus. The addition of landing pads, connecting sidewalks, and amenities such as seating and shelter enhance the customer experience and have the potential to increase ridership.

Opportunities for minimizing the cost of bus stop improvements include incorporating them into municipal or private projects construction projects that involve streets and sidewalks. A map of high priority bus stop improvements (Figure 86) was created to identify locations that would benefit a high number of existing and potential transit users.

Figure 86 Priority Bus Stop Improvements



Bus Stop Signage

Current bus stop signage (Figure 87) includes a clock to indicate scheduled arrival times, however, this is only beneficial for clockface headways of 15, 20, 30, or 60 minutes. Therefore, the current headway of 40 minutes makes the current bus stop signage (clock and arrival times) obsolete.

Figure 87 Current Bus Stop Signage

The redesign and replacement of BTS bus stop signs has the opportunity to improve customer information and service branding with the following modifications:

- Addition of the BTS logo
- Elimination of timed arrival information
- Addition of stickers indicating which routes serve each specific stop
- Addition of a unique stop identification number to simplify the electronic retrieval of arrival information

The approximate cost of replacing 100 bus stop signs is $5,000-8,000 depending on size and materials. The cost assumes the re-use of existing sign posts and limited purchase/installation of new sign posts. The procurement and installation of updated bus stop signage should be considered in the next Transportation Improvement Program.

Bike Racks on Buses

BTS buses currently do not offer bike racks for customers. Bike racks improve mobility and extend custom trip length by providing first and last mile connections to areas not within walking distance of existing bus stops. Bike racks on buses also have the potential to attract new

customers and allow customers to use transit in direction, should service not operate while traveling in the opposite direction (e.g. early in the morning or late at night).

Bike racks are typically included on new buses purchases to minimize installation costs. Bike racks are covered in Federal Transit Administration Section 5339 Bus and Bus Facilities formula funding (80% federal share and 20% local share).

The primary obstacle to installing bike racks on BTS buses is the current bus wash, which is scheduled for replacement in 2020.

Figure 88 Sample Bike Rack

13 FUTURE SERVICE EXPANSION

Service in the Illinois portion of the Beloit area is provided by Stateline Mass Transit District (SMTD), which serves South Beloit, Rockton, Rockton Township, and Roscoe. SMTD provides demand-response service within its service area and also connects to BTS at the Beloit Transit Center and Rockford Mass Transit District (RMTD) at Highway 173 in Machesney Park. Service is available to residents and employees of the service area, and trips must begin or end in the service area. Thus, even though the system serves both Beloit and Machesney Park, it is not possible to travel on SMTD from Beloit to Machensey Park and the Rockford area. This creates a gap in the transit service network in the Beloit area.

The 2004 Beloit TDP recommended three options to improve regional transit connections in the area:

- Maintain the status quo with BTS, Janesville Transit System (JTS), and RMTD operating as separate entities. Cooperation and coordination between the agencies would be expanded. This recommendation predated the formation of SMTD.
- Form county-wide mass transit districts serving Winnebago County and Rock County. These districts are re not currently allowed by state law in Wisconsin.
- Create a bi-state regional transportation authority to serve Janesville, Beloit, Machesney Park, Loves, Park, Rockford, Belvidere, and surrounding areas.

Given the lack of authority from the state to create a regional transit authority and the difficulties associated with creating such an authority across state lines, it is likely that any coordination to improve regional service in the near future will involve service agreements between the existing agencies: BTS, SMTD, JTS, and RMTD.

TRAVEL DEMAND

An analysis was conducted to determine the level of travel demand between Beloit and the surrounding areas, measured in the number of workers commuting from an area to other areas. Figures 89 to 91 depict this travel demand in map form.

- **Beloit:** Travel demand from Beloit is strongest to Janesville, with 1,812 worker flows. Next is South Beloit/Rockton/Rockton Township/Roscoe, with 972 worker flows, and Rockford/Loves Park/Machesney Park with 634 worker flows. This suggests that Janesville is a more important market to serve than areas south of Beloit. There are 4,068 workers who live and work in Beloit, and 6,098 who work in other areas, presumably in the greater Chicago area.
- **South Beloit, Rockton, Rockton Township, Roscoe:** Workers in communities immediately south of Beloit primarily commute to Rockford/Loves Park/Machesney Park (5,755 workers). There are 1,041 workers commuting to Beloit and 327 to Janesville, while 4,046 live and work in the same area, and 8,635 work in other areas.

- **Rockford, Loves Park, and Machesney Park:** The majority of workers in these areas work locally (49,202). Just 1,510 commute to South Beloit/Rockton/Rockton Township/Roscoe, 518 to Beloit, and 243 to Janesville. A high number (31,555) commute to other areas.

This analysis suggests that there is a market for service connecting Beloit, Rockford, and areas in between, but that in order to generate sufficient ridership to achieve ridership productivity levels comparable to the Beloit-Janesville Express, a fixed route operating between these areas would need to also serve the South Beloit/Rockton/Roscoe area rather than operate directly between Beloit and the Rockford Mass Transit District East Side Transfer Center, located northeast of the I-90 and Business 20 interchange.

East-west travel between Beloit and Clinton (located in southeast Wisconsin) is not a viable transit option due to the lack of population (approximately 2,000 persons) and employment (only one major employer in Scot Forge). Long-distance bus service to Chicago and Madison from the Road Ranger convenience store in South Beloit (approximately 3 miles from the Beloit Transfer Center) is already provided by Van Gilder Bus Company, which offers and expansive array of transportation services in the region. As a result, the feasibility of new transit services between Beloit and the surrounding areas was limited to Rockford and the communities in between.

Figure 89 Work Locations of Beloit Residents

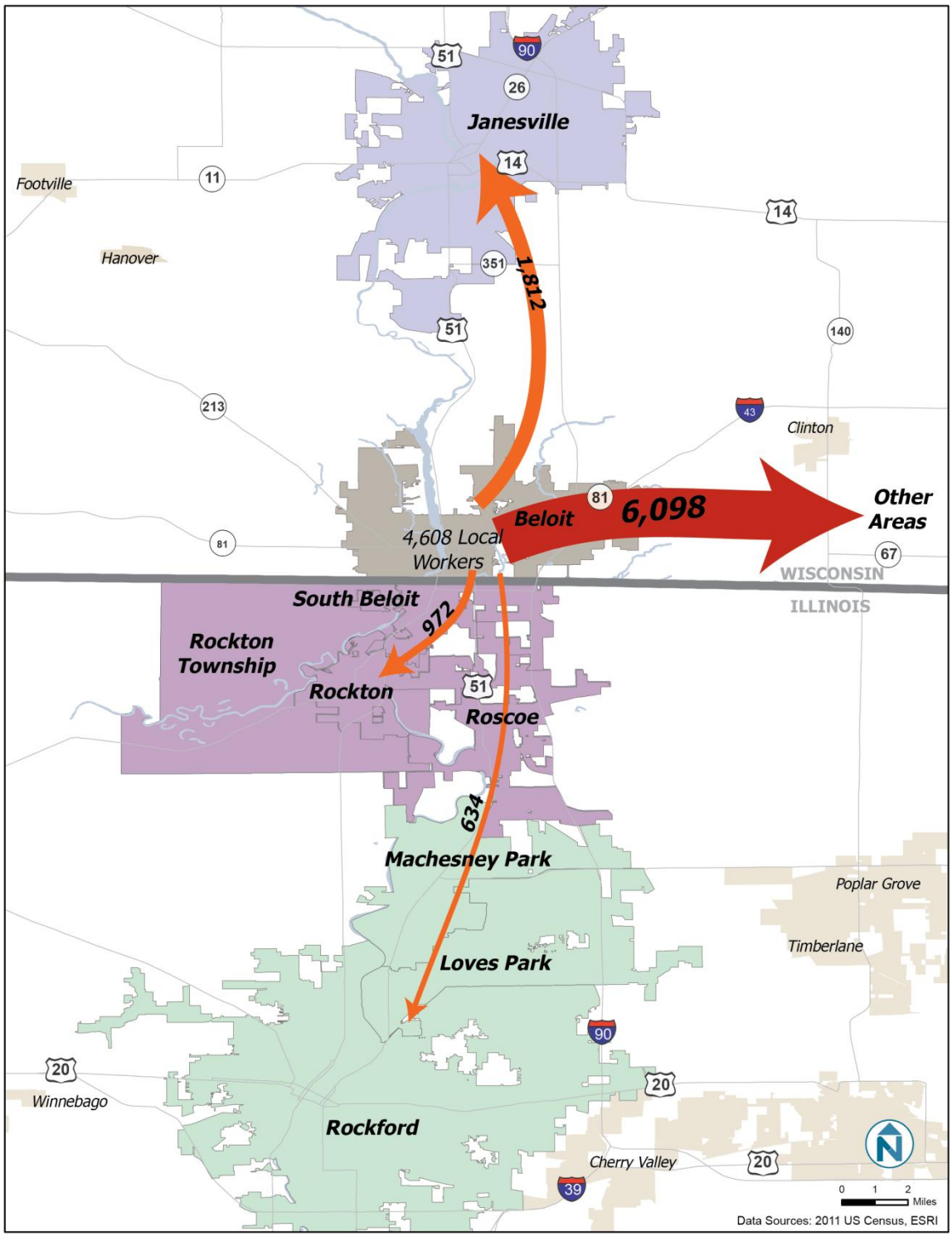


Figure 90 Work Locations of South Beloit, Rockton, Rockton Township, and Roscoe Residents

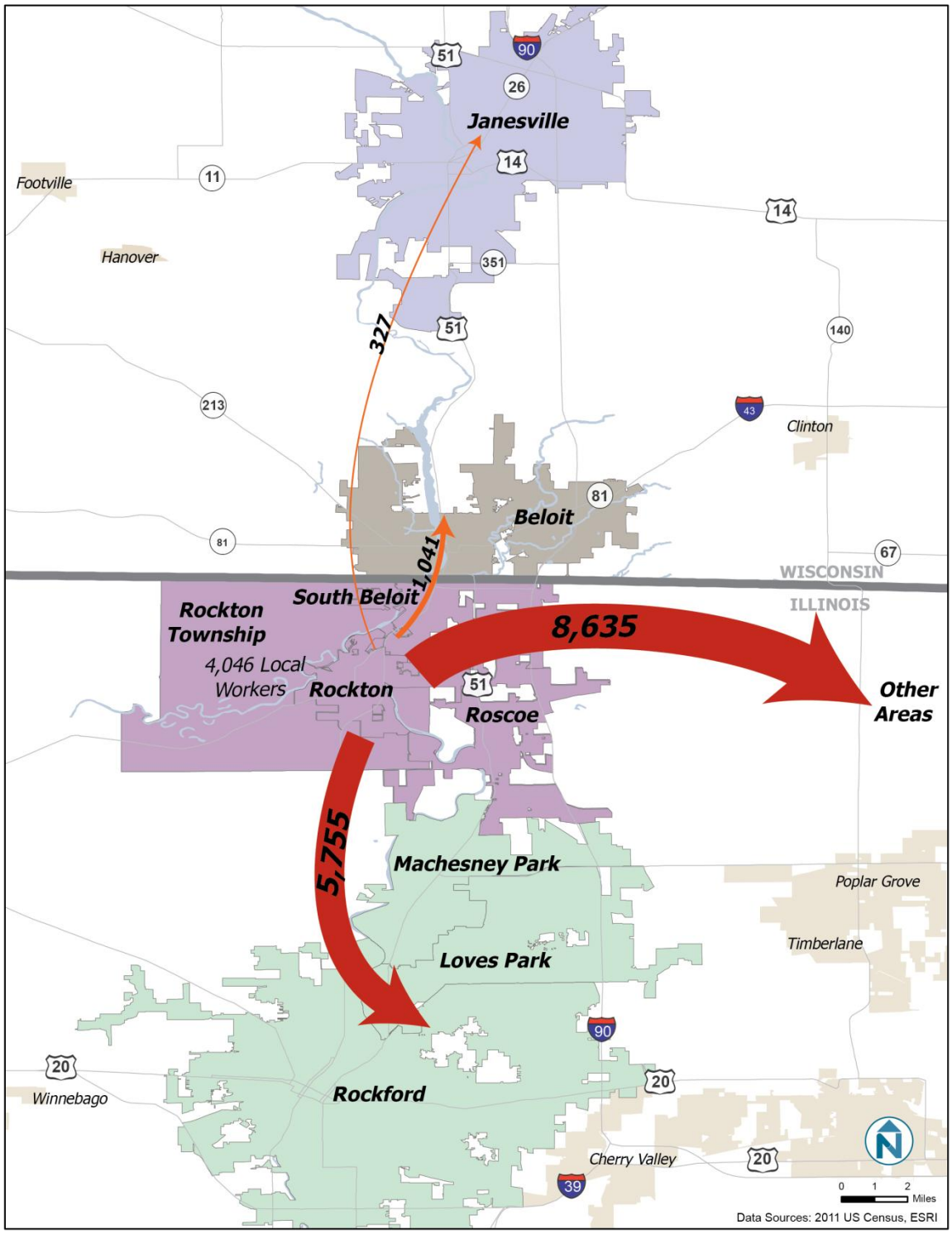
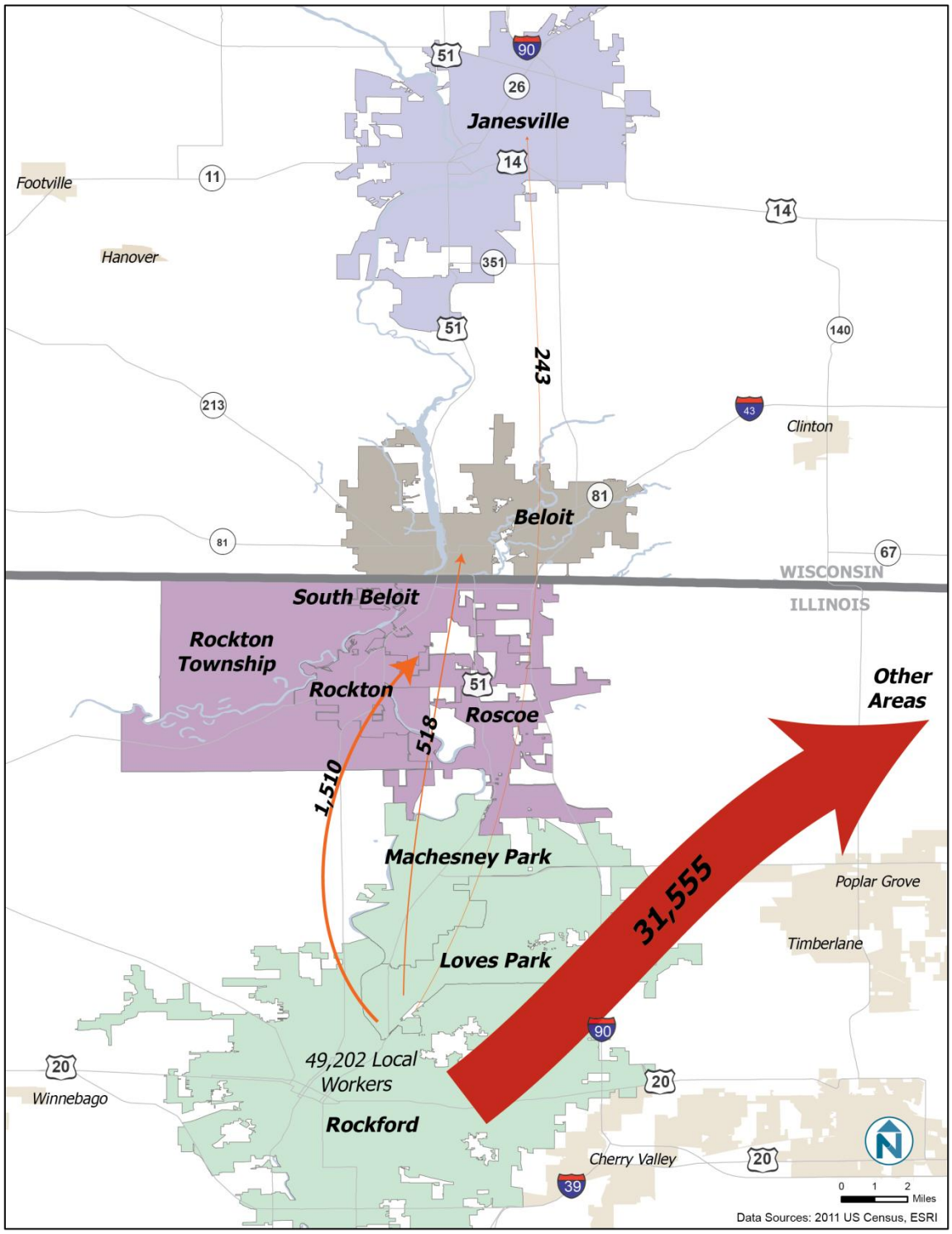


Figure 91 Work Locations of Rockford, Loves Park, and Machesney Park Residents



POTENTIAL NEW SERVICES

There are several different approaches that could be used to improve transit connections between Beloit, the South Beloit / Rockton / Rockton Township area, and the Rockford area:

- Create a regional transit route operating between Beloit and Rockford to be operated by either BTS, RMTD, or jointly operated. This could use a service model similar to the BJE route, with wide stop spacing serving key destinations along the route. It could also be operated as an express route, providing non-stop service between the Beloit Transfer Center and Rockford's Downtown Transfer Center or East Side Transfer Center, although this alternative would likely generate significantly less ridership than a BJE-style route. Bi-state routes like this exist between Duluth, MN and Superior, WI, and between La Crosse, WI and La Crescent, MN.
- Provide improved connections to the Van Galder terminal in South Beloit, which provides limited service to Rockford. If BTS operated a route to serve the terminal, riders could transfer to Van Galder buses and ride to Rockford. One disadvantage of this option is that there is limited service on Van Galder between South Beloit and Rockford, with departures at 3:45 a.m., 5:25 a.m., and 7:25 a.m., and arrivals at 8:10 a.m., 9:10 a.m., 8:10 p.m., 10:10 p.m., 10:40 p.m., 11:40 p.m., and 12:40 a.m. In addition, at least two transfers would be required to make a trip, from BTS to Van Galder and from Van Galder to RMTD, and travel times could be very long, depending on the destination.
- Expand SMTD service to include a fixed-route or deviated fixed-route operating through the SMTD service area and connecting to both the Beloit Transfer Center and RMTD service.

POTENTIAL CENSUS 2020 OUTCOMES

As of the 2010 Census, Beloit had a population of 36,966, a figure that has remained unchanged (within 1%) based on recent projections. The City of Beloit (BTS) is the direct recipient of federal and state funds allocated to the Beloit Urbanized Area (UA), which has a combined population of 58,732, and also includes the communities of Town of Beloit, Town of Turtle, Rock County, City of South Beloit, Village of Rockton, Rockton Township, and portions of Winnebago County.

A potential future threat to BTS funding is a merger of the Rockford Urbanized Area (UA) with the Beloit UA by the U.S. Census Bureau as a part of the 2020 Census. In 2010, the Census Bureau proposed rules that would have led to the merger of the Rockford and Beloit UAs. The combined population of the new UA would have been greater than 200,000, and the U.S. Department of Transportation would define it as a Transportation Management Area (TMA). In areas of this size, FTA Section 5307 funds cannot be used for operating expenses, only capital expenses. In 2013, these funds accounted for 32% of BTS revenues, so losing them would have dealt a significant blow to the BTS budget.

In the end, the proposed rules were not adopted by the Census Bureau, which instead adopted criteria to ensure that urbanized areas from the 2000 Census remained separate urbanized areas in the 2010 Census. This meant that BTS federal funding was not impacted. However, this issue may come up again during the 2020 Census process, and federal funding for BTS may again be in jeopardy.

14 PERFORMANCE METRICS

Performance metrics will maximize the effective use of limited resources by creating a rational and transparent evaluation process. This process will assist Beloit Transit in determining priorities when allocating funds and programming future transit investments. Performance metrics describe the methodology by which services are evaluated. Five metrics are proposed to measure each fixed-route.

Ridership Productivity

Ridership productivity measures route performance based on a unit of service. Local routes are evaluated based on passengers per revenue hour, which is calculated by dividing the total number of boardings by the total number of vehicle revenue hours. The Beloit-Janesville Express and School Trippers are evaluated based on passengers per revenue trip, which is calculated by dividing the total number of boardings by the total number of vehicle revenue trips.

Local Routes: Average Daily Boardings ÷ Daily Revenue Hours
Express Routes and School Trippers: Average Daily Boardings ÷ Daily Revenue Trips

Cost-Effectiveness

Cost-effectiveness is typically expressed in terms of operating cost per passenger or subsidy per passenger. Operating cost per passenger is calculated by dividing all operating and administrative costs by total boardings. Subsidy per passenger is a further refinement of this measure and is calculated by subtracting revenue generated by fares from gross operating and administrative costs, and dividing by total passengers.

Daily Administrative and Operating Costs ÷ Total Daily Boardings

Schedule Reliability

Schedule reliability is a measure of how well a particular route adheres to its schedule. It suggests whether a customer can count on a bus being there when the schedule says it will be. Buses should be considered on-time if they depart a designated timepoint between zero and 5 minutes later than the scheduled departure time. Buses should never depart a timepoint ahead of schedule unless operators are given explicit permission to do so.

Potential impacts on on-time performance include inadequate running times, traffic conditions, or construction. A high number of boardings on a particular trip or at a specific stop may also affect schedule reliability if recovery time is insufficient to absorb the added time.

Trips Departing Between Zero and Five Minutes of Scheduled Time ÷ Total Daily Trips

Recommended Performance Standards

Recommended performance standards are detailed in the table below. Standards are based on recent ridership performance trends and best practices for similar services. Performance standards should be re-evaluated biennially.

Figure 92 Recommended Performance Standards

Service Level	Riders per Revenue Hour	Riders per Revenue Trip	Schedule Reliability
Local Routes	15	-	85%
Express Routes	-	15	85%
School Trippers	10	-	90%

15 BUS STOP GUIDELINES

Stop Spacing

The distance between stops is a key element in balancing transit access and service efficiency. More closely spaced stops provide customers with more convenient access as they are likely to experience a shorter walk to the nearest bus stop. However, transit stops are also the major reason that transit service is slower than automobile trips, since each additional stop with activity requires the bus to decelerate, come a complete stop, load and unload riders, and then accelerate and re-merge into traffic. Since most riders want service that balances convenience and speed, the number and location of stops is a key component of determining that balance.

Stop Placement

Bus stop placement involves a balance of customer safety, accessibility, and operations. All stops should be fully accessible with a concrete landing and access to a sidewalk or pathway. Bus stops should be compatible with adjacent land use and minimize adverse impacts on the built and natural environment.

The initial step of determining placement of a new or relocated bus stop involves its proximity to the intersection. The placement of each bus stop can be classified as one of the following:

- Near-side—immediately prior to an intersection
- Far-side—immediately after an intersection
- Mid-block—between two intersections

Bus stops are generally located at street intersections to maximize pedestrian accessibility from both sides of the street and provide connectivity to intersecting bus routes. Far-side stops are typically ideal at signalized intersections and along high-volume arterial streets. Near-side stops are typically preferable along low-volume streets such neighborhood collector streets to reduce the possibility of stopping twice at an intersection (stop sign and bus stop).

Bus turning movements, driveways, and dedicated turn lanes sometimes restrict the placement of stops at or near an intersection and necessitate a mid-block stop. Mid-block stops may also be considered when destinations are a significant distance from intersections. Mid-block stops may be the only option at major intersections with dedicated turn lanes.

Infrastructure consideration for bus stop placement includes the presence of sidewalks, lighting, topography, and roadside constraints such as driveways, trees, poles, fire hydrants, etc.

Key advantages and disadvantages of each bus stop placement option are described in Figure 93.

Figure 93 Bus Stop Placement Considerations

	Advantages	Disadvantages
Near-side stops	Shortest distance from bus door to a crosswalk, which encourages riders to use crosswalks	Most exposure to traffic delays. May require more than one traffic cycle Increases conflict with right-turning vehicles May block travel lane with queuing buses May obscure motorists' view of traffic control devices and crossing pedestrians
Mid-block stops	Typically improves access to destinations on large tracts Minimizes motorist and pedestrian line of sight concerns	May require bus pullout on high-speed streets Encourages riders to cross street mid-block
Far-side stops	Encourages riders to use nearby crosswalks Allows bus operators to use intersection as a deceleration lane Allows additional right-turning capacity before intersection	May restrict travel lanes on far-side of intersection