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PART 2: Transit Alternatives Report
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5.0 TRANSIT ALTERNATIVES REPORT

5.1 INTRODUCTION

5.1.1 Overview

The intent of the Southwest Corridor Study is to evaluate the feasibility of premium transit improvements in the study corridor, and provide recommendations as to the type of transit service warranted, the most appropriate alignment and configuration, as well as transit station locations. In addition to this transportation planning function, the study also examines the opportunities for transit to serve as a catalyst for land use redevelopment in the corridor especially at key transit station locations, and in so doing leverage transit to support corridor renewal and economic development.

This work was accomplished in this study by following a multi-step process as follows:

- Researching and documenting relevant background information such as recent plans and studies, the most recent applicable documents addressing transit planning including the 2035 Regional Transportation Plan and the 2012 Short Range Transit Plan and others, and the resources within the current travel demand model for the region.
- Identification of the basis for examining ways to improve transit service in the study corridor by developing a project Purpose and Need statement.
- Development of project Goals and Objectives derived from the Purpose and Need statement.
- Formulation of a three-step alternatives analysis process including identification of transit alternatives, screening of these options through a sequence of technical analysis, and identification of the preferred transit alternative.

This process was conducted with input and feedback from the public and the corridor community through a series of public workshops and ongoing coordination with several study working groups and the study steering committee. This part of the study documentation provides a description of the transit alternatives process and the outcome of that process.

5.1.2 Existing Transit Conditions

5.1.2.1 Service Characteristics

To provide context for planning of improved transit service, existing services are first profiled. There are four public transportation systems that currently operate in Jefferson County and the City of Birmingham including the Birmingham Jefferson County Transit Authority (BJCTA) which operates the MAX, the Regional Planning Commission of Greater Birmingham which operates the Commute Smart vanpool program, ClasTran which provides coordinated human service transportation in Jefferson, Shelby and Walker counties and Blazer Express operated by UAB. BJCTA provides the transit services in the US 11 Southwest Corridor.

BJCTA/MAX provides fixed route and paratransit service to ten municipalities. The current service area is estimated to be 176 square miles. The municipalities within the service area are Birmingham, Bessemer, Fairfield, Homewood, Mountain Brook, Midfield, Tarrant, Center Point, Hoover, and Vestavia Hills. Figure 5.1 shows the routes serving the Southwest Corridor.
Figure 5.1. MAX Routes in the Southwest Corridor
Table 5.1 shows the National Transit Database information for fiscal years 2007 and 2012. As of October 2013, the MAX operates 58 peak buses on 37 routes. One of the newer MAX buses fueled by Compressed Natural Gas (CNG) is shown in Figure 5.2.

Table 5.1. MAX Operating Statistics FY 2007 and FY 2012

<table>
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<th>FY 2007</th>
<th>FY 2012</th>
<th>Average Annual Change</th>
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<tr>
<td>Unlinked Trips</td>
<td>3,124,269</td>
<td>2,734,046</td>
<td>-2.6%</td>
</tr>
<tr>
<td>Revenue Miles</td>
<td>2,867,445</td>
<td>2,718,346</td>
<td>-1.1%</td>
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<tr>
<td>Revenue Hours</td>
<td>231,342</td>
<td>223,692</td>
<td>-0.7%</td>
</tr>
<tr>
<td>Operating Expenses</td>
<td>$19,322,604</td>
<td>$22,295,644</td>
<td>2.9%</td>
</tr>
<tr>
<td>Passenger Fares</td>
<td>$2,245,640</td>
<td>$2,212,502</td>
<td>-0.3%</td>
</tr>
<tr>
<td>Net Cost of Service</td>
<td>$17,076,964</td>
<td>$20,083,142</td>
<td>3.3%</td>
</tr>
<tr>
<td>Operating Expense per Revenue Hour</td>
<td>$83.52</td>
<td>$99.67</td>
<td>3.6%</td>
</tr>
<tr>
<td>Operating Expense per Revenue Mile</td>
<td>$6.74</td>
<td>$8.20</td>
<td>4.0%</td>
</tr>
<tr>
<td>Recovery Ratio</td>
<td>11.6%</td>
<td>9.9%</td>
<td>-3.1%</td>
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Source: National Transit Database

MAX ridership declined through 2010 but has shown a slight rebound in 2011 and 2012. Also note that UAB ended their service contract with BJCTA in 2013 and has started a separate system for the University.
During the five year period FY 2007 to FY 2012, unlinked trips on MAX fell 2.6 percent per year while operating expenses increased an average of 2.9 percent per year. The operating cost of a revenue hour of transit service increased by 3.6 percent per year on average.

5.1.2.1 Peer Comparison

Birmingham’s transit operations have been compared to 12 other peer systems throughout the Southeast. Systems of similar size in terms of peak revenue vehicles and service area population were selected. Those systems are Raleigh, Little Rock, Tallahassee, Knoxville, Chattanooga, Durham, Winston-Salem, Greensboro, Lexington, Charleston, and Cobb County, GA. The recently published National Transit Database Report Year 2012 was utilized for the analysis which shows that BJCTA’s MAX is a troubled transit system that has been losing ridership over time.

During the 2012 reporting period, when compared to these 12 systems, MAX did not perform well on any of the performance measures evaluated. MAX’s performance problems are well recognized in Birmingham. The following points summarize the findings of the peer review:

- System Productivity – Riders per revenue hour of service: 12th place (lowest)
- Farebox Recovery-Share of operating cost from fares paid: 11th place (2nd lowest)
- Operating Cost per Revenue Hour of Service: 9th place (3rd highest)
- Operating Cost per Revenue Mile of Service: 9th place (3rd highest)
- Unlinked Transit Trips per Capita in the Service Area: 12th place (lowest)
- Operating Cost per Trip: 12th place (highest)
- Maintenance Cost per Mile of Service: 12th place (highest)
- Ridership Growth (2007-2012): 11th place (2nd lowest with 2.6% decline/yr)
- Annual Revenue Hours of Service (2007-2012): 0.7% decline per year

The low ranking for cost-related statistics is aggravated due by the relatively low frequency of service provided and the resulting low level of ridership which in turn exaggerates the unit costs for the measures. The BJCTA Board and the Birmingham City Council as the primary financial sponsor are taking steps to improve the service. During 2013 significant progress has been made with a new general manager and investment in new vehicles.
5.2 PROJECT DESCRIPTION

Downtown Birmingham is the focal point for bus transit in the region. The Southwest Corridor has a historical legacy of the earliest developments in the area, including the steel and mining industry around which the region initially grew. This development was supported by a network of rail lines, roads, and later trolley lines, as part of the region’s mobility evolution. While the legacy industries have waned in their intensity and impact on the corridor, the Southwest Corridor nevertheless remains a well-defined travel corridor with several notable activity centers and significant use of transit services provided by BJCTA.

Figure 5.3 shows the 22-mile long corridor study area that extends from downtown Birmingham southwest to the Tuscaloosa-Jefferson County line, and is also bounded by I-20/59 to the north and the Red Mountain ridge along the east. The principal surface street in the corridor is US 11, also known as the Bessemer Super Highway.

The project area includes portions of the City of Birmingham and Bessemer, as well as all of the cities of Fairfield, Lipscomb, Brighton and Midfield. There are also unincorporated areas of Jefferson County that comprise the balance of the study area. Each community has a unique character and history and comprises a combination of residential, industrial, and commercial uses, complemented by parks and open spaces, governmental facilities, as well as medical and educational centers. The study corridor has long-established neighborhoods on the east end of the corridor and emerging residential and commercial areas on the west.

The corridor developed around the iron and steel industry in the late 1800’s when Birmingham and Bessemer were founded. The natural resources of the area included iron ore, limestone and coal in proximity to each other and lead to the growth of its core enterprise of steel making and allied manufacturing. As the area developed, Fairfield, Lipscomb and Brighton were founded just after 1900. Midfield was incorporated decades later in 1953 during suburban growth.

The northern two-thirds of the corridor as a result of this history are mature, and have experienced decline in connection with the diminishing role of the steel industry and other industrial activity in the corridor. The southern reach of the corridor has been experiencing modest growth in suburban residential and commercial development, as well as a warehousing and distribution center, and a new Norfolk Southern Railroad regional intermodal center. The other Class 1 railroad in the corridor, the CSX Railroad has a smaller intermodal center in Bessemer.
Figure 5.3. Study Area
5.3 PLANNING CONTEXT

The RPCGB guides the transportation planning process in the Birmingham region. The agency represents a nine-county area including municipalities and county governments, ALDOT, and other local and regional jurisdictions, including BJCTA operating in Jefferson County and other smaller transit service providers and social service agencies. Through this process, RPCGB develops both short-term and long-term transportation plan; in addition, it also manages and distributes transportation funding to member agencies. In addition to the transportation plans developed by RPCGB, it also developed a Regional Alternatives Analysis for future transit improvements. RPCGB coordinates with BJCTA which has developed a Short Range Transit Plan in 2012 to guide near-term transit improvements. The plans and their status are described in Part 1: Corridor Framework Report.

5.4 TRANSIT PROJECT FRAMEWORK

This section describes the proposed transit project’s purpose and need and related goals and objectives derived from the purpose and need. The purpose and need defines the overall transportation problem to be addressed in the Southwest Corridor, and was developed using input from scoping, collected data, and technical analyses. The purpose and need in turn informs the goals and objectives, which provide the framework through which the selection of the preferred alternative is accomplished.

5.4.1 Corridor Problem Statement

The cities comprising the Southwest Corridor are challenged to meet mobility, housing, and economic development needs by the continuing loss of population and employment, the below-average economic standing of many corridor households due to unemployment or lack of education, retail and commercial districts that are aging or in obsolescence, declining condition of the housing stock, poor transportation connectivity across all modes, reductions in public services and public infrastructure maintenance, underutilization of existing transportation resources, and limited transit, bicycle, and pedestrian options.

Mobility and access in the study area are hampered in part by the reduced level of auto availability and economic resources of many corridor residents, coupled with insufficient transit, bicycle, and pedestrian options. The limitations of the non-auto transportation resources are particularly evident when travel between communities and neighborhoods within the corridor is attempted. These shorter, local trips are the dominant type of travel. Transportation-related problems caused by these deficiencies include limitations in travel and lengthier travel times as compared to travel by auto. Table 5.2 summarizes existing travel times in the study corridor for different travel options.
Table 5.2. Existing Corridor Travel Time Statistics – Academy Drive to BJCTA Central Terminal

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<th>Mode/Path</th>
<th>Off-Peak Travel Time</th>
<th>Peak Travel Time</th>
<th>Off-Peak Travel Time Ratio Compared to Auto via I-20/59</th>
<th>Peak Travel Time Ratio Compared to Auto via US 11</th>
<th>Off-Peak Travel Time Ratio Compared to Auto via US 11</th>
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<tr>
<td>Auto via I-20/59</td>
<td>20 min.</td>
<td>26 min.</td>
<td>1.00</td>
<td>1.00</td>
<td>0.63</td>
</tr>
<tr>
<td>Auto via US 11</td>
<td>32 min.</td>
<td>36 min.</td>
<td>1.60</td>
<td>1.38</td>
<td>1.00</td>
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<td>Transit via Route 1</td>
<td>65 min.</td>
<td>65 min.</td>
<td>3.25</td>
<td>2.50</td>
<td>2.03</td>
</tr>
<tr>
<td>Bicycling via US 11</td>
<td>100 min.</td>
<td>100 min.</td>
<td>5.00</td>
<td>3.85</td>
<td>3.12</td>
</tr>
<tr>
<td>Walking via US 11</td>
<td>310 min.</td>
<td>310 min.</td>
<td>15.50</td>
<td>11.92</td>
<td>9.69</td>
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Note: Transit travel time excludes any initial wait time.
Source: Google Earth

From this summary the following observations can be made:

- Auto travel time through the corridor is 38% to 60% more via the surface street route of US 11 compared to the slightly longer distance path via I-20/59.
- Transit travel time is longer than the freeway route by auto by a ratio of 2-1/2 to over 3 times, and by a ratio of 1.8 to 2 longer than the US 11 route by auto. These ratios exclude any access and wait time for transit.
- Bicycling and walking are not practical options for such a long trip.
- The auto trip via freeway takes up to 30% more time in the peak hour compared to the off-peak, but is still a relatively time-efficient trip. The auto trip via US 11 takes up to 18% more time in the peak hour compared to the off-peak, requiring 10-12 minutes more travel time than the freeway route.
- Travel by transit is not competitive in terms of travel time compared to auto travel, especially when transit access and wait time are considered.

The corridor problems discussed above also contribute to a lack of economic opportunity at the individual, communitywide, and regional levels. Examples are access to regional jobs by corridor workers, and access to corridor resources such as colleges and health care facilities by corridor and regional residents alike. Individually, each of these issues contributes to reduced quality of life, mobility, and economic competitiveness. Collectively, they are a significant obstacle to creating sustainable growth and a more vibrant and livable community into the future. Reversing these fortunes will require a comprehensive and progressive solution is required to integrate land use, economic development, social, and transportation needs holistically.

5.4.2 Project Purpose

The primary transportation purpose of this project is to improve access and mobility for existing and future Southwest Corridor residents and workers by improving transit options, with interconnections to the rest of the BJCTA transit system and bicycle/pedestrian network elements. These improvements should be consistent with the previous planning efforts relating to transit in this corridor, including the 2004 Regional Alternatives Analysis, the 2012 BJCTA Short Range Transit Plan and the prior 2008 BJCTA Comprehensive Transit Development Plan, and the 2035 Regional Transportation Plan. In addition to its
transportation purpose, the Southwest Corridor Study has land use and economic development components that can be supported by addressing the transportation purpose to stimulate economic activity and corridor growth. The project purpose for the Southwest Corridor responds to several significant identified needs, discussed below.

5.4.3 Project Needs

The significant needs for this corridor have been identified as follows:

- Need to improve limited regional connectivity.
- Need to strengthen reliable alternate modes of travel.
- Need to support community vitality and economic development.
- Need to address the limited transportation options for underserved populations.

These are each discussed further in the following narrative.

5.4.3.1 Regional Connectivity

The existing transit service in the study area does not have sufficient quality of service in terms of frequency, schedule speed and reliability to properly serve the non-auto travel demand within the study corridor and region. Providing access and improving mobility to, through, and in the study corridor is critical to enhancing regional connectivity. Improved transit service will also enhance regional accessibility to jobs in the study corridor as well for residents of the study corridor to access jobs in downtown and outside the study corridor.

The Southwest Corridor transit project would provide an important regional link between the corridor activity centers and downtown Birmingham. BJCTA is embarking on the expansion and modernization of its downtown transit terminal to become the multi-modal transportation hub of the Birmingham region, linking regional transit services, Greyhound intercity transit service, Amtrak rail service, and ground transportation (including taxis, shuttle buses, and bicycle/pedestrian movements). With some of the highest ridership routes in the BJCTA network occurring in the Southwest Corridor, improved transit service along the corridor and to downtown would expand mobility options for current and new transit users.

From the highway perspective, long range transportation planning shows congestion growing on the I-20/59 corridor on the border of the study area. Current peak hour congestion is limited to the highway segment closest to downtown and a segment adjacent to Fairfield, but based on 2035 projections, this congestion will extend further south to the Tuscaloosa-Jefferson County line and on I-459 through the study area as well. Premium transit choices, coupled with park-and-ride lots, are needed to divert some of this increased travel demand away from the highway mode and maintain acceptable regional connectivity. Figure 5.4 shows the proposed regional transit system.
5.4.3.2 Reliable Alternate Modes of Travel

Transportation options in the project area are currently limited to automobile travel and the existing fixed-route bus service. The Birmingham region is lacking in basic and premium transit service compared to its peer cities. Interviews with stakeholders at the beginning of the study revealed that prospective employers are prone to ask job applicants if they have access to a car, because the transit service is not considered reliable enough to ensure that employees can be at work on time. Also, for service trades with odd hours, transit service may not be available. A region’s vitality has been shown to be in part dependent upon its investment in alternative modes of travel, transit as well as bicycling, ridesharing, and walking. Improved transit service in the Southwest Corridor would give both those traveling outside the corridor and those traveling into the corridor a reliable alternative means to reach key destinations for a variety of trip purposes, and to quickly access the new downtown intermodal transportation center.

5.4.3.3 Transportation Options for Underserved Populations

Throughout the public outreach process for this study, it was apparent that there was a strong public demand and need to better serve populations in the study area with improved transit. Better transit service would provide access for users in the corridor and workers in the region. These users include employees, corridor residents, and other metropolitan area travelers traveling to key
activity centers within the corridor for educational, medical, government, shopping, recreational, and other purposes.

Improved transit service is also important for individuals without limited or no access to vehicles and minority, low-income, disabled, and elderly populations throughout the corridor. According to the demographic data presented in Part 1, the study area has disproportionate representation among these transportation-disadvantaged, environmental justice population groups as compared to the overall region.

Existing transit service is infrequent, slower in speed, and somewhat unreliable, with few amenities for its patrons. According to a 2008 Study (BJCTA Comprehensive Transit Development Plan, Wilbur Smith Associates), the service provided in terms of miles of service per capita and revenue hours of service per capita are at a level about 1/3 of the average of several peer transit systems. This leads to a resulting transit trips per capita rate that is also about 1/3 of peer transit systems. Bus route frequencies are generally in the range of 60 minutes, which is less convenient; as a result, transfers between routes at the Central Terminal can be lengthy. Even the transit captive are reluctant to use the service for these reasons, but usually have no other good choice. Despite these issues, some of the higher ridership routes lie within the study area. These points indicate a need to provide public transit and bicycle/pedestrian options in those areas where environmental justice populations have been identified in the study area.

5.4.3.4 Community Vitality and Economic Development

Much of the Southwest Corridor is an older, mature urban and suburban corridor with declining housing stocks and diminishing retail and employment resources for its residents and visitors. The corridor has undergone population and employment decline and regional forecasts to 2035 anticipate further decline of about 20% in the part of the corridor between I-65 and I-495, and small increases in downtown Birmingham and the McCalla area, for an overall loss of 14%.

In recent decades, the region’s land development patterns have been skewed to the suburban fringes and dominated by low-density, auto-centric development. Meanwhile, older, more mature urban districts have experienced little to no redevelopment and signs of decline over the same period. Market and demographic analyses show that without intervention these trends are set to continue into the future. If the existing low-density land use patterns and skewed development trends continue, this may lead to increased roadway congestion, decreased mobility, and a reduced quality of life, while doing nothing to address the lack of economic opportunities and quality of life issues, or make use of infrastructure capacity and redevelopment opportunities in the central city and adjacent urban districts. While population growth and development in part of the corridor and elsewhere in the region is a positive dynamic, a broader revitalization throughout the Southwest Corridor is needed. The data highlight a need to provide public transit improvements to accommodate growing population in the Center City and Five Points South while encouraging redevelopment in the study area.

The introduction of enhanced transit service can serve as a catalyst to increased use of transit and the synergism that can be created with land uses near major transit stations and key corridor activity centers. The application of transit-oriented development strategies and improved design of the urban realm can enhance community vitality and be a springboard to further redevelopment. The application of progressive land use and urban design policies, the development of Complete Streets, and integration of transit and community with the planned Red Rock Ridge and Valley Trail System can further influence
redevelopment and revitalization of the corridor retail and residential districts. A more integrated system of non-highway travel options can also contribute to improved air quality, which is another regional goal. Thus, there is need to increase transportation options in parallel with changes in land use and development patterns in the study area to improve economic opportunities and quality of life.

5.4.4 Project Goals and Objectives

Building upon the review of existing and future corridor conditions in Part 1, the purpose and need analysis, and feedback received from the public during several outreach sessions, the following goals and objectives were developed to guide the development and evaluation of alternatives.

1. **Theme: CONNECT** - Provide more and better transportation choices for corridor and regional travelers.

**Goal 1A: Access and Mobility.** Improve connectivity between transit services and land uses.

**Objectives**
- Promote connectivity to other transit services and the regional trail system.
- Improve regional accessibility and mobility.
- Facilitate connections between significant activity centers.
- Support adopted transit and transportation plans.

**Goal 1B: Service Quality.** Provide for enhanced service quality scaled to needs.

**Objectives**
- Maximize transit ridership for the level of capital investment.
- Preserve existing transportation capacity and access along the transit service corridor.
- Provide transit service scaled to the corridor demand patterns.
- Improve reliability and quality of service.

2. **Theme: CULTIVATE** - Provide more and better transportation choices for corridor and regional connectivity with a solution scaled to needs.

**Goal 2A: Community.** Leverage opportunities to reinforce community vitality and redevelopment.

**Objectives**
- Enhance accessibility to key corridor activity centers.
- Maintain consistency with local land use plans.
- Support opportunities for new and redeveloped land uses.
- Promote synergy between land use and transit.

**Goal 2B: Environment.** Avoid, minimize, and mitigate adverse impacts on the natural, social, and cultural environments.

**Objectives**
- Minimize adverse impacts to historic resources.
- Minimize impacts to wetlands and sensitive habitats.
- Minimize disproportionate impacts and maximize benefits to minority and low income populations.
- Minimize impacts to the built environment, including right-of-way needs.
3. **Theme: PROSPER - Support economic investment opportunities**

**Goal 3A: Economic Development.** Enhance mobility by providing transportation choices.

**Objectives**
- Serve sites with the most potential for redevelopment.
- Provide improved access to jobs and training sites.
- Provide access to prime industrial and commercial development and redevelopment sites.

**Goal 3B: Implementation.** Identify a cost-effective transportation solution with good potential for implementation.

**Objectives**
- Provide a cost-effective transportation solution.
- Provide compatibility with other corridor LPAs.
- Require reasonable capital investment.
- Have reasonable operational costs.
- Optimize use of federal and other funding.

These six major goals – access and mobility, service quality, community, environment, economic development, and implementation are directly related to addressing the identified transportation needs of the study corridor. The relationship between these goals and the corridor transportation needs is summarized in Table 5.3.

Table 5.4 summarizes the transportation goals and objectives in relation to the alternatives screening framework, showing the evaluation screening criteria for each of three stages of alternatives screening.
<table>
<thead>
<tr>
<th>Goals</th>
<th>Corridor Transportation Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>THEME: CONNECT</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **Goal 1A: Access and Mobility**  
Provide for improved connectivity between transit services and land uses. | This goal supports the need for improved *regional connectivity* and improved transportation options for *underserved populations*. There is a significant need to expedite travel times from locations within the corridor to other key locations within the corridor as well as to downtown Birmingham. The downtown is the site of many jobs, including those at the UAB campus, medical centers, government offices and others. It is also the location of the BJCTA transit terminal where transit users gain access to other BJCTA routes so that they can reach other trip destinations, as over 25% of BJCTA users make trip transfers at this location. |
| **Goal 1B: Service Quality**  
Provide for enhanced service quality scaled to needs. | This goal supports the development of the necessary and sufficient transit capacity to provide a *reliable alternate mode of travel* that enhances *regional connectivity*. Potential transit solutions are influenced by the cost of being developed into specific alignments, so it is important to tailor them to the specific travel needs of the corridor. |
| **THEME: CULTIVATE** | |
| **Goal 2A: Community**  
Leverage opportunities to reinforce community vitality and redevelopment. | This goal recognizes the importance of supporting *community vitality* in exploring alternatives. Extensive community planning efforts have taken place in the study corridor with the intent to integrate transit into existing and future developments. It is important to provide transit service that is consistent with past and on-going planning efforts while enhancing communities and minimizing adverse effects on the local residents and businesses. |
| **Goal 2B: Environment**  
Avoid, minimize, and mitigate adverse impacts to the natural, social and cultural environments. | This goal underpins the significance of maintaining and enhancing *community vitality* by managing a variety of potential impacts to social, environmental, and economic resources. It also underscores the relevance of considering both impacts and benefits to the high percentages of *underserved populations* (low-income, minority, and transit dependent) in the corridor. |
| **THEME: PROSPER** | |
| **Goal 3A: Economic Development**  
Support economic investment opportunities. | Any transit solution implemented in the corridor should be supportive of *economic development* strategies that would encourage reinvestment in corridor residences, businesses, and employment opportunities. |
| **Goal 3B: Implementation**  
Identify a cost-effective transportation solution with good potential for implementation. | This goal recognizes the importance of providing a *cost-effective* transit solution that has good potential for implementation for efficiently addressing the identified needs. The solution should be scalable to add future capacity if needed, and fit within the anticipated corridor funding capabilities of the region. |
Table 5.4  Project Goals and Objectives in Relation to Alternatives Screening Framework

<table>
<thead>
<tr>
<th>Goals</th>
<th>Objectives</th>
<th>Evaluation Criteria by Screening Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>THEME: CONNECT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access and Mobility</td>
<td>Provide for improved connectivity between transit services and land uses.</td>
<td>• Promote connectivity to other transit services and the regional trail system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Improve regional accessibility and mobility.</td>
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<tr>
<td></td>
<td></td>
<td>• Facilitate connections between significant activity centers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Support adopted transit and transportation plans.</td>
</tr>
<tr>
<td>Service Quality</td>
<td>Provide for enhanced service quality scaled to needs.</td>
<td>• Maximize transit ridership for the level of capital investment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Preserve existing transportation capacity and access along the transit service corridor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Provide transit capacity scaled to the corridor demand patterns.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Improve reliability and quality of service.</td>
</tr>
<tr>
<td>THEME: CULTIVATE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>Leverage opportunities to reinforce community vitality and redevelopment.</td>
<td>• Enhance accessibility to key corridor activity centers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Maintain consistency with local land use plans.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Support opportunities for new and redeveloped land uses.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Promote synergy between land use and transit.</td>
</tr>
<tr>
<td>Environment</td>
<td>Avoid, minimize, and mitigate adverse impacts to the natural, social and</td>
<td>• Minimizes impacts to parks, historic, cultural and religious sites.</td>
</tr>
<tr>
<td></td>
<td>cultural environments.</td>
<td>• Minimizes impacts to wetlands and sensitive habitats.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimize disproportionate impacts and maximize benefits to minority and low income populations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Minimize impacts to the built environment, including right-of-way needs.</td>
</tr>
</tbody>
</table>

**1. Transit Technology Screening**

- Does the technology contribute to corridor and regional connectivity, mobility and accessibility?
- Does the segment contribute to a route that enhances connectivity with and between other transit services and key activity centers?
- Number of connections to other transit service and non-motorized facilities.
- Transit travel time over corridor length.
- Number of key corridor activity centers served.
- Consistency with adopted transit and transportation plans.

**2. Transit Alignment Screening**

- Is the technology capacity scaled to the corridor ridership potential?
- Is the route segment compatible with the shortlisted transit technologies?
- Average daily transit ridership in 2035.
- Number of affected sites.
- Number of affected sites.
- Impacts and benefits to transportation disadvantaged populations.

**3. Final Transit Alternatives Screening**

- Is the technology compatible with corridor conditions and roadway cross-sections?
- Can the route segment support technology cross-section requirements?
- Extent of impact to properties and their access.
- Capacity of transit solution in relation to forecasted ridership demand.
- Transit travel time over corridor length.
- Number of affected sites.
- Number of affected sites.
- Impacts and benefits to transportation disadvantaged populations.
- Property impacts and acquisition needs.
<table>
<thead>
<tr>
<th>Goals</th>
<th>Objectives</th>
<th>Evaluation Criteria by Screening Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1. Transit Technology Screening</td>
</tr>
<tr>
<td>THEME: PROSPER</td>
<td>Support local and regional economic development opportunities, with a cost-effective transit solution that can be implemented.</td>
<td></td>
</tr>
<tr>
<td>Economic Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support economic investment opportunities.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Serve sites with most potential for redevelopment.</td>
<td>• Technology can be supportive of redevelopment around station areas?</td>
<td>• Does the route segment contribute to access to potential redevelopment sites?</td>
</tr>
<tr>
<td>• Provide improved access to jobs and training sites.</td>
<td>• Does the technology provide good access to jobs, training and redevelopment sites?</td>
<td>• Does the route segment support improved access to jobs, training and redevelopment sites?</td>
</tr>
<tr>
<td>• Provide access to prime industrial and commercial development and redevelopment sites.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation</td>
<td>Identify a cost-effective transportation solution with good potential for implementation.</td>
<td></td>
</tr>
<tr>
<td>• Provides a cost-effective transportation solution.</td>
<td>• Is the technology cost-effective for the corridor conditions?</td>
<td>• Does use of this route segment support a cost-effective solution?</td>
</tr>
<tr>
<td>• Provides compatibility with other corridor LPAs.</td>
<td>• Is the technology compatible with other corridor transit technologies?</td>
<td>• Not applicable.</td>
</tr>
<tr>
<td>• Requires reasonable capital investment.</td>
<td>• Is the technology expensive?</td>
<td>• Does use of this route segment support an affordable transit solution?</td>
</tr>
<tr>
<td>• Has reasonable operational costs.</td>
<td>• Are operating costs reasonable for likely available resources?</td>
<td>• Not applicable.</td>
</tr>
<tr>
<td>• Optimizes use of federal and other funding.</td>
<td>• Does the technology qualify for potential FTA funding sources?</td>
<td>• Not applicable.</td>
</tr>
</tbody>
</table>
5.5  ALTERNATIVES DEVELOPMENT AND EVALUATION

5.5.1  Alternatives Screening and Evaluation

Drawing from the corridor purpose and need discussion, a framework was created for the development and evaluation of alternatives. The framework began with the identification of project goals and objectives based on the corridor purpose and need, and input from the public and involved agencies and stakeholders through community and committee meetings. The goals and objectives then served as the foundation for evaluation criteria that were developed for use in a three-stage screening process that leads to the identification of the locally preferred transit alternative for the Southwest Corridor.

Alternatives were developed based on previous studies and input provided by the project team, and members of the public, and other study participants. Given the number of alternative elements and variations, the first two stages of the screening process compared alternative elements within the categories of transit technologies and potential transit service alignments. Once those elements were reduced as a result of the first two stages of screening, the remaining alternative elements were combined into final corridor alternatives for the final stage of evaluation and screening. Alternatives were evaluated in more detail at each screening stage, based on evaluation criteria that were developed in response to the identified goals and objectives and corridor purpose and need.

During the study process, options for alternatives were discussed at public meetings and study working group and steering committee meetings, as well as other sessions, to solicit input and feedback to the screening process. As part of the alternatives process, consideration was given to a No Action alternative that incorporated existing and committed transportation improvements actions in the study corridor, a Transportation Systems Management (TSM) alternative that considered certain new improvements in the corridor including more frequent transit service, and a Build alternative that proposed significant new upgrades to transit service in the study corridor.

The screening stages are further described as follows:

**Stage 1 Screening: Transit Technologies**
A series of “yes or no” questions reflective of the goals and objectives were used during the first stage of screening of transit technologies. The purpose of this screening was to sort through the transit technology options to identify the most appropriate transit service modes for the study corridor. Comments are provided to support this first stage of screening. Alternatives not eliminated in this initial screening were later incorporated into the development of final alternatives for detailed comparative screening.

**Stage 2 Screening: Transit Alignments**
In this stage of comparative screening, the study process identified potential transit alignments to be considered in support of the results of the first stage of screening for transit technologies. The purpose of this screening was to identify those alignment segments that were most practically suited for considered as a premium transit service corridor, based on the segment features and the surrounding

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urban context as related to land use and economic development goals. A qualitative (good 1/better 2/best 3) scoring approach was used to determine the alignment alternatives that were more effective in addressing the identified goals and objectives.

**Stage 3 Screening: Final Transit Alternatives**

Alignments, station locations, and technologies remaining after comparative screening, were combined to create several different corridor-wide transit alternatives for analysis in detailed screening. A quantitative (measure-based) analysis was used to identify the strengths and weaknesses of the various alternatives.

As part of the community outreach process, the project team developed support information and interactive exercises that permitted members of the public to provide their opinions and sentiments regarding transit technologies and transit alignments, for consideration by the study team as part of the evaluation process.

### 5.5.2 Reasonable Range of Alternatives

For any transit study corridor, there are a wide range of potential alternatives that can be defined and explored as potential improvement solutions to identified transportation needs in that corridor. The alternatives include several different elements of the potential transit solutions, including:

- **Transit technology:** this term refers to the types of possible transit service (or transit modes) to be considered. These could include but not be limited to heavy rail transit like MARTA in Atlanta, light rail transit such as that in Dallas or St. Louis, bus rapid transit such as the new North-South MetroRapid BRT line in Tampa, and others.
- **Transit alignment:** this refers to the pathway that the transit service would follow, which could include arterial streets and perhaps freeway segments, unused corridors, or railroad corridors.
- **Alignment configuration:** this term refers to way in which the transit service is positioned within its alignment, in terms of its placement with other features in the corridor, and its profile or vertical alignment (elevated or depressed) if different from the rest of the alignment features. For example, heavy rail transit requires a completely separated alignment for safety and security reasons, to the side of an existing roadway and grade-separated at intersecting streets. Light rail transit can be configured like heavy rail transit, or can operate within a city street in its own lane, within the street median, or in mixed flow; a streetcar presents the same options. Bus rapid transit could be configured in manners similar to light rail transit, in exclusive or shared lanes, in the center of a street or on either side in the curb lane.
- **Transit station locations:** transit stations are similar to conventional transit stops, except that for premium transit, they are configured with more features and amenities, are larger, often are slightly elevated to provide for level boarding of the transit vehicle, and are branded by color, logo and design to present a unified identity with the transit vehicle, signifying a higher quality transit service. Station locations are determined in view of several factors including traffic signals and operations, adjacent land uses, availability of land, and other factors. In some instances, the transit project would include larger stations serving other transit lines, to provide for transfer connections to other routes. Typically, planning for transit stations includes consideration of near-term or future transit oriented development opportunities that capitalize
on the presence of quality transit to support mixed-used developments near transit that further promote ridership by providing more possible destinations for transit users.

- Transit vehicles: the type of transit vehicle is dictated by the selected transit technology, but there are typically a variety of features that are available to customize the vehicles to the particular service requirements of each corridor, including the design, size and seating capacity, and other elements.
- Transit service parameters: this category refers to the type and nature of the transit service being provided, primarily including the frequency of service by time of day, and the daily hours that service is available.

Sometimes the features of the transit alternatives that are explored are limited by corridor physical conditions, the configuration of the transportation network in the corridor, the existing and anticipated land use patterns, the likely order-of-magnitude in the travel demand needs of the corridor, and the financial capacity of the sponsoring transit agency and the region to underwrite the investment in the new transit service. The point here is to identify a set of reasonable alternatives for consideration that are generally scaled to the existing and potential needs of the study corridor.

### 5.5.3 Technology Screening (Stage 1)

The first stage of transit alternatives evaluation was focused on identifying and screening transit technologies that could potentially be applied into the Southwest Corridor. The initial set of technologies selected excluded those that did not have a realistic chance of being implemented because they are not proven in revenue service, are inappropriate for use in the corridor, or would likely result in significant environmental effects. The candidate technologies considered include the following:

Transit technology refers to the specific mode (e.g., rail or bus), and the type of propulsion (e.g., diesel, natural gas, or electric) used by the vehicles. It also refers to operating characteristics for both guideway and guidance types. Technologies were developed during the scoping process based on input from the community and affected agencies, previous studies, as well as other reasonable alternatives developed by the project team. The following technologies were evaluated as potential premium transit alternatives in the Southwest Corridor:

- **Bus Rapid Transit – Exclusive (BRT - Exclusive)** – This transit technology applies the operating concepts of rail transit to a bus-based service. BRT in this exclusive configuration refers to a mostly separate alignment for the buses to operate in. This alignment could have at-grade intersections with major streets, but there are some examples that are completely separated from other street traffic by overpasses. BRT - Exclusive can also operate in high occupancy vehicle lanes, in tolled managed lanes on freeways, or along city streets in its

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own exclusive transit lane. All of these bus pathway treatments allow a faster operating speed that mimics rail-based transit technologies. It can operate in exclusive right of way, high occupancy vehicle lanes, roadway shoulders, or along city streets. The tradeoff for the higher operating speed with BRT – Exclusive is that the development of an exclusive roadway or travel lane for the BRT vehicles entails greater construction cost, perhaps special connecting ramps or other features, and very often extensive acquisition of right-of-way for the BRT facilities. Any true BRT facility also incorporates several other key features which include substantial station facilities that mimic light rail transit stations with additional passenger amenities, branding of the system elements to create a higher profile and unified identity, application of technology for passenger information systems, boarding platforms level with the bus floors, advanced bus vehicles which are often articulated in their design, ticketing machines on the platform, and information panels for transit users. The intent of BRT is to provide a rail-system level of service and patron experience, but using rubber-tired bus vehicles.

- **Bus Rapid Transit – Arterial (BRT - Arterial)** – The BRT-Arterial transit technology has most of the attributes of the BRT – Exclusive technology, except that the transit pathway is not exclusive for use by transit. Most often, BRT – Arterial transit operates on city streets in mixed flow with other traffic, passing through traffic signals at intersections. This mode may have some segments with exclusive lanes, or lanes that are shared with other traffic making turns to or from driveways or intersecting streets. To help compensate for the friction from general traffic, BRT – Arterial systems often apply traffic signal technology that extends green lights for oncoming transit vehicles, or adjusts the signal phasing and timing so that an approaching BRT vehicle will not have to stop. An additional feature is the “queue jumper” which entails using a right-turn lane or auxiliary travel lane for use by buses to travel around traffic backed up at a traffic signal. These traffic management strategies improve the operating speed of the transit vehicles. Along with other BRT features such as fewer stop locations and level boarding, overall bus travel speed can be increased by 30-40%. As noted, other features of BRT – Arterial are similar to those of BRT – Exclusive.

- **Commuter Rail** – This technology typically operates within a freight railroad corridor and is intended to serve longer distance trips with fewer stations spaced at larger distances. It may use locomotives pulling passenger cars or alternatively self-propelled passenger cars, known as diesel or electric multiple units (DMU or EMU), which are powered by diesel engines in the rail cars or by overhead electrical lines, respectively. The passenger cars are more substantial to meet Federal Railroad Administration safety requirements.
Heavy Rail Transit – This technology is sometimes referred to as metro transit, and is the type of transit seen on elevated lines or in subways in New York City, Boston, Atlanta, Washington, DC, Miami, San Francisco, and Los Angeles. Heavy rail transit provides medium to high capacity, medium speed service in high demand urban corridors. It operates on a fully separated alignment on a pair of rails in exclusive right-of-way, and is powered by electricity supplied from a third rail underneath the transit vehicles. Due to its use in higher demand corridors, the stations are much longer to serve several connected rail cars, and are much more substantial since they are usually overhead or underground. This transit mode has significant costs for construction and for its operation.

Light Rail Transit (LRT) – As the name implies, this technology has some of the characteristics of heavy rail transit, but operates in its own corridor separate from other rail traffic and thus can use lighter rail cars. Since LRT typically provides medium capacity, medium speed service in urban corridors, its stations are less substantial than for HRT, but are still significant in size. It is usually powered by electricity from overhead wires, called the catenary system (This overhead wire droops slightly between support points, approximating a catenary curve, thus the use of the term catenary to describe this wire). There are newer propulsion systems utilizing battery power for short segments where the overhead wires are undesired, and inground systems with hidden power pickup systems, but these are not widely used yet, and can have cost differentials for initial installation and for maintenance. LRT can operate in exclusive alignments fully separated from city streets as for HRT, in its own pathway along city streets, or in mixed flow with automobile traffic in city streets and passing through signalized intersections, or some combination of these. However, the operating speed is affected by the extent of in-street operations.

Streetcar Transit – Streetcars are a form of light rail transit scaled for lower speeds and smaller rail vehicles mostly operating on rails in mixed traffic flow on city streets through traffic signals, though they may have short sections exclusive alignment. Streetcars provide limited-stop service on medium length routes. A version of streetcar referred to as “trolley” typically means a vintage streetcar or replica which
has a historic look and usually a higher floor; these are more often used as circulators in historic and tourism districts and activity centers as opposed to service along a corridor. Most whereas trolleys typically provide circulation or connector service. Both streetcars and trolleys are usually powered by electricity from overhead wires, though there are battery-powered options.

In addition to the preceding options, Express Bus and conventional Bus services are defined and included in the technology matrix as they could be considered as additional complementary services to the recommended corridor transit improvement project.

- **Bus** – This common transit technology forms the basis for most urban public transit systems. These rubber-tired vehicles can be propelled by a variety of systems including clean diesel, compressed natural gas, and hybrid systems. The vehicles can be used to provide either local/circulator service within neighborhoods or support transit routes connecting to premium transit corridors at a transit station. Based on further analysis of corridor travel needs, new or modified conventional bus routes might be identified as part of the study.

- **Express Bus** – Typically using the same bus vehicles as for conventional bus transit service, this transit service mode provides point-to-point transit service with no or very few intermediate stops. It typically operates on freeways in mixed traffic or in high-occupancy vehicle lanes and managed lanes which provide higher operating speed. In some locales, express bus service is authorized to use freeway shoulders during periods of high congestion under specific operating procedures in order to help maintain higher operating speeds for the transit vehicles.
The following transit technologies were considered in the identification of transit technologies for screening, but were deemed as inappropriate for consideration in the study due to their limited application in basic commuting corridors, their development cost, their suitability for general corridor conditions, or a combination of these factors. Other technologies including high-speed rail and magnetic levitation were deemed impractical and not included in the screening as well.

- **Monorail** – This technology is elevated on a concrete or steel guideway. Monorail vehicles are supported and guided by rubber tires that run along the guideway. It is powered by electricity from a rail along the guideway. Trains can be fully automated or driver-operated. This technology has few operational applications in the United States.

- **Personal Rapid Transit** – This technology is designed to provide direct, non-stop service between specific origins and destinations. Personal rapid transit is an automated system of small vehicles that travel on elevated guideways and operate on demand without intermediate stops. There are limited applications of this technology for general transit commuting purposes.

 Figure 5.5 presents a summary of these transit technologies that were considered in the analysis. The cost ranges shown represent the range of costs from similar recent projects across the United States, excluding any significant right-of-way costs. The operating and ridership characteristics are likewise representative of implemented projects. It is seen that there is a wide range in the relative implementation costs of the various transit technologies. For this reason, it is important to scale the type of transit solution to the level of travel need identified for each specific corridor.
To support this initial analysis, the regional travel demand model was used to generate a “prototypical” estimate of 2035 ridership for a corridor running along US 11 from downtown Birmingham, southwestward through downtown Bessemer, and ending in a looping route through the McCalla district of the corridor via I-20/59. This analysis was performed for both a BRT-Arterial and a Light Rail Transit in an at-grade configuration, with an assumed set of station locations. This was based on station locations and spacing, assumptions for traffic signal priority operations, and prevailing traffic operating conditions for transit in mixed-low, and light rail in a partially separate alignment in terms of operating speeds for the two modes.

Because there is not a prior history in Birmingham demonstrating how the population would respond to premium transit opportunities in terms of their mode choice decisions, travel demand modeling practice dictated a conservative approach in modeling procedures as to the coding of the mode choice bias factor in all of the travel demand modeling for this study, to provide consistency with guidance from the Federal Transit Administration. As a result of the basic configuration of transit alternatives in the study corridor including alignment and station locations, as well as modeling protocol, the resulting forecast 2035 transit ridership for the two modes was fairly similar, capturing approximately 3,500 daily boardings. Again, this was largely the result of the fact that the average operating speed of the two modes was fairly similar, and it is travel time savings that primarily drives travel decision making along with other trip costs in determining the comparative utility or value of the travel choices presented to the traveler.

A series of “yes or no” questions based on the identified project goals and objectives were used to evaluate alternatives during initial screening. The list below summarizes the screening questions as first presented in this section of the report.

**SOUTHWEST CORRIDOR STUDY**

**PART 2: Transit Alternatives Report**
Theme: CONNECT - Provide more and better transportation choices for corridor and regional connectivity with a solution scaled to needs.

Goal 1A: Access and Mobility. Provide for improved connectivity between transit services and land uses.

Screening Criteria
- Does the technology contribute to corridor and regional connectivity, mobility and accessibility?

Goal 1B: Service Quality. Provide for enhanced service quality scaled to needs.

Screening Criteria
- Is the technology scaled to the corridor ridership potential?
- Is the technology compatible with corridor conditions and roadway cross-sections?
- Does the technology fit the demand characteristics of the corridor?
- Would the technology improve transit service reliability and quality?

Theme: CULTIVATE - Provide more and better transportation choices for corridor and regional connectivity with a solution scaled to needs.

Goal 2A: Community. Leverage opportunities to reinforce community vitality and redevelopment.

Screening Criteria
- Technology provides good access to key corridor nodes?
- Technology is consistent with local land use plans?
- Does the technology support future land use patterns?
- Does the technology contribute to potential synergy between land use and transit?

Goal 2B: Environment. Avoid, minimize, and mitigate adverse impacts on the natural, social, and cultural environments.

Screening Criteria
- Does the technology avoid clearly unacceptable environmental impacts?

Theme: PROSPER - Support economic investment opportunities

Goal 3A: Economic Development. Enhance mobility by providing transportation choices.

Screening Criteria
- Technology can be supportive of redevelopment around station areas?
- Does the technology provide good access to jobs, training and redevelopment sites?

Goal 3B: Implementation. Identify a cost-effective transportation solution with good potential for implementation.

Screening Criteria
- Is the technology cost-effective for the corridor conditions?
- Is the technology compatible with other corridor transit technologies?
- Is the technology affordable for the corridor?
- Are operating costs reasonable for likely available resources?
- Does the technology qualify for potential FTA funding sources?
If an alternative had a “no” response to any of the screening criteria questions, the alternative was eliminated. Technology alternatives not eliminated in this initial screening were retained for use in developing final corridor transit improvement alternatives.

During the first stage screening of technologies, a substantial number of the alternative elements were eliminated from further consideration because they were either fatally flawed or represented otherwise unreasonable alternatives that would not adequately address project purpose and need. Table 5.5 summarizes the results of the first stage of screening. The results of the comparative screening evaluation of technologies were used in development of the final corridor transit alternatives for further screening.

<table>
<thead>
<tr>
<th>Transit Technologies</th>
<th>Stage 1 Screening</th>
<th>Continue to Alternatives Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commuter Rail Transit</td>
<td></td>
<td>✗ STOP</td>
</tr>
<tr>
<td>Heavy Rail Transit</td>
<td></td>
<td>✗ STOP</td>
</tr>
<tr>
<td>Light Rail Transit</td>
<td></td>
<td>✗ STOP</td>
</tr>
<tr>
<td>Streetcar</td>
<td></td>
<td>✗ STOP</td>
</tr>
<tr>
<td>Bus Rapid Transit - Exclusive</td>
<td></td>
<td>✗ STOP</td>
</tr>
<tr>
<td>Bus Rapid Transit - Arterial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Express Bus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bus</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remaining options were combined to form final transit alternatives.

- Alternative carried forward.
- Alternative not carried forward.
- Not evaluated as a stand-alone option; combined with alternatives to improve overall system operations.

The following points in relation to the objectives identified for the transportation solution analysis summarize the key factors in this screening process which led to the determination of Bus Rapid Transit – Arterial as the surviving technology for consideration as the Build alternative transit technology:

- Access and Mobility:
  - While Commuter Rail and Heavy Rail Transit in theory could contribute to regional and corridor access and mobility, their scale exceeds the demand levels and patterns of the corridor. In 2035 there are estimated to be about 27,000 daily trips along the study corridor between corridor districts outside of downtown, and about 37,000 daily trips.
between downtown and corridor districts. This excludes trips on I-20/59 that do not originate within the study corridor, and shorter trips made within each of the corridor districts. The pool of 64,000 daily trips does not justify certain transit technologies; even Light Rail Transit would need to command about a 20% transit mode capture of these trips to generate ridership sufficient to justify that technology.

- The bus-based transit technologies are suitable for the corridor scale. Streetcar is potentially suitable, but the length of the corridor is excessive for the typical streetcar application.

- Service Quality:
  - While all of the transit technologies would have the capability to improve transit service reliability and quality, this asset is offset for Commuter Rail by the fact that it would need to be implemented on either of the Class 1 railroad mainline facilities in the study corridor, which are not well-positioned to serve corridor demand. In addition, Commuter Rail would provide at most 6-8 stations if the entire corridor were to be served at stations requiring park-and-ride lots. Heavy Rail Transit and Commuter Rail both provide surplus capacity for the level of corridor demand. Per the discussion above under Access and Mobility, even Light Rail Transit most likely is “over-scaled” to the demand patterns of the corridor.
  - With the exception of parts of US 11 north and south of central Bessemer, and I-20/59, there are few roadway segments in the study corridor with four travel lanes over an extended distance with a wider roadway right-of-way that would more easily accommodate the rail-based transit technologies. This is a significant point because narrower street rights-of-way less readily can accommodate the space needed for a transit technology. This translates into the need to acquire right-of-way or convert travel lanes into transit pathways. Irrespective of suitability for demand patterns, the rail-based transit alternatives would be more difficult and costly to accommodate in the corridor.

- Community:
  - All of the technologies except Commuter Rail were considered acceptable as to providing access to key corridor activity centers. Commuter Rail would follow the existing rail corridors which do not readily access the key corridor nodes.
  - As to compatibility with local land use planning, both the Commuter Rail and Heavy Rail Transit were found lacking due to the scale and intensity of their presence. Other technologies were considered more acceptable.
  - All of the modes were considered to have the potential to contribute to future synergy between land use and transit. This synergy is a given for the rail modes, but recent studies show that Bus Rapid Transit also has that potential, albeit on a lower scale.

- Environment:
  - All of the technologies except Bus Rapid Transit – Arterial were considered to have the potential for significant environmental impacts, owing mainly to the requirement of each for significant acquisition of right-of-way and the related impacts to the built and natural environment.

- Economic Development:
  - All of the technologies except Commuter Rail were considered to be supportive of redevelopment around station areas, and providing reasonable access to jobs and job training sites.
• Implementation:
  o Only the Bus Rapid Transit technologies were considered to be cost-effective for
corridor conditions, and affordable in relation to potential funding resources in terms of
the initial capital cost for construction and the ongoing costs of daily operations.
Despite the fact that all the technologies are conceivably eligible for Federal Transit
Administration funding, the fact is that the more expensive modes could not be
demonstrated to be cost-effective given the potential ridership levels. Another key
point is that for the ITP downtown circulator project, the I-65/US 31 Mobility Matters
corridor, and the US 280 corridor, the respective transit alternatives studies for those
corridors have identified Bus Rapid Transit in one of its forms as the preferred
alternative. As a result, any of the rail-based transit technologies would not be
compatible with those other corridors operationally, and the rail technology would have
other unique costs including its own maintenance facility. The initial capital costs for
the rail-based technologies for a 13-mile service corridor from downtown Birmingham
to downtown Bessemer would range from approximately $325 million for the Streetcar
to $800 million for Light Rail Transit to $1.3 billion for Heavy Rail Transit. These transit
investment levels are not within reasonable reach within the region and the order of
cost is disproportionate with the identified potential demand levels.

• Overview:
  o The Bus Rapid Transit – Arterial technology is the recommended shortlisted transit
  technology based on the screening process. This technology is best scaled to the travel
patterns of the corridor, has the long-term potential for further upgrading over time,
and possesses the potential to provide a base-level of synergism with the key activity
centers along the study corridor.
  o This technology is the most affordable to the region, represents a quantum
improvement in the quality of corridor transit service, and is compatible with the transit
technology choices in the other regional transit study corridors.

5.5.4 Alignment Screening (Stage 2)

The second stage of transit alternatives evaluation was focused on identifying and screening transit
alignments that could be potentially utilized for new premium transit service. The initial set of
technologies selected excluded those that did not have a realistic chance of being implemented because
they are not proven in revenue service, are inappropriate for use in the corridor, or would likely result in
significant environmental effects. The selected transit technology was Bus Rapid Transit – Arterial (BRT
Arterial). Consequently, the alignment screening phase focused on candidate transportation network
segments that offered opportunities as part of the overall proposed routes for the Bus Rapid Transit –
Arterial transit technology.

The alignment segments considered in this stage of analysis were based on input from a variety of
sources, including: the 2035 Regional Transportation Plan, the 2008 BJCTA Transit Development Plan,
the work of the project team in reviewing the corridor in the field and discussing with RPCGB and BJCTA
staff, and from the community. In the community forums that were held with the public, one of the
exercises presented to the public was the identification on a corridor map of their preferred alignment
for the proposed premium transit service, as well as key station locations. From this exercise, the public
mostly flagged the US 11 corridor as the favored routing, but the study team also considered other options provided by the public.

Alignments are described within three subareas of the corridor:

- **Eastern Corridor**: alignment segments from downtown Birmingham (connecting to and from the planned ITP Downtown Circulator) to the vicinity of the north-south line defined by 31st St. SW/Ave. S/Ensley Ave.
- **Central Corridor**: alignment segments from the preceding north-south line southwesterly to the downtown Bessemer area.
- **Western Corridor**: alignment segments from downtown Bessemer to the southwestern end of the corridor.

The overall corridor crosses each of these three alignment subareas; therefore, an alignment from each subarea is necessary to develop an alternative that connects from downtown Birmingham to the southwestern part of the corridor. Figure 5.6 presents these candidate alignment segments collectively on a map of the corridor study area.
These candidate alignment segments were evaluated according to the alternatives evaluation framework against the identified corridor transit objectives, using a scoring system from 1 to 3, where 3 represents a segment that conforms well to the stated criteria and 1 represents a segment that minimally conforms to the stated criteria. The following list summarizes the evaluation criteria applied to the alignment segment screening stage:

**Theme: CONNECT -** Provide more and better transportation choices for corridor and regional connectivity with a solution scaled to needs.

**Goal 1A: Access and Mobility.** Provide for improved connectivity between transit services and land uses.

**Screening Criteria**
- Does the segment contribute to a route that enhances connectivity with and between other transit services and key activity centers?

**Goal 1B: Service Quality.** Provide for enhanced service quality scaled to needs.

**Screening Criteria**
- Is the route segment compatible with the shortlisted transit technologies?
- Can the route segment readily support the cross-section requirements of the shortlisted technologies?

**Theme: CULTIVATE -** Provide more and better transportation choices for corridor and regional connectivity with a solution scaled to needs.

**Goal 2A: Community.** Leverage opportunities to reinforce community vitality and redevelopment.

**Screening Criteria**
- Does the route segment support good access to key corridor nodes?
- Is premium transit on this segment compatible with local land use plans?
- Is transit on this segment supportive of potential new land uses?

**Goal 2B: Environment.** Avoid, minimize, and mitigate adverse impacts on the natural, social, and cultural environments.

**Screening Criteria**
- Does premium transit service on this segment minimize unacceptable environmental impacts?

**Theme: PROSPER -** Support economic investment opportunities

**Goal 3A: Economic Development.** Enhance mobility by providing transportation choices.

**Screening Criteria**
- Does the route segment contribute to improved access for potential redevelopment sites?
- Does the route segment support improved access to jobs, job training and potential employment redevelopment sites?

**Goal 3B: Implementation.** Identify a cost-effective transportation solution with good potential for implementation.
**Screening Criteria**
- Does the route segment support a cost-effective premium transit solution?
- Does use of this route segment support an affordable premium transit solution?

The Stage 2 comparative screening step considered which alignments best met the project purpose and need based on how they scored relative to one another for the different evaluation criteria relating to the stated goals and objectives. In many cases, certain alignment segments were not well-suited to the BRT—Arterial service technology because they possess only two roadway travel lanes and usually within a relatively constrained right-of-way width. Other segments provided less opportunity to connect to major activity centers or transit-supportive land uses, and still others resulted in more potential impacts.

These advantages and disadvantages were reflected in the total scores for each segment. In the preceding table, those segments highlight in green were retained, those shown in yellow were dropped, and those shown in blue were kept for consideration as part of complementary transit services. The results of this step in the screening process are summarized below in Table 5.6.

### Table 5.6. Stage 2 Alignment Segment Evaluation Screening Summary

<table>
<thead>
<tr>
<th>Alignment Segments</th>
<th>Stage 2 Screening &gt; Alignments &gt;</th>
<th>Continue to Further Alignment Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>EASTERN CORRIDOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Downtown to 31st St. SW/ Ave. S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-20/59 - Downtown Birmingham to Ensley Ave.</td>
<td></td>
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<tr>
<td>Graymont Ave. - Downtown Birmingham to Bush Blvd. W</td>
<td></td>
<td>STOP</td>
</tr>
<tr>
<td>8th Ave. W/Bush Blvd. W/Ensley Five Points West Ave. - Downtown Birmingham to US 11</td>
<td></td>
<td>STOP</td>
</tr>
<tr>
<td>3rd Ave. N (US 11)/Bessemer Road - Downtown Birmingham to Ensley Five Points West Ave./Ave. W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Ave. N/2nd Av. N/Tuscaloosa Ave. - Downtown Birmingham to Lomb Ave.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Princeton Pkwy. - Lomb Ave. to US 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Martin Luther King, Jr. Blvd./Lomb Ave. - 6th Ave. SW to Railroad Right-of-Way (ROW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Railroad ROW/Ave. W - Lomb Ave. to US 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6th Ave. SW - Dr. Martin Luther King, Jr. Dr. to Downtown Birmingham</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson Ave. SW/Cotton Ave. - Lomb Ave. to 31 St. SW</td>
<td></td>
<td>STOP</td>
</tr>
<tr>
<td>Jefferson Ave. SW - Pearson Ave. to 31 St. SW</td>
<td></td>
<td>STOP</td>
</tr>
<tr>
<td>Lomb Ave. - Railroad ROW to US 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dennison Ave. SW - Jefferson Ave. SW to Dr. Martin Luther King, Jr. Dr. AND Dr. Martin Luther King, Jr. Dr. - Jefferson Ave. SW to 6th Ave. SW</td>
<td></td>
<td>STOP</td>
</tr>
<tr>
<td>CENTRAL CORRIDOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31st St. SW/ Ave. S to Downtown Bessemer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-20/59 - Ensley Ave. to Downtown Bessemer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warrior Rd./40th St. Ensley/Valley Rd./Aronov Dr. - from Ensley Five Points Ave. to US 11</td>
<td></td>
<td>STOP</td>
</tr>
<tr>
<td>Vinesville Rd./Carlisle Rd./Ave. H/Dr. Martin Luther King, Jr. Blvd./Woodfield Rd./Huntsville Ave./Harmer St. - from US 11 to US 11</td>
<td></td>
<td>STOP</td>
</tr>
<tr>
<td>US 11 - Ensley Ave./Ave. W to Downtown Bessemer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CR 18 - 31 St. SW to Downtown Bessemer</td>
<td></td>
<td>STOP</td>
</tr>
<tr>
<td>Ave. W - CR 18 to US 11</td>
<td></td>
<td>STOP</td>
</tr>
</tbody>
</table>

**SOUTHWEST CORRIDOR STUDY**
PART 2: Transit Alternatives Report
Table 5.6. Stage 2 Alignment Segment Evaluation Screening Summary (Continued)

<table>
<thead>
<tr>
<th>Alignment Segments</th>
<th>Stage 2 Screening</th>
<th>Continue to Further Alignment Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WESTERN CORRIDOR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Downtown Bessemer to County Line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-20/59 - Downtown Bessemer to McAshan Dr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US 11 - Downtown Bessemer to Academy Dr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CR 18/Eastern Valley Dr. - Downtown Bessemer to McAshan Dr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CR 20/Old Tuscaloosa Hwy./4th Ave. N - Downtown Bessemer to McAdory School Rd.</td>
<td></td>
<td>STOP</td>
</tr>
<tr>
<td>Academy Drive - US 11 to CR 20</td>
<td></td>
<td>STOP</td>
</tr>
<tr>
<td>19th St. S/20th St. S One-way Pair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR 150 - US 11 to CR 18</td>
<td></td>
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</tr>
<tr>
<td>I-459 - I-20/59 to CR 18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McAshan Road - I-459 to CR 18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McAdory School Rd. - CR 20 to CR 18</td>
<td></td>
<td>STOP</td>
</tr>
</tbody>
</table>

Remaining options were combined to form final transit alternatives, except for duplicative segments in the Eastern Corridor which were carried to a secondary alignment.

- Eastern Segment:
  - In this part of the corridor, there were six surviving alignment segments which contributed to conceivably nine different paths between downtown Birmingham and the Five Points West area. These options are further screened to a single preferred alignment in the next section of the report.
  - The I-20/59 corridor segment was retained for consideration as an alignment for a complementary transit service supporting the proposed BRT-Arterial service corridor.

- Central Segment:
  - In this portion of the corridor, only the US 11 alignment survived as a suitable routing for the proposed premium transit service. While this is logical conclusion, the results of the evaluation of the other segment options in this part of the corridor are also supportive of the finding. Key reasons include the facts that other options had mostly two-lane roadway corridors, did not connect as well to key activity centers, did not support prime redevelopment opportunities which are mostly along US 11, and were part of alignment pathways that afforded a less direct route with longer travel times.
  - The I-20/59 corridor segment was retained for consideration as an alignment for a complementary transit service supporting the proposed new BRT-Arterial service corridor.

- Western Segment:
In this area, the US 11 corridor from north of downtown Bessemer to Academy Drive was identified as the preferred alignment.

Segments south of Academy Drive had lower scores and were not included due to a combination of lower land density, narrower two-lane roadway corridors, and limited key activity centers to be served. The preliminary analysis of ridership potential also supports this conclusion as ridership at hypothetical station locations in this part of the corridor under projected 2035 conditions were noticeably lower than for station locations further north in the corridor.

Portions of the SR 150 route with a four-lane arterial section and the 18th St. N/19th St. N one-way pair with three travel lanes in each direction were identified as candidate sections. These were retained as both could provide for a linkage into downtown Bessemer which would reinforce ridership and redevelopment potential.

The I-20/59 corridor segment was retained for consideration as an alignment for a complementary transit service supporting the proposed new BRT-Arterial service corridor. The same applies to the I-459 segment as well as portions of the McAshan Rd. and Eastern Valley Rd. (CR 18) corridors as they could support a complementary peak hour only transit service.

These remaining alignment segments are depicted collectively in Figure 5.7 which follows.
Figure 5.7. Transit Alignment Segments from Initial Stage 2 Screening
As noted previously, in the Eastern Segment of the corridor, there are six surviving alignment segments which provide duplicative pathways. These segments were further screened in two groups of three, using the Princeton Baptist Hospital as the middle dividing point of the six segments. Both groups of three segments then were further screened against five specific factors which better relate to the corridor setting in this area and to the functionality of the transit alignment, and also point back to the project goals and objectives. These five factors were:

- Quality of connection to the ITP downtown circulator routing.
- Redevelopment opportunities along the segment.
- Directness of the connection provided.
- Interface with major activity nodes.
- Transit operational quality.

Table 5.7 below provides a graphic summary of the results of this secondary alignment analysis.

**Table 5.7. Stage 2 Alignment Segment Evaluation Screening Summary – Eastern Segment**

<table>
<thead>
<tr>
<th>Alignment Segments</th>
<th>Stage 2 Screening =&gt; Alignments =&gt; Continue to Alternatives Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>EASTER CORRIDOR</td>
<td></td>
</tr>
<tr>
<td>Between Downtown Birmingham and Five Points West</td>
<td></td>
</tr>
<tr>
<td>Final Screening of Segments East of Princeton Baptist Hospital</td>
<td></td>
</tr>
<tr>
<td>3rd Ave. N (US 11)/Bessemer Road - Downtown Birmingham to Princeton Pkwy. AND Princeton Pkwy. - US 11 to Lomb Ave.</td>
<td>STOP</td>
</tr>
<tr>
<td>1st Ave. N/2nd Av. N/Tuscaloosa Ave. - Downtown Birmingham to Lomb Ave.</td>
<td>STOP</td>
</tr>
<tr>
<td>6th Ave. SW - Downtown to Dr. Martin Luther King, Jr. Dr. AND Dr. Martin Luther King, Jr. Blvd./Lomb Ave. - Dr. Martin Luther King, Jr. Blvd./Lomb Ave. - 6th Ave. SW to Railroad Right-of-Way (ROW) to Princeton Pkwy.</td>
<td>STOP</td>
</tr>
<tr>
<td>Final Screening of Segments West of Princeton Baptist Hospital</td>
<td></td>
</tr>
<tr>
<td>Dr. Martin Luther King, Jr. Blvd./Lomb Ave. - Princeton Pkwy. to Railroad Right-of-Way (ROW) AND Railroad ROW/Ave. W - Lomb Ave. to US 11</td>
<td>STOP</td>
</tr>
<tr>
<td>Lomb Ave. - Railroad ROW to US 11 AND 3rd Ave. N (US 11)/Bessemer Road - Lomb Ave. to Ave. W/Ensley Five Points West Ave.</td>
<td>STOP</td>
</tr>
<tr>
<td>Remaining options were utilized to form final transit alternatives.</td>
<td>Alternative carried forward. Alternative not carried forward. Not evaluated as a stand-alone option; combined with alternatives to improve overall system operations.</td>
</tr>
</tbody>
</table>

**SOUTHWEST CORRIDOR STUDY**

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From this analysis, two segments scored better against the evaluation criteria and were selected to comprise the alignment in the Eastern Segment of the corridor. These segments are described as follows:

- 6th Ave. S, connecting to the planned ITP downtown circulator route east of the CSX Railroad underpass, and continuing to Martin Luther King, Jr. Blvd., proceeding north to Lomb Ave. to Princeton Parkway at the Princeton Baptist Hospital
- Lomb Ave. from Princeton Parkway at Princeton Baptist Hospital to the railroad right-of-way near 12th St. W., and then following along the railroad corridor to Ave. W, turning north on Ave. W, serving a proposed BICTA Super Stop on Ave. W adjacent to the W. S. “Bill” Harris Arena (just west of the CrossPlex) and the Five Points West Library, and continuing two more blocks to US 11. The options in this area are shown in Figure 5.8.

Regarding the downtown Bessemer area, it was considered that the US 11 corridor passes on the periphery of the downtown core. Bypassing the downtown core would sacrifice considerable trip making potential. Upon further inspection, it was determined that the optimal routing would follow a path from US 11 to and from downtown on the 18th St. N/19th St. N one-way pair to 4th Ave. N (CR 20), then south on 4th Ave. N to SR 150 (14th St. N), and returning back to US 11. This path uses the two segment of streets shortlisted in the alignment segment analysis, plus 4th Ave. N to create a route jog that penetrates the downtown core. Figure 5.9 presents these two routing options.
The final recommended premium transit alignment utilizes these roadway segments:

- 6th Ave. S – from the planned ITP Green Route downtown circulator terminus, a UAB remote parking garage near 6th Ave. S at 8th St. S, westward to Martin Luther King, Jr. Blvd.
- Martin Luther King, Jr. Blvd. – from 6th Ave. S to the CSX Railroad underpass.
- Lomb Ave. – from the CSX Railroad underpass to the proposed trail corridor in the railroad right-of-way near 12th St. W.
- Railroad Right-of-Way – from Lomb Ave. to Ave. W.
- US 11 – from Ave. W southwest to the 18th St. N/19th St. N one-way pair at downtown Bessemer.
- 18th St. N/19th St. N One-Way Pair – from US 11 to 4th Ave. N
- 4th Ave. N – from the 18th St. N/19th St. N one-way pair to SR 150 (14th St. N)
- SR 150 – from 4th Ave. N to US 11
- US 11 – from SR 150 south to Academy Drive

Figure 5.10 presents the final preferred premium transit alignment and the other candidate alignments considered.

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Figure 5.10. Final Transit Alignment and Candidate Alignments
5.6 CORRIDOR ALTERNATIVES DEVELOPMENT AND EVALUATION (STAGE 3)

Based on the result of the first two screening stages, the identified transit technology (BRT – Arterial) and the selected transit alignment, were combined to form the proposed Build alternative. Several other assumptions or considerations were incorporated into the alternatives planning process. These are summarized here and described in further detail with supporting maps later in this section of the report.

- **ITP Downtown Circulator**: The BRT-Arterial Build Alternative would utilize the defined ITP Green Route corridor in the downtown Birmingham area (Figure 5.11) continuing from its corridor routing into and through downtown area, providing a one-seat ride to and from downtown destinations and also providing operational coverage on the ITP route. Given features of the UAB campus master plan, it was determined that the east-west leg of the ITP Green Route would need to follow 6th Ave. S to 18th St. S, rather than 5th Ave. South. This would not materially affect the functionality of this segment of the ITP route system. Stops on this east-west leg would be places on 6th Ave. S at 14th St. S to serve the vicinity of the UAB Bartow Arena and near 17th St. S to serve the area near several UAB medical facilities. This service would also stop at the UAB parking garage on 18th St. S between 4th Ave. S and 5th Ave. S; the ground floor of this facility serves as a transit hub for UAB shuttle buses and for taxis. The western terminus of the defined ITP Green Route would be another planned UAB parking garage to be situated north of 6th Ave. S near 8th St. S. It is noted that part of the project includes neighborhood circulators, two of which extend into the Southwest Corridor serving neighborhoods directly west of downtown.

Figure 5.11. Downtown ITP Circulator Routes
• **Bus Preferential Lanes:** In order to preserve eligibility for potential FTA New Starts funding as it has evolved under the MAP-21 legislation, it is presumed that the portion of the Build Alternative route tracing the ITP downtown collector corridor would occur in exclusive bus lanes. It was also assumed that a third lane would be built in both directions along two segments of US 11: (1) on the segment from Vinesville Road to 29th St. N in Bessemer, and (2) from 9th St. N in Bessemer to Academy Drive. The downtown ITP segment is approximately 2.7 miles long, the middle US 11 segment is approximately 5.5 miles long, and the southern US 11 segment is 2.5 miles long, for a total of 10.7 miles; these portions of the route would be dedicated to bus only usage, except for turns made by general traffic in and out of driveways and intersecting streets. As the overall length of the preferred BRT route is 17.1 miles from 8th St. S to Academy Drive, and 2.7 miles for the ITP segment, the total route mileage is 19.8 miles. FTA New Start grant requirements pertaining to a BRT project require over half of the route to be dedicated to bus movements, at least in the peak periods. The 10.7 miles of bus preferential lane segments satisfies the 50% criterion, as they constitute 54% of the total route alignment.

• **Traffic Signal Treatments:** The travel demand modeling for the Build Alternative would be based generally on a mixed traffic flow operation, but with traffic signal priority/preemption treatment (TSP). Under this scheme, BRT buses approaching a traffic signal would experience an extension of a green light if needed, or at some key locations a preemption traffic controller routine would be invoked to avoid undue delays to buses approaching a signalized intersection with a red display. The regional travel demand model normally credits bus operating speed at 90% of the traffic operating speed. Reasonable adjustments were made in the model to better reflect the TSP treatment for BRT vehicles and more accurately represent the attractiveness of this project component in terms of reduced travel time and higher operating speed for BRT vehicles. As a result, the model settings for bus operating speed were adjusted as follows:
  
  o Standard MAX Bus Service: 80% of traffic operating speed
  o Express Bus Service in mixed flow: 85% of traffic operating speed
  o BRT Service in mixed flow: 90% of traffic operating speed

  The adjustments did not significantly alter ridership on the standard transit service routes, but did yield some reasonable separation in the ridership results for the TSM and the BRT options.

• While “queue jumper” technology was considered as an applicable strategy to expedite BRT vehicle movements, the lower level of congestion at key corridor intersections did not appear to call for applications of this approach.

• **Station Locations:** Station locations for the Build Alternative would be determined based on connectivity to other transportation modes, compatibility with existing and future land use, access to major activity centers, input from the public and agencies through various meetings, and assumed station spacing guidelines that specify these station intervals:
  
  o Central Business District – 650 to 1,350 feet (0.125 to 0.25 miles; 2 to 4 blocks)
  o Dense Urban Areas – 0.5 to 0.75 mile
  o Mixed Urban Areas – 0.5 to 1 mile
  o Suburban – 0.75 to 1.0 mile
  o Maximum – 1.5 to 2 miles
- **Transit Super Stops:** The Build Alternative will include two transit Super Stops, as noted in the 2035 Regional Transportation Plan and as originally proposed in the 2008 BJCTA Transit Development Plan. The Super Stop sites are proposed for the Five Points West area and for Downtown Bessemer. The downtown BJCTA bus terminal is also considered a Super Stop and is on the proposed ITP downtown circulator route. The new Birmingham Intermodal Center, now under construction, will replace the downtown terminal with a more modern facility interconnected with Amtrak rail, intercity bus, taxis and other services. This study examined possible sites for both of the corridor Super Stops. At Five Points West, several concepts were considered; the recommended site is on Ave. W between the Five Points West Library and the Harris Arena next to the Crossplex, and would use both curbs of Ave. W. Other sites on US 11 involved expensive right-of-way acquisition or had cumbersome access/egress patterns because of the location of traffic signals and driveways along US 11. In downtown Bessemer, several sites were again considered and the preferred site is on the southwest corner of 18th St. N and 4th Ave. N. This facility would serve two existing BJCTA routes, two proposed routes (Bessemer Shuttle and SR 150).

- **Express Bus Routes:** Complementing existing BJCTA service and the proposed premium transit services along US 11, two Express Transit routes were identified. The purpose of these two routes is to provide direct and faster access for trips between the Bessemer and McCalla areas and the downtown Birmingham area. Ridership modeling indicates that these routes are not significantly competitive with the proposed premium transit service along US 11. These routes would be connected to three proposed park-and-ride lots located on I-20/59 and I-459 as described below. The 2035 Regional Transportation Plan identified future regional park-and-ride lots, but there were none identified or planned for construction in the Southwest Corridor; the cost of these park-and-ride lots are thus considered in project costs. Both routes would originate in downtown Birmingham at Convention Center area, connecting to the ITP Green Route and Blue Route. Alternatively the routes could follow the ITP Green Route from the Convention Center area southward through downtown and past the UAB campus area along 6th Ave. S, and then taking I-65 northward and back to I-20/59. The first route, referred to as the Bessemer Express Route (BER), would follow I-20/59 southwest to the downtown Bessemer interchange where a park-and-ride lot would be located, and it would continue eastward to the downtown Bessemer transit Super Stop, where it would interconnect with existing and proposed BJCTA routes as well as the new premium transit service in the US 11 corridor. The second route, referred to as the McCalla Express Route (MER), follows the route of the BER on I-20-59 with its first stop at a proposed park-and-ride lot at the Academy Drive interchange where the premium transit service would terminate, with access from US 11 north of Academy Drive. The route continues south on I-20/59 proceeding south to McAshan Rd. A stop would be located east on McAshan Rd. at Jefferson Metro Pkwy. to serve the adjacent warehousing/distribution center. This loop in the route would continue northward on CR 18/Eastern Valley Dr. with stops at Heritage Park Dr., Bell Hill Rd. just south of I-459, and the proposed park-and-ride lot in the parking lot of the Tannehill Promenade Shopping Center. The route would then return via I-459 and I-20/59 to the Academy Drive park-and-ride lot and thence back to downtown Birmingham.

- **BJCTA Services:** Relative to existing BJCTA transit service, it was assumed that all existing routes and services levels remain the same. The exception is that Route 3 – Jefferson Wenonah and Route 41 – Fairfield would be connected from Route 41 along Aronov Drive and B. Y. Williams,
Sr. Dr./40th St. SW/Spaulding St. to Grasselli Ave. SW and 33rd St. SW, connecting back to Route 3. It appears that this routing can be accomplished for essentially no change in route length and hence no change in operational cost. This connection would provide a through route between Fairfield and Midfield, connecting both Miles College on Route 41 and Lawson State College – Birmingham Campus on Route 3 to each other and to the US 11 corridor where the BRT-Arterial service would be operating. This route would retain the current revenue hours (60 minute frequency) and bidirectional service along the loop. According to the 2035 Regional Transportation Plan, there are no plans for systemwide upgrading of BJCTA services in terms of improved headways or route revisions. Figure 5.12 below depicts the proposed connection of Routes 3 and 41.

**Figure 5.12. Proposed Routes 3 and 41 Connection**

- **New Transit Routes:** Two new regular transit routes in the Bessemer area were assumed to be in place to complement the improved US 11 corridor transit service, for both the Build Alternative and the TSM Alternative. Based on preliminary travel modeling, these routes were not competitive to improved service along US 11. The first route runs along SR 150 from the Galleria Mall to I-459, following I-459 to CR 52/Morgan Rd. SE, then northward back to SR 150 to 4th Ave. N, into downtown Bessemer, and connecting with other BJCTA routes and the new premium transit service. The second route was identified as the Bessemer Shuttle, and would operate in a bidirectional loop which runs from downtown Bessemer via 4th Ave. N to SR 150, then eastward to Clarendon Ave. where it proceeds south to 9th St. N eastward. From this point, it goes south on CR 18/Eastern Valley Rd. jogging a short distance into the Tannehill Promenade Shopping Center, and then crossing I-459. It makes a loop on Ben Hill Rd. and Lawson Farms Rd., returning to CR 18, going north to McAdory School Rd., traversing east to CR 20/Old Tuscaloosa Hwy., and then northward to Academy Dr. At this point, the route goes west on Academy Dr. passing under I-20/59 to CR 17/Powder Plant Rd. where it turns northward to Visionland Pkwy./Alabama Adventures Pkwy., returning to I-20/59. From this point it follows I-20/59 north to the 18th St. N/19th St. N one-way pair, returning to its starting point in downtown.
Bessemer. This route provides transit service into the South Bessemer/McCalla area, serving downtown Bessemer, transit supportive neighborhoods, Tannehill Promenade Shopping Center and a proposed park-and-ride lot at this center, the Letson Farms residential development, employment sites in south Bessemer, the Academy Dr. retail district and the proposed park-and-ride lot at this location, the development west of the interstate including hotels, Bessemer High School and other retail, employment along Powder Plant Rd., Alabama Adventures Park, and the park-and-ride lot at the I-20/59 downtown Bessemer interchange. This routing is a refinement of a proposed route presented in the recent City of Bessemer Master Plan prepared by RPCGB. These two routes were included conceptually in the 2035 Regional Transportation Plan as a Community Circulator route (Bessemer Shuttle) and as a Community Connector route (SR 150 Route) and were included within the cost-constrained plan.

- **Other Planned Transportation Improvements:** All alternatives will incorporate planned and funded improvements within the region as part of the background planning condition. Within the Southwest Corridor, there are few roadway and transit projects, and a number of non-motorized (pedestrian and bicycle) projects.

In addition to the Build Alternatives, a No Build Alternative and a Transportation System Management (TSM) Alternative were also developed. The No Build Alternative serves as a benchmark for reevaluating the social, environmental, and economic benefits and effects of the Build and TSM Alternatives. The TSM Alternative represents the best bus alternative that mimics the service plan for the Build Alternative, but does not include the same station investments, the traffic signal priority/preemption treatments, and additional bus preferential lanes, and thus does not require as significant a financial investment. The TSM Alternative was previously the basis for developing the FTA New Starts Baseline Alternative, but the MAP-21 changes to FTA project grants and project development requirements has altered that aspect, no longer requiring it. Nevertheless, the TSM Alternative is retained as a competitive option to the Build Alternative in operational and performance comparisons with the Build Alternative in assessing the preferred transit improvement strategy for this study corridor.

Transit service plans were developed for each of the alternatives. The RPCGB 2035 regional travel demand model was then applied for the detailed screening analysis and evaluation of these alternatives. This model provides a projection of daily transit ridership. These projections were factored to peak hour levels to check vehicle requirements. Transit service plans were developed based on representative operating hours and frequencies for other similar services nationally.

### 5.6.1 No-Build Alternative

This section describes the elements that comprise the No-Build Alternative, which provides a frame of reference to other transit “improvement” alternatives.

**Committed Transportation Projects**

The No Build Alternative includes existing and committed roadway and transit improvements in the Birmingham region, including the corridor study area. Planned non-motorized improvements are acknowledged in the corridor planning, but are not included in the travel demand modeling. The highway and transit improvements are included as the background condition for all of the alternatives.
considered for the Southwest Corridor as defined in the 2035 Regional Transportation Plan. The committed roadway and transit projects lying within the study area include the following:

- I-20/59: Arkadelphia Rd. to I Ave. (3.5 miles) – Widen from 8 to 10 lanes
- I-65: University Dr. to Greensprings Rd. – Add auxiliary lanes, widening from 6 to 8 lanes
- In-Town Transit Partnership (ITP) Downtown Birmingham Transit Circulator – Project development and implementation, infrastructure and vehicles, and neighborhood circulator routes
- Bessemer Shuttle: Initiate community circulator transit route
- Hwy. 150 Crosstown Route: Initiate community connector transit route

There are few capacity projects in the Southwest Corridor, as existing and projected levels of congestion are relatively low compared to other sectors of the region. There are many other highway capacity projects planned across the rest of the region outside of the Southwest Corridor. The RPCGB in recent years has studied other radial corridors for premium transit services, including I-65/US 31, US 280, and US 11 East currently. However, the recommendations for enhanced transit in these corridors are not presently included in the cost-feasible transportation plans for the region, and they are as a result not considered in this analysis. The presence of other interconnecting premium transit corridors would obviously enhance ridership on each individual premium transit corridor.

Transit Services

Current BJCTA transit service within the study corridor includes all or part of these transit routes:

- Route 1 – South Bessemer
- Route 3 – Jefferson Wenonah
- Route 5 – Ensley/Wylam (portion)
- Route 6 – Pratt Ensley (portion)
- Route 8 – 6th Ave. South
- Route 38 - Graymont Ensley (portion)
- Route 41 - Fairfield
- Route 45 – Bessemer
- Route 48 – South Powderly
- Route 96 – Titusville Circulator (portion)

Figure 5.13 illustrates these existing BJCTA routes. Besides the ITP downtown circulator and the two new transit routes noted in the Bessemer area, there are no committed improvements to the existing BJCTA transit system in terms of route revisions and service frequencies. For this reason there are other no modifications to the transit network in terms of route modifications, new routes, or service changes under the No Build Alternative.
Figure 5.13. No Build Alternative Transit Services
Ridership Forecast

The projected 2035 transit ridership in terms of daily boardings on the transit system components under the No Build Alternative are as follows:

- BJCTA fixed route system: 7,698
- Bessemer Shuttle: 44
- Hwy. 150 Connector: 288
- ITP Blue and Green routes: 787
- ITP Neighborhood Circulators: 2,543
- TRANSIT SYSTEM TOTAL: 11,360

Capital and Operating Costs

The capital and operating costs of the No Build Alternative are considered baseline costs that are accommodated within in the cost-constrained improvements for the region per the 2035 Regional Transportation Plan. The capital and operating costs for the TSM Alternative and the Build Alternative will be presented as incremental costs over and above the transit service condition represented by the No Build Alternative.

5.6.2 Transportation System Management (TSM) Alternative

This section describes the elements that comprise the TSM Alternative, which provides a frame of reference to other transit “improvement” alternatives. The TSM alternative represents an expansion of service beyond the No-Action Alternative and short-term improvements already committed for implementation. The TSM alternative provides for the best possible bus service to meet corridor needs, goals, and objectives without major infrastructure investments.

Committed Transportation Projects

The committed regional and corridor transportation projects under this alternative are the same as for the No Build Alternative.

Transit Services

The transit services under the TSM Alternative within the study corridor are described as follows:

- All BJCTA routes in the study corridor and the region retain their existing alignments and service structure (frequencies by time of day, and service hours), with the exception of Routes 3 and 41 as noted below.
- Routes 3 and 41 are connected as described at the beginning of this section, and retain the headways of the existing routes.
- The Bessemer Shuttle and the Hwy. 150 Connector route, described at the beginning of this section, are included. Headways would be 60 minutes all day to basically match existing BJCTA services.
- The Bessemer Express Route (BER) and the McCalla Express Route (MER), described in the beginning of this section, are included in this alternative.
• Park-and-ride lots are included at the I-20/59 interchanges for downtown Bessemer and Academy Drive, and within the Tannehill Promenade Shopping Center at I-459 and CR 18/Eastern Valley Dr.
• Transit Super Stops are included at Five Points West and in downtown Bessemer.
• An improved bus route operating along the path of the Build Alternative (BRT-Arterial) is included, with stops at the same locations as for the Build Alternative. Headways would be 10 minutes in morning and evening peak hours and 15 minutes in off-peak periods.

Besides the ITP downtown circulator and the two new transit routes noted in the Bessemer area, there are no committed improvements to the existing BJCTA transit system in terms of route revisions and service frequencies. For this reason there are other no modifications to the transit network in terms of route modifications, new routes, or service changes under the TSM Alternative.

Ridership Forecast

The projected 2035 transit ridership in terms of daily boardings on the transit system components under the No Build Alternative are as follows:

- BJCTA fixed route system: 6,170
- Route 41 & 3 Combo: 373
- TSM Alternative: 2,951
  - Subtotal: 9,594
- Bessemer Express: 373
- McCalla Express: 170
- Bessemer Shuttle: 41
- Hwy. 150 Connector: 414
- ITP Blue and Green routes: 347
- ITP Neighborhood Circulators: 2,545
- TRANSIT SYSTEM TOTAL: 13,593

Overall transit ridership increases to 13,593 with this alternative, compared to 11,360 with the No Build Alternative, an increase of almost 20%. The BJCTA fixed route system ridership declines by just over 900 daily boardings, due in part to some existing riders transferring onto the more frequent service.

A service level review was completed for the Build Alternative. This review is done to confirm the number and type of buses needed to provide the specified frequency of peak service as for both the TSM and the Build Alternatives, taking into account operating speed of each option. It was determined that there would need to be 14 buses operating in the peak hour for the projected operating speed, and that the number and size of buses would be adequate to serve this projected demand. The daily ridership projection was factored for a 60% peak direction bias, a 20% peak hour ridership share, and six vehicles per peak hour. It was determined that there would need to be 14 buses operating in the peak hour to serve this projected demand. This level of service would conform to an assumed peak hour standard of 125 percent of seated capacity at the peak load point. Since the radial routes in Birmingham tend to accumulate ridership towards downtown, this bus service plan should also accommodate a maximum standing time of 15 minutes for any individual.
Capital and Operating Costs

The following capital and operating costs are those additional costs over and above the No Build Alternative. The estimated capital cost to implement the TSM Alternative is $22.29 million (2014 dollars) includes the following cost components.

- Required transit vehicles (peak demand and spares),
- Two transit Super Stops (land and improvements),
- Academy Drive Park-and-Ride lot, and
- New transit stops with shelters and pads.

The estimated annual operation and maintenance cost for the TSM Alternative, after adjustment for farebox revenues, is $4.18 million. This estimate is based on the following variables:

- Service Span: 260 days at 15 hours daily (weekdays) and 100 days at 12 hours daily (weekends and holidays, with 5 days of no service.
- Frequency: 10 min. peak/15 min. offpeak, with 6 weekday hours of peak service and 9 hours of offpeak service; 20 min. peak/30 min. offpeak, with 5 weekend day hours of peak service and 7 hours of offpeak service.
- Operating Cost: 2012 BJCTA operations and maintenance cost of $93.98 per National Transit Database, escalated 2 years to 2014 at a rate of 1.5%/year to $97.00/revenue hour.
- Based on peak bus requirement of 14 vehicles, and one-way route run time of 70 minutes.
- Annual farebox revenue at $855,000 based on the ridership forecast and an effective fare of $1.00.

The annualized capital cost of the TSM Alternative at a 3.5% discount rate is $1.57 million. The total annualized project cost is then $5.75 million, and distributed over the daily transit ridership is $1,955 per daily passenger.

The estimated capital cost for the two Express routes to Bessemer and McCalla are $19.05 million which includes costs for transit vehicles, and development of park-and-ride lots at Bessemer and the Promenade Tannehill Center on I-459. The estimated annual operation and maintenance cost for the two Express Bus routes, after adjustment for farebox revenues, is $2.58 million.

Since the Bessemer Shuttle and Hwy. 150 Connector routes are included in the 2035 Regional Transportation Plan, there is no additional capital or operating cost for those elements.

5.6.3 Build Alternative (Bus Rapid Transit-Arterial)

This section describes the elements that comprise the proposed Build Alternative, which provides a high-quality, premium transit service alternative for the Southwest Corridor, in contrast to the TSM Alternative and the No Build Alternative. The Build Alternative provides for the best possible bus service to meet corridor needs, goals, and objectives including additional key major infrastructure investments.

Committed Transportation Projects

The committed regional and corridor transportation projects under this alternative are the same as for the No Build Alternative.
Transit Services

The transit services under the Build Alternative within the study corridor are described as follows:

- All BJCTA routes in the study corridor and the region retain their existing alignments and service structure (frequencies by time of day, and service hours), with the exception of Routes 3 and 41 as noted below.
- Routes 3 and 41 are connected as described at the beginning of this section, and retain the headways of the existing routes.
- The Bessemer Shuttle and the Hwy. 150 Connector route, described at the beginning of this section, are included. Headways would be 60 minutes all day to basically match existing BJCTA services.
- The Bessemer Express Route (BER) and the McCalla Express Route (MER), described in the beginning of this section, are included in this alternative. Headways would be 10 minutes in morning and evening peak hours and 15 minutes in off-peak periods.
- Park-and-ride lots are included at the I-20/59 interchanges for downtown Bessemer and Academy Drive, and within the Tannehill Promenade Shopping Center at I-459 and CR 18/Eastern Valley Dr.
- Transit Super Stops are included at Five Points West and in downtown Bessemer.
- An improved BRT-Arterial transit service operating along the proposed alignment, with the following additional features as compared to the TSM Alternative:
  - Branding of bus vehicles and transit stations to provide an integrated identity for the new transit service.
  - Quality transit stations with these features: branding with a service logo, larger footprints sized for anticipated ridership demand, nighttime lighting, electronic messaging showing status of next bus arriving, information and display panels, and bicycle parking at larger stations. Level boarding at transit stations (stations platforms can be elevated slightly to provide for level boarding with the bus floor) could be an added feature as a convenience to patrons, which would also reduce dwell time at transit stations.
  - Distinctive and branded 40-foot buses providing a modern, comfortable design.
  - Traffic signal priority and preemption: traffic signals will be coordinated with bus arrivals to either extend the green light to move the bus through the intersection, or advancing the green light to expedite the movement of the bus. This technology reduces the delay to the buses and thus increases the average operating speed. It has its best benefit with far-side transit stations at intersections, but can provide benefit in situations where there are no boardings or alightings at stops as well.
  - Bus preferential lanes: As discussed at the beginning of the chapter, the BRT vehicles will operate in mixed flow through most of the corridor alignment. Based on existing and projected traffic conditions along the alignment, bus operations will not be significantly affected by traffic operations in this corridor. However, preferential bus lanes would be found in the downtown Birmingham area as part of the ITP project and on the busway segment near the CrossPlex in the railroad right-of-way (total of 3.7 miles).

Besides the ITP downtown circulator and the two new transit routes noted in the Bessemer area, there are no committed improvements to the existing BJCTA transit system in terms of route revisions and
service frequencies. For this reason there are other no modifications to the transit network in terms of route modifications, new routes, or service changes under the TSM Alternative.

The resulting network of existing, committed, and proposed transit routes is shown in Figure 5.14.

**Figure 5.14. Build Alternative Transit Services**
Ridership Forecast

The projected 2035 transit ridership in terms of daily boardings on the transit system components under the Build Alternative are as follows:

- BJCTA fixed route system: 6,000
- Route 41 & 3 Combo: 549
- Build Alternative: 3,487
  - Subtotal: 10,035
- Bessemer Express: 217
- McCalla Express: 100
- Bessemer Shuttle: 37
- Hwy. 150 Connector: 409
- ITP Blue and Green routes: 484
- ITP Neighborhood Circulators: 2,478
- TRANSIT SYSTEM TOTAL: 13,761

Overall transit ridership increases to 13,761 with this alternative, compared to 11,360 with the No Build Alternative, an increase of almost 20%. Compared to the TSM Alternative, the Build Alternative has 441 more overall boardings. Compared to the No Build Alternative, the BJCTA fixed route system ridership declines by just over 1,100 daily boardings, due in part to some riders on existing routes transferring onto the more frequent service. Table 5.8 summarizes the transit ridership forecasts.

Table 5.8. Summary of Transit Ridership

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A service level review was completed for the Build Alternative. This review is done to confirm the number and type of buses needed to provide the specified frequency of peak service as for both the TSM and the Build Alternatives, taking into account operating speed of each option. It was determined that there would need to be 14 buses operating in the peak hour for the projected operating speed, and that the number and size of buses would be adequate to serve this projected demand. The daily ridership projection was factored for a 60% peak direction bias, a 20% peak hour ridership share, and six vehicles per peak hour. It was determined that there would need to be 12 buses operating in the peak hour to serve this projected demand; this is two fewer than required for the TSM Alternative due to the higher overall operating speed resulting from traffic signal priority/preemption. This level of service would conform to an assumed peak hour standard of 125 percent of seated capacity at the peak load point. Since the radial routes in Birmingham tend to accumulate ridership towards downtown, this bus service plan should also accommodate a maximum standing time of 15 minutes for any individual.

**Capital and Operating Costs**

The estimated capital cost to implement the Build Alternative is $40.65 million (2014 dollars), which represents the following cost components:

- Required transit vehicles (peak demand and spares),
- One mile of bus-only roadway required between Lomb Ave. and Ave. W,
- Two transit Super Stops (land and improvements),
- Bus bay improvements at a number of station locations,
- Academy Drive Park-and-Ride lot, and
- New transit stations.

The estimated annual operation and maintenance cost for the Build Alternative, after adjustment for farebox revenues, is $3.36 million. The annualized capital cost at a 3.5% discount rate is $2.18 million. The total annualized project cost is then $5.54 million, and distributed over the daily transit ridership is $1,588 per daily 2035 passenger.

The estimated capital cost for the two Express routes to Bessemer and McCalla are $19.04 million which includes costs for transit vehicles, and development of park-and-ride lots at Bessemer and the Promenade Tannehill Center on I-459, as shown previously under the TSM Alternative discussion. The estimated annual operation and maintenance cost for the two Express Bus routes, after adjustment for farebox revenues, is $2.58 million. This estimate is based on the following variables:

- Service Span: 260 days at 15 hours daily (weekdays) and 100 days at 12 hours daily (weekends and holidays, with 5 days of no service.
- Frequency: 10 min. peak/15 min. offpeak, with 6 weekday hours of peak service and 9 hours of offpeak service; 20 min. peak/30 min. offpeak, with 5 weekend day hours of peak service and 7 hours of offpeak service.
- Operating Cost: 2012 BJCTA operations and maintenance cost of $93.98 per National Transit Database, escalated 2 years to 2014 at a rate of 1.5%/year to $97.00/revenue hour.
- Based on peak bus requirement of 12 vehicles, and one-way route run time of 60 minutes.
- Annual farebox revenue estimated at $981,000 based on the ridership forecast and an effective fare of $1.00.
Since the Bessemer Shuttle and Hwy. 150 Connector routes are included in the 2035 Regional Transportation Plan, there is no additional capital or operating cost for those elements.

5.6.4 Comparative Screening of Final Transit Alternatives

This section describes the comparative screening of the final transit alternatives described above. This screening uses the evaluation framework of goals, objectives and measures; the alternatives are scored against those measures to assess the performance of each in absolute and relative terms.

The detailed analysis is summarized by the selected data in Table 5.9 which follows:

<table>
<thead>
<tr>
<th>Table 5.9. Summary of Comparative Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Element</strong></td>
</tr>
<tr>
<td>Transit System Daily Ridership (2035)</td>
</tr>
<tr>
<td>Alternative Daily Ridership (2035)</td>
</tr>
<tr>
<td>Travel Time (Downtown Birmingham to Academy Drive)</td>
</tr>
<tr>
<td>Capital Cost</td>
</tr>
<tr>
<td>Net Annual Operating Cost</td>
</tr>
<tr>
<td>Annualized Total Cost</td>
</tr>
<tr>
<td>Annualized Total Cost per Daily Rider (2035)</td>
</tr>
</tbody>
</table>

**Highway Components**
- Buses operate on existing streets.
- Downtown ITP exclusive bus lane routing.
- Bus-only roadway from Lomb Ave. to Ave. W on east side of the CrossPlex.
- Buses operate in mixed traffic flow elsewhere.

**Traffic Signalization**
- Standard traffic signal operation.
- Standard traffic signal operation.

**Transit Service Elements**
- BiCITA Routes: 60 min. peak/60 min. offpeak; standard transit service features.
- ITP Blue and Green Routes: 10 min. peak/15 min. offpeak; Bus Rapid Transit service features.
- ITP Neighborhood Collectors: 15 min. peak/15 min. offpeak; standard transit service features.
- BJCITA Route 3/41 Combined: Run separately as existing Routes 3 and 41, unconnected; standard transit service features.
- Bessemer Shuttle: 60 min. peak/60 min. offpeak; bidirectional; standard transit service features.
- Hwy. 150 Connector: 60 min. peak/60 min. offpeak; standard transit service features.
- Bessemer and McCalla Express Routes: 15 min. peak/15 min. offpeak; standard transit service features. [Weekday operations only]
This assessment of the final alternatives can be summarized as follow based on scores for project goals and objectives for each:

<table>
<thead>
<tr>
<th>Goal</th>
<th>No-Build Alternative</th>
<th>TSM Alternative</th>
<th>Build Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONNECT</td>
<td>16</td>
<td>28</td>
<td>37</td>
</tr>
<tr>
<td>CULTIVATE</td>
<td>13</td>
<td>33</td>
<td>37</td>
</tr>
<tr>
<td>PROSPER</td>
<td>16</td>
<td>27</td>
<td>34</td>
</tr>
<tr>
<td>TOTAL</td>
<td>45</td>
<td>88</td>
<td>108</td>
</tr>
</tbody>
</table>

It is seen that the No-Build Alternative, representing today’s transit service conditions, does not advance the pursuit of the specified corridors goals and objectives significantly. The TSM Alternative performs reasonably well and consistently across the three corridor goals. However, the Build Alternative outperforms the TSM Alternative more broadly in terms of its benefits and positive impacts over the three corridor goals. Several other pertinent observations summarizing the results of the comparative analysis of alternatives are provided as follows:

- Of the potential 120 scoring points for conformance with the goals/objectives/measures evaluation framework, the No-Build Alternative scores 37.5% of the maximum points, the TSM Alternative scores 72.5% of the maximum points, and the Build Alternative scores 90.0% of the maximum points.
- Based on these figures, the Build Alternative scores 25% better than the TSM Alternative. This is based on its higher operating speed, higher ridership, improved cost-effectiveness, and the resulting benefits to accessibility for the abutting properties and potential development sites.

The results of this multiple step alternatives definition and screening process can be highlighted as follows:

**No-Build Alternative**

Implementation of the No-Build Alternative would not satisfy the project purpose and need, as it would:

- Fail to attract additional captive transit riders and potential new choice riders to offer mobility choices to corridor residents, students, employees, and visitors.
- Continue to provide somewhat unreliable alternative travel to the automobile because of its infrequent service, longer wait times, and irregularities in travel times.
- Fail to reduce travel times for transit users in relation to the travel time for the trip in a private automobile.
- Fail to provide an effective corridor transit solution that connects to the planned ITP project in downtown Birmingham and to other premium transit projects identified for the US 280 and I-65/US 31 corridors.
- Not provide a stimulus for the potential reinvestment in corridor employment and retail at key activity centers and at other locations across the corridor.
TSM Alternative

Implementation of the TSM Alternative would not fully satisfy the project purpose and need because it would:

- Fail to attract the most additional captive transit riders and potential new choice riders to offer mobility choices to corridor residents, students, employees, and visitors, due to maintaining the same operating speed as existing transit service, although its more frequent service succeeds in attracting many more daily riders.
- Operate at only a slightly better speed than existing transit service due to reduced number of stop locations matching the Build Alternative, although the improved service frequency greatly reduces waiting time for users.
- Fail to reduce travel times for transit users in relation to the travel time for the trip in a private automobile.
- Fail to provide a fully effective corridor transit solution that connects to the planned ITP project in downtown Birmingham and to other premium transit projects identified for the US 280 and I-65/US 31 corridors.
- Not provide as strong a stimulus for the potential reinvestment in corridor employment and retail at key activity centers and at other locations across the corridor as the Build Alternative.

Build Alternative – Bus Rapid Transit-Arterial

The proposed Build Alternative, the Bus Rapid Transit – Arterial option, best addresses the corridor goals to Connect – Cultivate – Prosper as articulated by the corresponding objectives and measures. The following points summarize how the Build Alternative best satisfies the purpose, need, goals and objectives for the Southwest Corridor. The Build Alternative would:

- Attract the most additional new transit riders to offer mobility choices to corridor residents, students, employees, and visitors, due to its frequent service and faster operating speed.
- Greatly reduce waiting time for users due to the frequent service.
- Reduce travel times for transit users in relation to the travel time for the trip in a private automobile.
- Provide an effective corridor transit solution that connects to the planned ITP project in downtown Birmingham and to other premium transit projects identified for the US 280 and I-65/US 31 corridors.
- Provide a stronger stimulus for the potential reinvestment in corridor employment and retail at key activity centers and at other locations across the corridor as the Build Alternative.
- Provide a quality transportation service alternative in the corridor for the many transit dependent corridor residents.
- Yield an annualized total cost that is slightly higher than for the TSM Alternative (by 8.5%, but is 8.5% lower in terms of the annualized cost per rider.

On the basis of these factors, the Build Alternative – Bus Rapid Transit-Arterial is recommended as the Locally Preferred Alternative (LPA) for the Southwest Corridor of greater Birmingham.
5.7 DEFINITION OF THE PREFERRED ALTERNATIVE

As the recommended LPA for this study corridor, BRT-Arterial is a form of BRT that can blend the flexibility and lower capital cost of buses with the efficiency and attractiveness of rail transit. BRT services improve the convenience and quality of regular bus service by traveling much faster, much more frequently, and with a higher quality of service to customers. The flexibility in applying the differing variables of BRT service allow a BRT solution to be tailored to the needs of a specific corridor in terms of the street improvements needed and in the required cost to implement and operate the new service. This flexibility and lower cost, while achieving significantly faster transit service, has made it a popular option for new transit services around the country. This section of the report discusses the specific features and characteristics which are planned as part of the recommended LPA for this corridor.

5.7.1 Key Features of Bus Rapid Transit – Arterial Transit Service

BRT transit service is distinguished from conventional transit service by several key characteristics, which include:

- **Service Quality:** providing very frequent transit service for at least a 14-hour service day, significantly reducing the wait times for customers,
- **Bus Vehicles:** utilizing vehicles that are modern in look and passenger features,
- **Branding:** refers to a distinctive and unified look and image for the BRT service including the name, design, logo and color which are carried across vehicles, stations, and supporting literature and website pages,
- **Technology:** incorporating a variety of technology enhancements to improve the safety, quality, and efficiency of transit operations, and improving customer convenience, information, and experience in using the service,
- **Stations:** providing a distinctive station, more substantial in its design, at every stop location as part of the branding, and including lighting, real-time travel information panels, and other amenities, and
- **Running Ways:** developing a specific pathway for the operation of the BRT vehicles involving mixed traffic flow, preferential bus lanes, and exclusive bus lanes.

The BRT concept provides some flexibility in which features are implemented, the extent to which they are implemented, and the phasing of that implementation in increments. It should be noted that there is some difference of opinion in the transit community as to referring to variants of the maximum form of BRT as true BRT. It is conceded that BRT with exclusive bus roadways or lanes, prepayment of bus fares, level floor boarding through multiple doors and other BRT features represents the best that BRT has to offer in terms of a lower cost replica of light-rail transit service at a fraction of the cost. However, it is considered that services such as the recommended LPA still represents a significant level of improvement over non-BRT transit services like “skip-stop” and “limited stop” services offered by some transit systems. The following proposed features of the Southwest Corridor BRT-Arterial provide important distinguishing features that elevate it to a premium service for the Birmingham market:

- **Service Quality:** proposed as 10 minutes between buses in peak periods and 15 minutes in off-peak periods,
- **Bus Vehicles:** proposed modern look BRT vehicles with comfortable interiors,
- **Branding:** a planned branding of the BRT service with unifying logo and color elements,
• Technology: initial technology applications will include “next bus” messaging at stations, solar-powered nighttime lighting of stations, alternative fuel BRT vehicles, and TSP treatments at existing and proposed traffic signals,
• Stations: stations that are distinctive, substantial and unique to the BRT service, with important passenger amenities and a level-boarding configuration, and
• Running Ways: proposed alignment uses 2.7 miles of downtown ITP exclusive bus lane route, and one mile of exclusive bus roadway sharing the railroad corridor with the proposed Jones Valley trail near the CrossPlex. This is a total of 3.7 miles of lanes primarily or entirely for bus use, or nearly 1/5 of the total BRT service corridor.

Each of these distinguishing features of the proposed BRT-Arterial transit service is discussed in the following subsections.

5.7.2 Service Quality

An important characteristic of BRT is its much more frequent service. For the Southwest Corridor, the proposed BRT service is planned to operate at 10-minute frequencies in the peak periods and 15-minutes in the off-peak periods. The peak periods are each defined three hours in duration during the usual morning and evening peak travel periods. For planning purposes a 15-hour service day is proposed. The frequent service all day means that the waiting times for users are almost inconsequential, as in the peak period, if a user just misses a bus, there will be only a 10-minute wait for the next bus. This frequency of service along with a faster operating speed makes to BRT service much more attractive to users and greatly improves their transit travel experience.

5.7.3 Vehicles

The bus vehicles are the most visible part of the proposed BRT service in the Southwest Corridor. The vehicles are proposed to be modern style buses used for BRT service environments, with low-floors and attractive interior designs, accommodations for wheelchair customers, and bicycle racks.

Another key issue with this component of the BRT system is the size of the bus vehicle in terms of the seating capacity and reserve standing capacity, also in relation to BJCTA policy goals on the percentage and duration of standing customers. For planning purposes, it was assumed that the working capacity of buses would be the seating capacity plus 20% standing, with the goal of standing no longer than 10 minutes. By applying a group of factors to this daily volume, it is possible to estimate the peak hour directional ridership demand, and thus determine the size of bus needed to serve the system. Applying appropriate factors to the daily ridership yields a peak hour demand per bus of 42 patrons. The capacity of a 40-foot long BRT vehicle is 43 seated and another 8 standing maximum per the above discussion, for a total of 48 riders. Likewise the capacity of a 60-foot articulated BRT vehicle is 62 seated and another 15 standing, for a total of 77 riders. Since the calculated peak demand of 42 is within its nominal seating capacity, the 40-foot BRT vehicle is recommended for use in the Southwest Corridor, and its cost is reflected in the project cost estimates.

5.7.4 Branding

The concept of branding refers to the application of a unifying look and image for the BRT service that distinguishes it from the conventional transit service in the area. Elements of branding include the
name, design, logo and color associated with the BRT service which are consistently applied to the vehicles, stations, and collateral materials such as schedules, marketing, and website pages. Older BJCTA buses had a white field over most of the bus with blue and yellow accent designs. In the past the accents were two large chevrons on the sides of the bus near the rear. More recently the accent colors were curving shapes applied to the lower third of the bus side panels. However, new buses delivered under the contract to convert bus fueling to compressed natural gas portray a different look using the same colors. This progression of BJCTA exterior bus designs is shown in Figure 5.15.

Figure 5.15. BJCTA Bus Exterior Designs

For the Southwest Corridor, two initial branding concepts were identified. The first concept utilized the colors of the existing BJCTA MAX transit service in a different format. Since the newer BJCTA bus design dominated by a blue field is the motif that the buses in standard service are transitioning to as new buses are delivered, this option utilized a white field over the bus with blue and yellow accents.

The second potential concept is the design motif used for the planned Downtown ITP BRT-based circulator service. This design has a mostly grey field over the bus with a pattern of multi-colored, overlapping curved shapes on the lower rear part of the bus flowing behind the hypothetical name of the service – the Breeze. Either of these designs, or another, could eventually be adopted to brand BRT services in one or all of the regional corridors. It has been suggested that the design, logo and naming of the service would be determined through a community contest which could generate a variety of interesting concepts and would promote the engagement of the public into the new service concept. The main advantage of branding all BRT services in a similar manner is that then the BRT vehicles can be shared across all of the BRT service corridors freely. For the purposes of this report, the white bus with color accents concepts is used to depict the BRT vehicles in concept renderings. The two concepts are shown in Figure 5.16.
5.7.5 Technology

One key element of BRT services is the application of technology to enhance bus operations and the customer experience. Examples of such applications can include methods to expedite bus travel, information systems, and passenger amenities. Table 5.10 lists several technologies and the recommended timeline for their implementation. The timelines are based in part on the capacity of BJCTA as the presumed operator to build these technologies into their systemwide capabilities.
Table 5.10. Proposed Technology Applications

<table>
<thead>
<tr>
<th>Technology Application</th>
<th>Description</th>
<th>Implementation Timeline</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Signal Priority (TSP)</td>
<td>Allows buses to avoid delay at traffic signals by</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>way of communication between the bus and traffic signal controller.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Next Bus/GPS Tracking</td>
<td>Informs users of the arrival time of the next bus on real-time message boards</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>at stations; allows dispatch to track vehicles and can be used for Smart</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phone application.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queue Jumper</td>
<td>Routes buses through congested traffic signals</td>
<td></td>
<td>Need for queue jumpers to be monitored.</td>
</tr>
<tr>
<td></td>
<td>in specially assigned lanes to reduce delay at traffic signals.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ticketing</td>
<td>Use of smart fare cards, at-station ticket vending, and/or fare prepayment</td>
<td></td>
<td>Implementation of this technology form is</td>
</tr>
<tr>
<td></td>
<td>to expedite the passenger boarding process.</td>
<td></td>
<td>dependent upon BCETA system-wide fare payment policies and procedures.</td>
</tr>
<tr>
<td>Bus Fueling</td>
<td>Use of Compressed Natural Gas (CNG) or hybrid fueling system that is</td>
<td></td>
<td>BCETA received delivery of another 30 CNG</td>
</tr>
<tr>
<td></td>
<td>environmentally friendly and can be more cost-effective.</td>
<td></td>
<td>vehicles as part of its ongoing fleet transition.</td>
</tr>
<tr>
<td>Onboard WiFi</td>
<td>Allows passengers to connect to the internet while onboard the buses.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Solar Lighting</td>
<td>Used to power nighttime lighting at the BRT stations for passenger</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>convenience and security.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security Cameras</td>
<td>Placed at transit stations to monitor passenger security.</td>
<td>✓</td>
<td>Implementation of this technology form is</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>dependent upon BCETA system-wide safety/security policies and procedures.</td>
</tr>
<tr>
<td>Emergency Telephones</td>
<td>Placed at transit stations to support passenger security.</td>
<td>✓</td>
<td></td>
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</tbody>
</table>

One important technology application is Traffic Signal Priority (TSP). This technology involves management of traffic signals with respect to approaching transit vehicles so as to minimize bus delay at the signalized intersections. This has significant benefits to BRT transit vehicles as the BRT stations to pickup and dropoff passengers are further apart, and those stations are typically located on the farside of a signalized intersection, so that once a bus passes through a signal it can stop at the downstream station, and then continue onto the next station with minimum delay. The faster operating speed enhances the attractiveness of BRT to potential users.

TSP can provide preference to transit vehicles at traffic signals in several ways:

- **Green time extension**: the green light display is extended until the transit vehicle passes,
- **Red time truncation**: the red light display is shortened to provide a green light to the oncoming transit vehicle,
- **Signal phase change or rotation**: the signal controller changes the operating plan for the traffic signal to jump to a phase favoring the transit vehicle movement, and
- **Transit vehicle pre-emption**: the traffic signal controller switches to a special phasing plan for the transit vehicle.

The green time extension and red time truncation are the most common applications of these treatments. Figure 5.17 illustrates the example of a red time truncation, where the oncoming bus activates the shortening of the red light display to expedite the movement of the bus through the intersection.
The most commonly applied preference strategies are the first two involving green time or red time elements. In general, these preferential treatments are triggered by communication from the transit vehicle to the traffic signal controller which has been modified to receive the communication and act upon it. The equipment required includes:

- **Bus Equipment**: GPS receiver and radio unit, vehicle control unit, and a radio/GPS antenna. Cost for these items is about $5,000 per bus vehicle.
- **Signal Controller Equipment**: Communication signal receiver, signal controller firmware upgrade, and signal controller software upgrade. Cost for these items is about $10,000 per traffic signal.

The application of TSP typically yields an 8% to 15% reduction in overall transit time, depending upon local corridor characteristics with minimal impacts to non-transit traffic, as borne out by field studies of TSP implementations around the country. The estimated travel time reduction for the proposed Southwest Corridor BRT over the length of the service corridor is approximately 14% based on calculations of the field conditions for the traffic signals, consistent with other TSP applications.

Implementation of TSP will require coordination with ALDOT and the municipalities that participate in traffic signal maintenance and operations. There are 55 existing traffic signals and 8 proposed traffic signals that are involved in this corridor. The costs of TSP implementation have been included in the project cost estimates.

The benefits of TSP include reduced delay for the transit vehicle, resulting travel times and reliability for transit, and improved transit throughput. For non-transit traffic, the benefits are improved signal timings in the direction of the transit vehicle with minimal impact on intersection traffic service. In addition to these benefits, the TSP supports improved transit efficiency and cost savings, in both the number of buses needed due to higher operating speed and in the amount of labor and operating costs needed. In the case of this corridor, the incorporation of the TSP treatments avoids the cost of two BRT transit vehicles to meet peak hour service frequency.

### 5.7.6 Stations

As the projected transit ridership varies by station location, and because the surrounding land uses and their redevelopment potential varies as well, a hierarchy of three station configurations was developed.
Each configuration has standard features such as the same design and architectural features, identifying service logo, seating, information panels, real-time next bus arrival time displays, trash receptacles, bicycle racks and lighting; however, they do vary in size. As part of implementation phasing, some features such as real-time information signs could be deferred. The design motif reflects traditional elements of Birmingham’s history including brickwork, I-beams, and architectural stonework reflective of much of the historic architecture of the corridor’s public and industrial buildings; however, alternative design treatments can certainly be entertained during the project development process. Figure 5.18 depicts the family of three stations.

**Figure 5.18. Transit Station Hierarchy**

The Neighborhood station is used at those locations with a basically residential character, usually low to medium density in nature, and where no significant redevelopment activity is anticipated. While initial ridership forecasts showed minimal ridership at three stations, and low ridership at some others, this is considered to be an issue with the travel model and those locations are retained for costing purposes. Another option would be to defer implementation of stations at these locations, or further refine ridership forecasts. The Hub station is used for those locations with higher residential density, retail or special generators, or a combination of the two, where ridership is expected to be at an intermediate level of demand. The Activity Center station relates to those more developed locations along the corridor with substantial employment, retail activity, or major special uses where transit demand is expected to be high.
As discussed below, there are also two transit Super Stops which serve as transit stations, and three Park-and-Ride Lot locations which will interface with transit services. At these sites, multiple stations will be installed at each of the identified transit bus bays. As part of the study process, the proposed transit service alignment was reviewed for the location of proposed transit stations. This review considered a variety of factors including:

- Station spacing considerations,
- Anchor station locations,
- Existing land use,
- Land use redevelopment potential,
- Location of existing traffic signals,
- Availability of public right-of-way, and
- Field review.

Station locations were reviewed with RPCGB staff, and based on this analysis process, a set of 24 station locations along the corridor was selected. Most of these entail a pair of stations on opposite sides of the route, but there are a few exceptions. In downtown Bessemer there is a proposed Transit Super Stop which will serve the BRT route and several other transit routes in both directions of travel. There is also a planned Super Stop at Five Points West, but it is configured with bus bays on both sides of Ave. W. Finally, the south end of the proposed BRT alignment is located at the proposed Academy Drive Park-and-Ride lot, which is a single terminal area with several bus bays. It is assumed that the north end of the alignment will utilize the end stations of the proposed downtown ITP Circulator at the intersection of 6th Ave. South and 8th St. South, and continue its operation into downtown, stopping at all stations of the ITP Green Route.

In positioning bus stations at specific locations, a variety of factors were considered as discussed at the beginning of this section. There are two further considerations in bus station locations:

- Bus station position: This can be farside (located on the downstream side of an intersection), nearside (located on the upstream side of an intersection), or mid-block (located at some distance from the nearest intersections. Farside station locations are preferred, especially at signalized intersections, because the BRT vehicle can clear the traffic signal under TSP treatment with minimal delay. This advantage is harder to accomplish with a nearside station location.
- Bus station configuration: Configuration refers to the relationship of the bus station footprint to the adjacent roadway. These are adjacent to a travel lane, adjacent to a recessed bus bay, and adjacent to a bus turnout lane. These configurations are shown in Figure 5.19.
Figure 5.19. Bus Station Configuration Options

- Bus Station Adjacent to Traffic Lane
- Bus Station Adjacent to Recessed Bus Bay
- Bus Station Adjacent to Bus Turnout Lane

Figure 5.20 shows the distribution of the BRT station locations across the study corridor.
Figure 5.20. Location of BRT Stations in the Study Corridor
Princeton Baptist Hospital

This growing employment center just outside of downtown Birmingham will be served by stations on Lomb Ave. near the hospital’s new addition. Bus bays would be constructed for each direction with eastbound station located on the nearside of the intersection due to available land and convenience for transit patrons traveling to and from the hospital. Figure 5.21 shows the stations in plan view, and Figure 5.22 illustrates the inbound station with the hospital in the background.

Figure 5.21. Princeton Baptist Hospital Station Plan View
Lomb Ave./Jones Valley Rail Greenway Trail

A pair of transit stations is planned at the intersection of Lomb Ave. with the Jones Valley Rail Greenway Trail. Both stations would be located within the trail corridor near Lomb Ave. to take advantage of the available land in the former railroad corridor. The BRT would share this rail corridor west to Ave. W. near the CrossPlex. Figure 5.23 illustrates the proposed layout.
Five Points West Transit Super Stop

Based on prior planning work by the RPCGB in cooperation with BJCTA, a transit Super Stop was planned in the Five Points West area. In consideration of the proposed BRT route and the orientation of other BJCTA routes that would use the Super Stop, a site on Ave. W between the Five Points West library and the Harris Arena, and adjacent to the new City of Birmingham Police Substation. The Super Stop features 10 bus bays on-street and in parallel aisles; depending on the specific bus route, the layout permits buses to stop and then continue in the same direction or to turn back to resume their original route. The 10 bays shown are based on three existing BJCTA routes in the area that would connect at the Super Stop (Routes 5, 41, and 45), the proposed BRT route, and a possible circulator route. These five routes depending on scheduling may meet both inbound and outbound, requiring two spaces per route. The layout permits incremental development of bus bases based on actual need.

Signalized crosswalks will facilitate pedestrian movements. Given the layout, the bus bays could be built in phases as capacity is needed. Use of public right-of-way reduces the cost of implementation. Figure 5.24 shows the Super Stop in plan view and Figure 5.25 shows a street view of the area at the US 11/Ave. W intersection just to the north, showing anticipated new development with the CrossPlex in the background.
Figure 5.25. Five Points West Street View Looking East
Aronov Drive

This station pair is situated in a retail district that is popular with transit users. Signalized crosswalks will facilitate pedestrian movements. Figure 5.26 shows the station locations in plan view and Figure 5.27 shows a street view of US 11 and the inbound station looking to the south, with proposed redevelopment in the background.

Figure 5.26. Aronov Drive Station Plan View

Figure 5.27. Aronov Drive Station Street View Looking South at US 11
Midfield/Health Center

This station area is situated just southwest of the Aronov Drive station area. The Jefferson County Health Department has planned a consolidated health care facility in this area, and the High Line recreational trail lies just to the northeast. Land use planning conducted as part of this study identified this area as an opportunity site for redevelopment with retail and housing. Figure 5.28 shows the proposed station locations in plan view and Figure 5.29 shows a view of one of the stations with an alternative station design concept and proposed redevelopment in the background.

Figure 5.28. Midfield/Health Center Station Plan View
Figure 5.29. Midfield/Health Center Station Street View
Brighton/Lipscomb Station Area

This station area is located around the intersection of US 11 with Harmer St. and 5th St. N in the area of Brighton and Lipscomb. This district was also identified as an opportunity site for redevelopment with retail and housing. Figure 5.30 shows the proposed station locations in plan view and Figure 5.31 shows a view of one of the stations with an alternative station design concept and proposed redevelopment in the background.

Figure 5.30. Brighton/Lipscomb Station Plan View
Figure 5.31. Brighton/Lipscomb Station Street View
Downtown Bessemer and Transit Super Stop

Downtown Bessemer is considered one of the corridor’s anchor land use activity centers with its government facilities and offices, shopping and services, and historic tradition. It is the focus of two existing BJCTA transit routes, two new transit routes, and the proposed BRT route. As for the Five Points West area, prior planning identified downtown Bessemer as a site for transit Super Stop facility. Several potential sites were investigated as to convenience and circulation for the existing and proposed transit routes. As site at the corner of 18th St. N and 4th Ave. N was proposed as it minimizes unnecessary circulation for the transit routes and is convenient to the downtown core. Figure 5.32 illustrates the conceptual layout which provides up to 12 bus bays. This capacity is based on two existing BJCTA routes (Routes 41 and 45), the proposed BRT route, and the proposed Bessemer Express Route, the Bessemer Shuttle and the Hwy. 150 route. Allowing for both inbound and outbound meetings of these routes yields up to 12 positions.

Figure 5.32. Downtown Bessemer Transit Super Stop Plan View

Besides the Super Stop, there are several other BRT stations in downtown Bessemer. Figure 5.33 shows the proposed location of bus stations on the one-way pair of 18th St. N (eastbound) and 19th St. N (westbound) just off of US 11. Figure 5.34 which follows shows a rendering of a street view of the US 11 and 19th St. N intersection looking east with potential redevelopment in the background.
Figure 5.33. Downtown Bessemer - US 11 at 18th Street North and 19th Street North Plan View

Figure 5.34. Downtown Bessemer - US 11 at 19th Street North Street View
Bessemer Park-and-Ride Lot

As part of the overall transit service recommendations for the study corridor, express routes are proposed on I-20/59 serving the Bessemer and McCalla areas. As part of this express bus service, a park-and-ride lot is proposed at the I-20/59 interchange with 18th St. N and 19th St. N. This lot would be serviced by the Bessemer Express Route which will also stop at the downtown Bessemer Super Stop, and by the Bessemer Shuttle route. The site lies within ALDOT right-of-way. The drawing shows approximately 200 parking spaces and three bus bays. Figure 5.35 shows the conceptual layout of the park-and-ride lot.

Figure 5.35. Bessemer Park-and-Ride Lot Plan View

Lawson State Community College/Medical West Center

Another important station location along the BRT route is at the site which would serve Lawson State Community College – Bessemer Campus and the Medical West Center. A pair of stations both positioned on the farside of existing traffic signal and connected by pedestrian crosswalks would serve these two important facilities. Figure 5.36 shows the proposed station locations in plan view and Figure 5.37 shows a view of one of the inbound station with the Medical West Center in the background.
Academy Drive Park-and-Ride Lot

The southern terminus of the BRT service would be at the proposed Academy Drive Park-and-Ride lot, situated on US 11 just north of Academy Drive. This facility would feature commuter parking and a bus center with eight bus bays to serve the BRT route, BJCTA Route 1, the McCalla Express route, and the Bessemer Shuttle route, offering commuters and travelers a variety of mobility choices. The site lies within ALDOT right-of-way. The layout shows eight potential bus bays and about 275 parking spaces. The eight bus bays are based on the existing Route 1 and proposed BRT route, McCalla Express Route, and the Bessemer Shuttle route, with two of these possibly needing concurrent inbound and outbound positions; another two spaces are included for future service of some kind. Figure 5.38 provides a conceptual layout of this facility.
Promenade Tannehill Park-and-Ride Lot

The proposed McCalla Express service would stop at the Academy Drive Park-and-Ride lot and at a proposed lot to be leased at the Promenade Tannehill Center off of I-459 at Eastern Valley Road. An area of 100 parking spaces has been identified for this site, subject to negotiations with the ownership as project development would progress. From this location, commuters could access downtown Birmingham with only a stop at the Academy Drive Park-and-Ride lot. Figure 5.39 illustrates the concept for this facility.
Figure 5.39. Tannehill Promenade Center Park-and-Ride Lot
5.7.7 Running Ways

Running ways refer to the pathways used by BRT vehicles in traversing the designated BRT service route. As discussed elsewhere, optimally BRT would operate on its own exclusive lanes with few interruptions to its flow. However, in many urban applications, compromises are properly made to reduce the cost of implementation and to best manage impacts to traffic service, property access, and traffic safety. The development of the proposed BRT alignment considered these roadway factors as well as the linking of key land use activity centers to maximize potential ridership and generate the most benefits from the synergy between quality transit service and the adjacent land uses.

There are several basic BRT street configurations that can were considered in defining the running ways for the Southwest Corridor BRT alignment. These are presented in Figure 5.40.

**Figure 5.40. BRT Street Configurations**
In formulating the goals and objectives for this project, one of the objectives was to scale the solution to the projected level of need and demand. In this way, the cost-effectiveness of a proposed operational concept for transit improvement can be preserved and maintain the feasibility of a project. In the case of the Southwest Corridor, there are several key physical features and operating characteristics of the corridor roadway network, both existing and future, which were carefully considered in the determination of the most suitable configuration for BRT service within the streets of the Southwest Corridor. These include:

- The availability of several parallel streets west of downtown Birmingham that penetrate into the study corridor and provide substantial reserve street capacity for the traffic entering and leaving downtown area.
- The generally good peak period traffic operations that prevail on surface streets throughout the Southwest Corridor, for both existing conditions and for 2035 traffic conditions. This is the result of the trend of gradual loss of jobs and population endured by corridor over the last decades, a trend which is forecast to persist into the future, except for the portion of the corridor south of central Bessemer.

These BRT configuration options were reviewed over the length of the proposed BRT-Arterial route alignment, in consideration of traffic operations, transit station locations, and construction costs for roadway improvements. Based on this assessment, the following running way recommendations were reached for the BRT alignment:

- Downtown Birmingham [2.7 miles]: Utilize the planned dedicated bus-only lanes for the Downtown ITP Circulator Green Route, from 8th St S via 6th Ave S east to 18th St S, stopping at the UAB intermodal center and continuing northward through downtown to the Convention Center district.
- 6th Ave. S/Martin Luther King, Jr. Dr./Lomb Ave.[3.0 miles]: Utilize mixed flow operation using the right-most travel lane.
- Jones Valley Rail Greenway (Lomb Ave. to Ave. W) [1.0 mile]: Utilize a dedicated two-lane bus-only roadway shared with the trail corridor.
- Ave. W (from trail corridor) and US 11 (to Academy Drive Park-and-Ride Lot entrance) [13.1 miles]: Utilize bus-preferential lane to be constructed.

In summary, the BRT street configurations are as follows:

- Downtown ITP bus-only lanes: 2.7 miles
- Mixed-flow in right-most lane: 16.1 miles
- Bus-only roadway in the trail corridor: 1.0 miles

TOTAL 19.8 miles

This configuration yields 3.7 miles of bus-only or bus-preferential configuration which is nearly 20% of the total corridor length.

5.7.8 Intermodal Connectivity

One of the key goals in developing the transit component of urban mobility is to plan transit system service improvements so that they become better interconnected, mainly bus routes connecting to bus routes, but also improving interfaces with the existing and planned bicycle and pedestrian networks. While some bus patrons access transit service by being dropped off, or in some cases by riding a bicycle
or driving to a park-and-ride lot, most users access transit service by walking to the bus route and return to their ending destination also by walking. Transit planners refer to this connection between transit service and the origins or destinations of a complete trip as the “last mile” – with the intent that if access and walkability between transit and trip origins or destinations are not considered and accommodated, then the public can be discouraged from using transit because there is not a safe, lighted pathway with a smooth paved walkway and curb ramps at street crossings to facilitate their access to and from transit.

While much of the study corridor is developed and urbanized with paved streets bounded by sidewalks, there are significant sections of US 11 between Vinesville Road and Academy Drive lacking sidewalks due to its quasi-rural roadway environment. There are also some abutting residential areas lacking in sidewalks, leaving pedestrians to walk on the roadways or on unpaved shoulder areas.

As part of study recommendations, several actions are proposed to improve corridor walkability, bicycle circulation, and general accessibility to the proposed BRT transit service. In the vicinity of the seven key BRT station locations (Princeton Baptist Hospital, Five Points West, Aronov Drive, Midfield/Health Center, Lipscomb/Brighton, Downtown Bessemer and South Bessemer/Academy Drive, the project cost estimate includes a $1 million allowance for enhancement of the street environment in the vicinity of the designated transit station location. This allowance is separate from the budget for the construction of the transit stations. While it was not possible to develop site-specific streetscape concepts and the setting for each station location differs, the following types of improvements are contemplated:

- In the immediate vicinity of station location, the enhancement of the sidewalk environment to include sidewalk widening and repair, tree wells and planting beds, street furniture, street lighting and other features.
- Consistent with jurisdictional policies and approvals, these treatments should reflect a Complete Streets approach, providing for not only the transit station facility, but also pedestrian movements and bicycle routes.
- These improvements should be coordinated with the proposed Red Rock Ridge and Valley (RRRV) trail system improvements identified within the Southwest Corridor. In the planning for BRT station locations, consideration was given to coordination with proposed regional trail system greenway trails and street trails. There are two significant specific opportunities to coordinate the trail system plan with the proposed BRT service:
  - Railroad Corridor from Lomb Ave. to Ave. W: within this 100-foot railroad corridor, the regional trail plan calls for a major trail corridor, the Jones Valley Rail Greenway. Based on prior coordination, the BRT alignment proposes to share a 1-mile segment of this corridor with the trail. There is adequate room for both and transit stations at either end of this segment will facilitate bicycle and pedestrian access by way of the trail corridor.
  - US 11 Corridor: this corridor from downtown Birmingham through downtown Bessemer and beyond is designated in the plan as a street-based trail, meaning that in urbanized areas the trail system would need to rely on sidewalks and opportunities to designate bicycle lanes. However, through much of this area, from Vinesville Road to Visionland Parkway with the exception of central Bessemer, there is a wide and meandering ALDOT right-of-way which affords the opportunity to develop a linear park which incorporates the trail system elements. Discussions could be advanced with ALDOT through the RPCGB for use of federal Transportation Alternative funding (formerly Transportation Enhancement funding), as a means to implement an initial segment of this corridor treatment.

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These improvements should be partnered with ALDOT and local municipalities to complement the improvement allowance so it is leveraged with other funding resources to maximize the impact of improvements at each location.

The Regional Transportation Plan adopted in June of 2010 the “Complete Streets Policy” which requires all federal-aid roadway projects to include appropriate active transportation provisions. The development of the BRT alignment within the city should be coordinated with city staff to maximize opportunities for implementing Complete Streets improvements. For the other municipalities in the corridor, opportunities to coordinate expanded project scopes need to be explored.

The intent of these actions is to develop prototype treatments around the key station locations to demonstrate through the improvements the application and benefits of streetscaping, Complete Streets, and walkability concepts to enhance the transit station environment and to serve as a catalyst to redevelopment and renewal initiatives in the vicinity. Depictions of these types of treatments can be seen in the depictions of future station areas.

### 5.7.9 Complementary Transit Services

The recommended transit improvements through this study include:

- **The Locally Preferred corridor Build Alternative:** BRT-Arterial transit service, from downtown Birmingham to Academy Drive, running along 6th Avenue South, Martin Luther King, Jr. Dr., Lomb Ave., a segment of new bus-only roadway, Ave. W, and US 11 from Five Points West south to the Academy Drive Park-and-Ride lot.
- **BJCTA Route 3 and Route 41 Hookup:** this concept links these two existing BJCTA routes lying on either side of US 11 with a connection across US 11 to improve mid-corridor circulation and enhance access to the US 11 BRT corridor.
- **Bessemer Express Route,** running from downtown Birmingham along I-20/59 to the Bessemer Park-and-Ride Lot and to the downtown Bessemer Transit Super Stop.
- **McCalla Express Route,** running from downtown Birmingham along I-20/59 to the Academy Drive Park-and-Ride Lot through McCalla with a stop at the Promenade Tannehill Shopping Center Park-and-Ride Lot.

These routes were determined to serve different travel sheds and be non-competitive to each other. The above proposed services complement two other planned routes which were considered in the corridor planning:

- **Downtown In-Town Partnership (ITP) Route System:** this planned service has two overlapping routes in the downtown Birmingham core extending from the Convention Center district at the north, to the Five Points South and the western side of the UAB campus near I-65. This system also includes three pairs of neighborhood collector routes extending outside the downtown district to surrounding neighborhoods. The downtown core routes would be operated on dedicated lanes for the BRT service at 10-minute headways, and the neighborhood routes also have 10-minute headways.
- **Bessemer Shuttle:** a planned route which circulates through downtown Bessemer through the East Valley Road corridor and the Academy Drive commercial area.
• Route 150 Circulator: a planned route connecting downtown Birmingham to the Galleria Mall district.

Based on existing and planned services, there would be multiple locations for interconnection of transit services, summarized as follows:

• Central Terminal:
  o Existing BJCTA Routes
  o DART Routes
  o ITP Green and Blue Routes
  o ITP Neighborhood Routes
  o BRT Route
• Five Points West Super Stop
  o BJCTA Routes 5, 38 and 41
  o BRT Route
• Aronov Drive
  o BJCTA Routes 3, 41, and 45
  o BRT Route
• Downtown Bessemer Super Stop
  o BJCTA Routes 1 and 45
  o BRT Route
  o Bessemer Express Route
  o Proposed Bessemer Shuttle
  o Proposed Hwy. 150 Connector Route
• Bessemer Park-and-Ride Lot
  o Bessemer Express Route
  o Proposed Bessemer Shuttle
• Academy Drive Park-and-Ride Lot
  o BJCTA Route 1
  o BRT Route
  o McCalla Express Route
  o Proposed Bessemer Shuttle
• Tannehill Promenade Shopping Center Park-and-Ride Lot
  o Proposed Bessemer Shuttle
  o McCalla Express Route

All the existing and proposed routes are collectively displayed in Figure 5.41 which shows existing BJCTA routes in the study corridor, the Downtown ITP routes, and the other planned and proposed transit services in the study corridor.
Figure 5.41. Existing and Planned Transit Services
5.7.10 Future Corridor Transit Service Improvements

In addition to these planned and proposed transit routes, there are other future transit enhancements which would improve alternative transportation choices in the Southwest Corridor, including:

- Further refine BJCTA route structures to improve service in areas of higher ridership, to improve route directness and travel time, and reduce duplicative coverages as routes converge on downtown Birmingham. BJCTA has investigated these sorts of lower cost route changes and is committed to identifying opportunities to improve the cost-effectiveness of the service provided.
- Improve headways on existing BJCTA routes. As sources to augment BJCTA funding are found, the frequency of service can be upgraded to 30-minute service during the day, and eventually to 20-minute service in peak hours. Such improvements will enhance overall transit ridership in this transit-reliant corridor, and enhance ridership on the BRT and express routes as feeder lines.
- Improve headways on the Bessemer Shuttle and Hwy. 150 Circulator Routes. As for the BJCTA system, consideration could be given to improvements in at least the peak period headways to enhance transit mobility and connectivity into the premium transit services of each radial corridor in greater Birmingham.
- Improve premium transit in other major radial corridors of the Birmingham region. As premium transit is developed in other key corridors such as US 65/US 31 and US 280, synergistic effects on ridership will occur as the range of accessible destinations is expanded.
- Future extension of the US 11 BRT service southward to the McCalla area may become warranted as jobs are developed around the Norfolk Southern Railroad intermodal hub and the surrounding warehousing and distribution district.

These types of improvements can be considered and tested as part of future Regional Transportation Plans, and programmed for implementation as expanded sources of transit funding for the region are identified and realized.

5.7.11 Summary of Corridor Transit Ridership

As discussed previously, the projected daily ridership on the proposed BRT service is 3,487 daily riders. Ridership on the Bessemer Express is estimated at 217 daily riders and on the McCalla Express is 100 daily riders. It is noted that forecasts of the future daily ridership using the regional travel demand model is tempered by its calibration to existing transit services provided and the corresponding ridership response. This approach reflects Federal Transit Administration guidance that promotes a conservative approach to projections of transit ridership on new premium transit services, especially in urban areas where those new services represent the first of their kind for which there is not a demonstrated history of ridership response. This is to say that as new premium transit services are implemented in the US 11 corridor and others in the region, ridership response would likely be somewhat greater than forecast, especially where riders on the premium transit in one corridor could interconnect with the premium transit service in another corridor. However, as no premium transit corridor services except for the Downtown ITP Circulator are in the cost-constrained element of the long-range Regional Transportation Plan, they cannot be considered in the ridership planning for other corridors.

Given those notations, the regional travel model produces station-specific estimates of future transit ridership, in this case for the year 2035. From these data, Figure 5.42 was prepared to illustrate the variations in 2035 daily ridership by station location in order from downtown Birmingham outbound to Academy Drive.
From this summary, it is seen that ridership is distributed across the corridor, with concentrations at Five Points West, Aronov Drive, and the Downtown Bessemer area, all with over 200 daily boardings. There are several other locations with over 100 daily boardings, and three with negligible boardings. It should be noted that the coding of travel analysis zones within models including the centroid connectors that link each zone to the adjacent roadway system and transit routes can often cause some anomalies in the resulting ridership results, in terms of the precise locations of boarding and alighting activity. There can also be coding issues which can restrict the attractiveness of the transit to potential users. While a review did not identify any obvious coding issues, further refinements such as division of zones or addition of connectors can be considered. Still the results correlate in general with areas of denser residential land uses and employment along the corridor.