

COLUMBUS TO ATLANTA HIGH SPEED RAIL FEASIBILITY STUDY

FINAL REPORT

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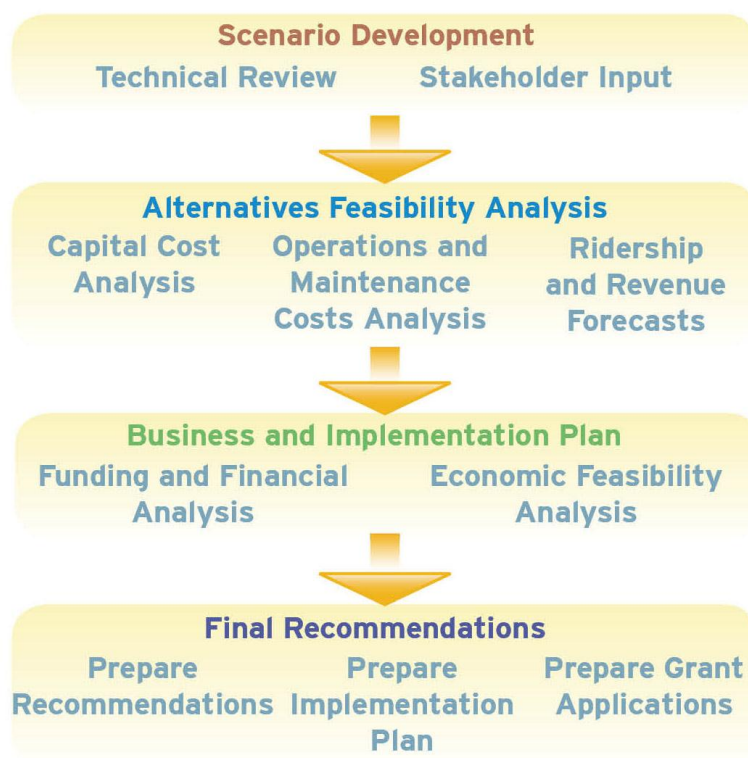
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Executive Summary

The Columbus Consolidated Government (CCG) has completed its High-Speed Rail Feasibility Study, which began in March 2013. This study, an initiative by Mayor Teresa Tomlinson and the Mayor's Commission for Passenger Rail, explores the relative feasibility of high-speed passenger rail between Columbus and Atlanta based on revenues, operating ratios, financial performance and social impacts.

Over the 10-month study period, two representative routes and three high-speed rail technologies were identified and examined. Utilizing socio-economic and transportation data, stakeholder input, and forecasting and planning tools, the study team developed operating plans, ridership forecasts, operations and maintenance cost estimates, and capital cost estimates for each alternative.

Feasibility Study Process

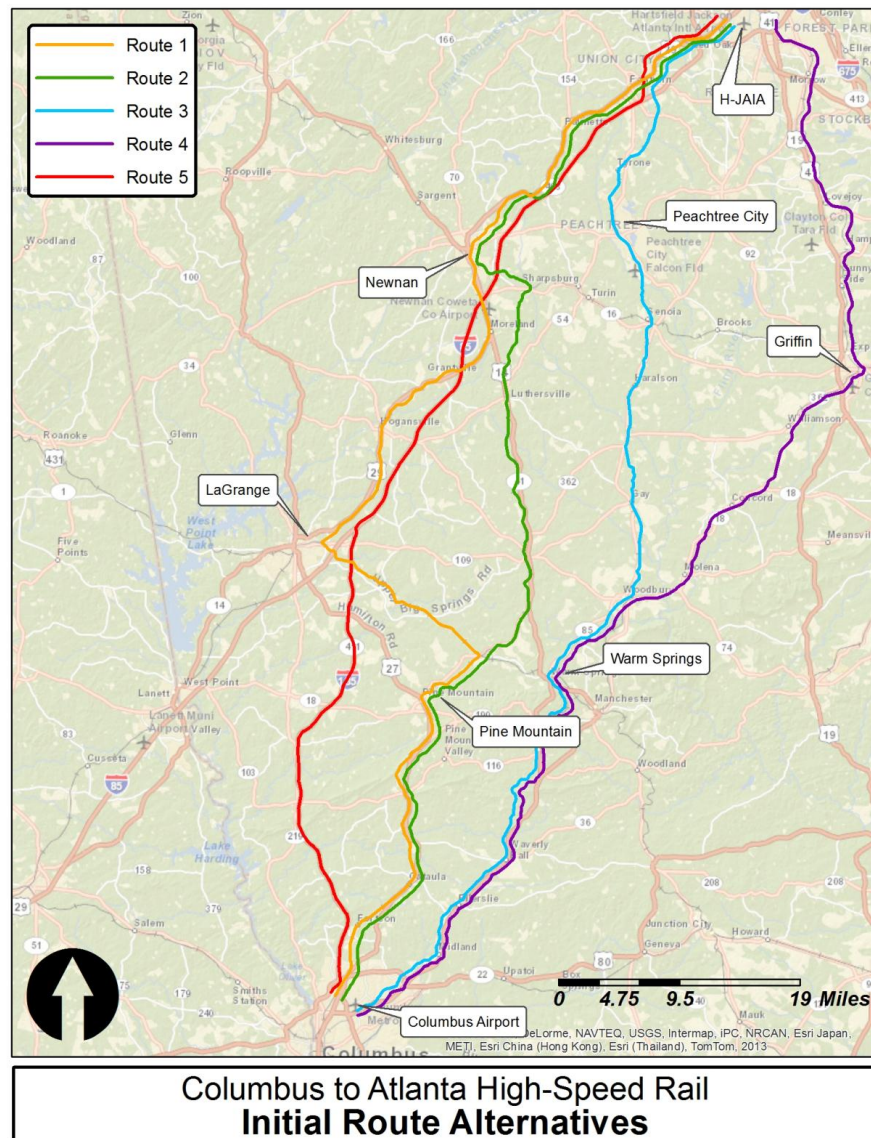


REPRESENTATIVE ROUTES AND OPERATING PLANS

The first major task for the study was to develop representative routes. Five initial routes were identified. The study team also garnered input from local advisors and stakeholders on potential issues and

opportunities of these five initial routes. Based on a quantitative and qualitative screening process, two routes were selected to base feasibility. These representative routes demonstrated the potential to deliver the highest level of service with the least public and environmental impact.

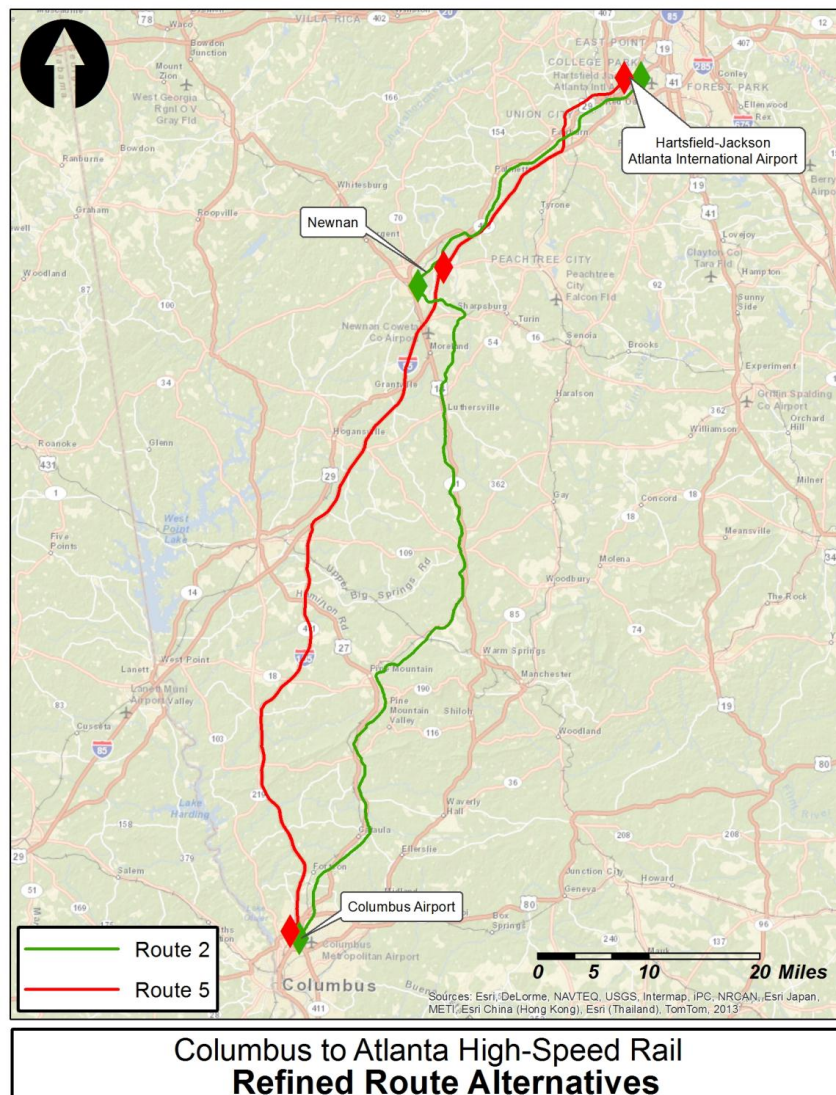
Initial Route Alternatives



The two routes that were selected as representative routes include Route 2 and Route 5.

- **Route 2** (in green) represents the Emerging High-Speed Rail analysis. It follows the abandoned right-of-way from the Columbus Airport through Pine Mountain and Raymond, and then transitions to existing (or adjacent to existing) rail ROW in Raymond before making its way to the Hartsfield-Jackson Atlanta International Airport (H-JAIA) area.
- **Route 5** (in red) represents both the Regional and Express alternatives. It generally follows I-185 and I-85 but transitions to existing (or adjacent to existing) rail ROW near Fairburn in order to access the H-JAIA station area.

Representative Routes



Once representative routes were identified, operating plans were created including travel times, schedules, equipment types and fleet size. Using Geographic Information Systems (GIS) and Train Performance modeling software, the Feasibility Study team developed calculated rail distances, travel times, and average speeds for each of the alternatives, providing the basis for ridership, revenue, and cost analyses.

RIDERSHIP

To determine potential ridership for the Columbus to Atlanta High-Speed Rail corridor alternatives, the Feasibility Study team developed a demand forecasting model which considered and estimated:

- The existing travel market (auto and air);
- The future market growth (population and employment);
- Level of Service characteristics (travel times, train capacity and frequency of service); and
- Ticket fares.

Federal Railroad Administration's Three High-Speed Rail Technologies: Emerging, Regional and Express

EMERGING HIGH-SPEED RAIL utilizes abandoned and active rail corridor right of way and is intended for developing corridors of 100-500 miles with a strong potential for future Regional or Express high speed rail services. Emerging rail uses diesel locomotives to achieve top speeds up to 79-110 mph.

REGIONAL HIGH-SPEED RAIL accommodates relatively frequent service between major and moderate population centers, 100-5—miles apart. Regional rail involves establishing a new passenger rail corridor but can utilize existing interstate and state highway corridors, private railroad right-of-way and greenfield alternatives. Diesel-electric locomotives achieve stop speeds of 110-150 mph.

EXPRESS HIGH-SPEED RAIL is frequent, quick service between major population centers with few intermediate stops. Top speeds range from 150-220 mph on completely grade-separated, dedicated rights-of-way. Electrified locomotives are used to achieve these top speeds. Express Rail involves establishing a dedicated passenger rail corridor along interstates, state highways and greenfield alternatives.

Ridership and Revenues were produced for years 2030 (opening year) through 2050

Annual Ridership Estimates

Year	Emerging	Regional	Express
2030	775,000	968,000	1,100,000
2040	945,000	1,200,000	1,400,000
2050	1,200,000	1,400,000	1,700,000

WHAT WILL HIGH-SPEED RAIL COST?

Operating and maintenance (O&M) for each of the three technologies were estimated based on fixed and variable cost categories. O&M costs were estimated for years 2030 through 2050

Estimated O&M Costs (in millions)

Annual O&M	2030	2040	2050
Emerging	\$19.9	\$23.0	\$26.2
Regional	\$21.5	\$24.2	\$27.1
Express	\$23.5	\$25.9	\$28.3

Capital cost estimates utilized the FRA's Standard Costing Categories (SCC) to maintain a consistent costing methodology. Each of the 10 major categories includes subcategory items to provide detailed costing information.

Estimated Capital Costs (in millions)

	Emerging	Regional	Express
Total Cost	\$1,300	\$2,000	\$3,900
Cost per Mile	\$13.0	\$22.2	\$42.5

IS THE CORRIDOR FEASIBLE?

One of the primary indicators of feasibility according to the FRA is the ability to cover O&M costs from annual revenues, also referred to as an operating ratio. A positive ratio (>1.0) is considered a feasible operation, resulting in no anticipated operating subsidy. Operating ratios were calculated for all three alternatives.

Estimated Operating Ratios

Operating Ratios	2030	2040	2050
Emerging	0.83	0.88	0.95
Regional	1.15	1.24	1.36
Express	1.21	1.34	1.50

WHAT ARE THE NEXT STEPS?

The Columbus to Atlanta corridor is deemed feasible based on the data collected and technical analysis. Moving forward, the CCG will begin working on both immediate and long-term next steps for successful implementation, including:

- Incorporating the study in the Georgia State Rail Plan Update;
- Continuing education and outreach;
- Identifying fund for the next planning and environmental analyses;
- Building partnership with local and regional leaders;
- Identifying funding/financing strategies for implementation; and
- Preserving the corridor through documentation and map.

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Glossary of Terms

AADT – Annual Average Daily Traffic
ACS – American Community Survey
ARC – Atlanta Regional Commission
AREMA – American Railway Engineers and Maintenance Association
ARRA – American Recovery and Reinvestment Act
ATS – American Travel Survey
BRT – Bus Rapid Transit
BTS – Bureau of Transportation Statistics
CCI – Construction Cost Index
CE – Categorical Exclusion
CID – Community Improvement District
CMAQ – Congestion Mitigation and Air Quality Improvement Program
CSU – Columbus State University
DB1B – Airline Origin and Destination Survey
DCA – Department of Community Affairs
DNR – Department of Natural Resources
EIS – Environmental Impact Statement
EJ – Environmental Justice
EMU – Electric Multiple Units
FAA – Federal Aviation Administration
FD – Final Design
FRA – Federal Railroad Administration
FTA – Federal Transit Administration
FWHA – Federal Highway Administration
GARVEE – Grant Anticipation Revenue Vehicle Bond
GDOT – Georgia Department of Transportation
GIS – Geographic Information System
GNAHRGIS – Georgia’s Natural, Archaeological and Historic Resources GIS
GO – General Obligation
GPA – Georgia Ports Authority
GRPA – Georgia Regional Passenger Authority
H-JAIA – Hartsfield-Jackson Atlanta International Airport
HSGT – High Speed Ground Transportation
HSIPR – High Speed and Intercity Passenger Rail
HSR – High Speed Rail
LOS – Level of Service
MAP-21 – Moving Ahead for Progress in the 21st Century
MMPT – Multi-Modal Passenger Terminal

MPO – Metropolitan Planning Organization
MSA – Metropolitan Statistical Area
NEPA – National Environmental Policy Act
NHPRS – National High-Performance Rail System
NRHP – National Register of Historic Places
NPV – Net Present Value
NS – Norfolk Southern
OBS – On Board Service
OMB – Office of Management and Budget
P3 – Public Private Partnerships
PRIIA – Passenger Rail Investment and Improvement Act of 2008
PTC – Positive Train Control
RRIF – Railroad Rehabilitation and Improvement Financing Program
RTC – Rail Traffic Controller
SAFETEA-LU – Safe Accountable Flexible Efficient Transportation Equity Act: A
Legacy for Users
SCC – Standard Cost Categories
SDP – Service Development Programs
SEHSR – Southeast High Speed Rail
SPLOST – Special Purpose Local Option Sales Tax
STP – Surface Transportation Program
TAD – Tax Allocation Districts
TEA-21 – Transportation Equity Act for the 21st Century of 1998
TIF – Tax Incremental Financing
TIGER – Transportation Investment Generating Economic Recovery
TIFIA – Transportation Infrastructure Finance and Innovation Act
TMP – Transportation Management Plan
TPC – Train Performance Calculator
TPO – Transportation Planning Organization
TRB – Transportation Research Board
TSPLIST – Transportation Special Purpose Local Option Sales Tax
TWC – Track Warranted Control
UIC – International Union of Railways
USGAO – United States Government Accountability Office
US FWS – United States Fish and Wildlife Services
USDOT – United States Department of Transportation
VMT – Vehicle Miles Traveled

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1. CORRIDOR HISTORY AND PROJECT BACKGROUND

The Columbus to Atlanta High-Speed Rail Feasibility Study (Feasibility Study) intends to evaluate the potential for implementation and operations of intercity passenger rail between Columbus, Ga., and Atlanta. This study takes into consideration the history of the corridor, potentially feasible route alternatives and technical operating estimations in order to determine overall feasibility for the corridor.

This study also incorporates data collection, technical analyses and stakeholder involvement to help determine feasibility. Final recommendations include the determination of feasibility, implementation and phasing strategies, and next steps for the corridor as it advances through the typical implementation process for transportation projects.

Before being able to determine feasibility, it is important to recognize the history of the corridor and previous passenger rail service, and the purpose behind the local initiative of the Columbus Consolidated Government (CCG) to initiate the evaluation of a high-speed rail corridor between Columbus and Atlanta.

1.1 CORRIDOR HISTORY

Passenger rail from Columbus to Atlanta has a long standing history starting in the late 19th Century with the Georgia Midland and Gulf Railroad (GM&G), chartered in 1885 and completed in 1887. The railroad connected Columbus to Atlanta via Woodbury (Meriwether County), Griffin (Spalding County) and McDonough (Henry County). By 1888, the railroad had seven locomotives, eight passenger cars, two baggage cars and 135 freight cars.¹ According to the 1895 timetable, it took approximately four to four and one-half hours to travel between the two cities. The GM&G had quite a few financial problems and changed ownership and names until it was incorporated into the Southern Railway and then absorbed into the system that is now known as Norfolk Southern (NS). Portions of the line were abandoned in the 1970s to 1980s.

After the GM&G service halted around the turn of the century, another passenger rail system between the two cities was introduced in 1947 by the Central of Georgia Railway. This service was a leader in

Figure 1-1: Georgia Midland & Gulf Railroad 1895 Timetable

GEORGIA MIDLAND AND GULF RAILROAD.											
JOHN F. FLOURNOY, Receiver. C. W. CHEARS, Gen. Manager. T. C. S. HOWARD, Sec'y & Treas. CLIFTON JONES, Gen. Fht. & Pas. Agt.						J. D. MCPHAIL, Master Mechanic. D. E. WILLIAMS, Jr., Comm'l Agt. C. J. BIRDSONG, Train Master, GOETCHINS & CHAPPELL, Gen. Counsel. General Offices—Over Third National Bank, cor. 12th and Broad Sts., Columbus, Ga.					
50	52	MI	September 15, 1895.			MI	51	53			
P. M.	A. M.		(Central of Ga. Ry.)				A. M.	P. M.			
*5 00	*7 30		lve...Atlanta...arr.				10 00	8 05			
	A. M.		(Central time.)					P. M.			
	*8 15	0	lv. McDonough ¹ ar.			95		7 02			
	8 23	4	Greenwood.....			94		6 52			
	8 30	8	Luella.....			91		6 45			
	8 55	18	arr. Griffin ² lv.			78	A. M.	6 20			
*6 10	9 05		lv. Williamson ³ ar.			72	8 53	6 10			
6 27	9 22	26	Jolly.....			67	8 37	5 53			
6 36	9 32	31	Concord.....			63	8 27	5 43			
6 45	9 42	35	Neal.....			59	8 21	5 35			
6 54	9 51	39	Molena.....			55	8 12	5 24			
7 00	9 58	42	Woodbury ⁴			51	8 07	5 18			
7 11	10 09	47	Raleigh.....			46	7 57	5 07			
7 21	10 20	52	Warm Springs... ⁵			42	7 46	4 55			
7 30	10 31	56	Shiloh.....			38	7 38	4 46			
7 54	10 41	61	Oak Mountain...			34	7 29	4 35			
8 03	10 50	65	Waverly Hall... ⁶			28	7 20	4 25			
8 14	11 02	70	Ellerslie.....			23	7 08	4 11			
8 23	11 11	75	Midland.....			18	7 00	4 02			
8 33	11 23	80	Flat Rock.....			14	6 49	3 51			
8 42	11 32	85	Columbus ⁷			10	6 40	3 41			
8 48	11 40	88					6 34	3 32			
9 07	12 02	98					*6 15	*3 10			
P. M.	NO'N		[ARRIVE]				[LEAVE]	A. M., P. M.			

Connecting in Union Depot, Atlanta, with Vestibule trains to and from the East, via Southern Ry. and Seaboard Air Line; also with Western & Atl. R.R. and Southern Ry. for all points to and from the north and west.

¹ www.railga.com/gmidgulf.html

locomotive technology, being the first intrastate steamliner. This service provided two roundtrips per day from Columbus to Raymond (Coweta County), Newnan (Coweta County) and Atlanta. Each train consisted of two chair cars, one baggage-passenger car and one tavern-observations car. The total seating



per train was 208 passengers, equaling a total capacity of 832 passengers daily.

This passenger service continued until 1970, a time when many other passenger corridors in the state were discontinuing service due to the expansion of the interstate system and prominence of personal vehicles. As mentioned, today the majority of the corridor is abandoned and the land is owned by Norfolk Southern.

During the 1950s, the Columbus leadership opted out of the interstate system that was rapidly expanding in the state, with the hopes of keeping Columbus a smaller city. While the interstate system continued to grow outside of Columbus, the negative economic impacts were realized by the city. As leadership changed, the political backing of an interstate to Columbus also changed and during the 1970s, an interstate connecting Columbus with Atlanta became a high priority. Interstate 185 was constructed in 1979 and was open for travelers in the early 1980s. In the 1990s, I-185 became known as the “longest cul-de-sac in the country,” and the corridor seemed more of an afterthought without any connectivity to other areas. In the years to follow, Columbus leadership’s goal was to be more progressive in decision-making regarding transportation, land use and development, and economic development.

1.2 PROJECT BACKGROUND AND PURPOSE OF THE STUDY

During the 1990s, the U.S. Department of Transportation (USDOT), in conjunction with the Transportation Research Board (TRB), conducted research that indicated high-speed ground transportation systems, including high-speed rail, could be a competitive alternative to highway and domestic air travel in high-density travel markets and corridors in the United States. TRB Special Report 233, *In Pursuit of Speed, New Options for Intercity Passenger Transport*, concluded that “High-speed ground transportation systems could be an effective alternative in corridors where travel demand is increasing but expanding capacity to reduce highway and airport congestion and delays is very difficult.”²

The Federal Railroad Administration (FRA) also completed a study of the potential for high-speed ground transportation systems, drawing similar conclusions to the TRB. In its 1997 study *High-Speed Ground Transportation for America*, commonly referred to as the Commercial Feasibility Study, the FRA estimated

² <http://www.trb.org/Publications/Blurbs/153319.aspx>

the total costs and benefits of implementing a variety of high-speed ground transportation systems. The study identified the potential for diverted trips to competitive high-speed rail and ground transportation services, especially for trips between 100 and 600 miles long. The study found that high-speed ground transportation's total benefits exceeded total costs in many of the illustrative corridors.

Current high-speed rail systems range from Emerging high-speed rail with top speeds of 79 to 110 mph, Regional high-speed rail with top speeds of 110-150 mph, and Express high-speed rail with 150-220 mph top speeds.

In addition to federal interest, the Georgia Department of Transportation (GDOT) has made continued investment in high-speed rail studies in Georgia over the past few years with the 2012 *High Speed Rail Planning Services* study for three corridors: Atlanta to Birmingham, Ala.; Atlanta to Jacksonville, Fla.; and Atlanta to Louisville, Ky. Currently, GDOT is conducting a Tier I Environmental Impact Statement (EIS) for the Atlanta to Charlotte, N.C. corridor as well as the Atlanta to Chattanooga, Tenn., corridor. The Columbus, Ga., to Atlanta corridor, providing alternative transportation services to the third largest city in Georgia, is another spoke in a potential Georgia high-speed rail system with Atlanta serving as its hub.

Beginning in 2012, the CCG began pursuing a high-speed rail initiative. Mayor Teresa Tomlinson initiated a citizen's group with a mission to "... review and analyze the viability of passenger rail in Georgia and the feasibility of a Columbus, Ga., line." From this, the Mayor's Commission for Passenger Rail was formed and met continuously over the course of a year while trying to identify funding to conduct a feasibility study. The Commission was successful in identify discretionary funding from GDOT, the Columbus Metropolitan Planning Organization (MPO), local business and civic groups.

The CCG released a request for proposals from consultants in September 2012 and began their study in Spring 2013. This study focused on a new high-speed rail corridor from Columbus traveling northeast towards Hartsfield-Jackson Atlanta International Airport (H-JAIA) in Atlanta. The study included a number of components including data collection, forecasting, planning and integration, qualitative economic and financial analysis, and stakeholder involvement.

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2. STAKEHOLDER INVOLVEMENT

Public participation is the foundation for any planning effort; therefore, a variety of opportunities for involvement must exist to ensure active and widespread participation within the study area. This is especially true for high-speed rail planning, which must consider a wide variation of users, including commuters and visitors. Significant involvement from key stakeholders representing these groups helped to ensure that the final feasibility study met the needs of the broader public, the CCG, GDOT and other partners, thus being accepted and supported by communities and leaders within the study area.

Public involvement was an essential component of this study. Outreach efforts were focused on educating, informing and involving stakeholders as to the purpose and progress of the project by highlighting local issues, technical considerations and potential impacts. Outreach techniques were designed to educate and update key stakeholders.

The primary public involvement objectives for the Feasibility Study were:

- **Objective 1:** Identify stakeholders and maintain a stakeholder database compiled from agency and interest group partners.
- **Objective 2:** Inform elected officials to improve their understanding of the Feasibility Study process and schedule.
- **Objective 3:** Inform stakeholders of general project information and receive feedback throughout the study process.
- **Objective 4:** Update the public and solicit input throughout the planning process by means of a project website and public forums such as the Mayor's Commission for Passenger Rail meetings.

2.1 STAKEHOLDERS

For the Columbus to Atlanta corridor, the study team worked with a number of groups including:

- **Mayor's Commission for Passenger Rail** – a Commission of 30-persons appointed by the Mayor in 2012 including business leaders, elected officials, citizens and staff. The Commission meets the first Wednesday of each month, and is used as a sounding board as the project progressed and providing insight into next steps of the study and further stakeholder and public participation. The Mayor's Commission is anticipated to continue meeting after the conclusion of this study.
- **Technical Advisory Group (TAG)** – formed specifically for this project and included representatives along the study area who are critical to the development of high-speed passenger rail between Columbus and Atlanta (for a list TAG members, refer to Appendix B). The group met two times: once on June 14, 2013, to discuss the process and then again on December 18, 2013, near the completion of the Feasibility Study. Because of the varied composition of the stakeholder groups, these meetings were beneficial in bringing together a wide range of opinions that assisted in exploring various perspectives on key issues.

- **Key Stakeholders and Elected Officials** – Over 300 elected officials, city and county staff, business leaders, institutions, economic development staff, and other key stakeholders who are located within the large study area were invited to attend two larger stakeholder meetings: one held on September 4, 2013, and the final on January 8, 2014.

These entities served as a gateway to local communities throughout the study process and beyond, helping to inform the business community, organizations, elected officials and the public of the latest updates and developments and encouraging participation as the project moves into future phases.

At the conclusion of the Feasibility Study, the team conducted two speakers' bureaus in February 2014 and created a presentation and materials for members of the Mayor's Commission for Passenger Rail to continue its work towards implementation.

2.2 OUTREACH EFFORTS

Collateral materials were developed by utilizing a variety of outreach and involvement tools to allow the team greater flexibility in determining the best practices for the community or stakeholder groups, as follows:

- **Website** - A dedicated project website was developed in coordination with the CCG to provide continuous public access to project details and materials (www.columbusga.org/highspeedrail). Citizens and stakeholders had the opportunity to submit comments to the project team via the website and were able to stay informed of on-going project activities by consulting the site at their convenience. The website hosted documentation developed for the study, newsletters and factsheets.
- **Social Media and Facebook** – Pertinent questions and their corresponding answers from Facebook (Columbus, Georgia Passenger Rail), the project website (www.columbusga.org/highspeedrail), as well as emails and questions received during meetings were posted through the electronic sources (e.g., Facebook, website) to keep stakeholders and the public informed as the project progressed.
- **Newsletters/Fact Sheets** – Two Newsletter/Fact Sheets were developed at milestones and were distributed through email blasts, and posted on Facebook and the website. They were also available for key stakeholders to share with their constituents.
- **Messaging and Materials for Senior Leadership** – Materials were developed using targeted messages and eye-catching collateral materials to effectively summarize and communicate the plan to GDOT Senior Leadership, GDOT Board Members, Georgia State Legislators, Federal partner agencies, and private-sector partners.

2.3 STAKEHOLDER INPUT

Input from local stakeholders ensured that the Feasibility Study reflected the most recent and accurate data. The following section documents a portion of the discussion points. For more information on the meetings and discussions, please refer to Appendix B for a copy of meeting minutes for all meetings held during this project.

2.3.1 Technical Advisory Group

Members of the TAG provided valuable insight into issues and opportunities along the corridor to assist the study team in developing representative alternatives for the Shared-Use and Dedicated-Use services to base the feasibility determination. In addition, the group asked the project team questions during the meeting; a sample of questions asked and the responses from the project team are shown in Table 2-1.

Table 2-1: Questions/Comments from the July 14, 2013 TAG Meeting

Question/Comment	Response
Would we (CCG) look at locations in Columbus where there could be additional connections to communities?	Future connections to other locations could be considered; however, this Feasibility Study will focus on how to create an efficient service between Columbus and Atlanta.
Would the service have to make any stops between Columbus and Atlanta?	It may be that this service works better without any intermediate stations. However, intermediate stations could be a benefit in which the added ridership may be substantial enough to help cover operations and maintenance costs. The use of express and local service may also be an option where some trains stop at every station and others skip the intermediate stations depending on peak travel times. All potential stops will be analyzed as well as overall trip time to find the most efficient operation.
What about Lee, Chambers and Russell Counties (Alabama)? They are becoming bedroom (commuting) communities to Columbus. Are these all the possible routes?	Routes through Opelika and Junction City were identified when determining the universe of alternatives; however, it was determined that both routes had considerable increases of travel time and did not serve the purpose of creating an efficient service between Columbus and Atlanta that is competitive with auto travel and were screened or eliminated from this study. <i>It should be noted that although several routes were eliminated from this study they would be further evaluated again more thoroughly in future environmental studies.</i>

2.3.2 Key Stakeholders

On September 4, 2013, a larger stakeholder meeting was held. Approximately 300 invitations were sent out to a stakeholder list that included elected and appointed officials, economic development entities, Atlanta and Columbus airport staff, planners, regional commissions and other key stakeholders that are located between Columbus and Atlanta. Attendance at the meeting included approximately 40 representatives from cities and counties within the study area. Some of the discussion points from the meeting are shown in Table 2-2 with the complete meeting minutes included in Appendix B.



Photo 1: Stakeholder Meeting, held September 4, 2013

Table 2-2: Comments/Questions from the September 4, 2013, Stakeholder Meeting

Question/Comment	Response
How does this corridor fit into the Georgia State Rail Plan?	The 2009 State Rail Plan covers both freight and passenger rail. The 2014 plan will include both freight and passenger rail projects. Past and current studies will be incorporated. The update to the State Rail Plan is currently under development. It should be noted that FRA strongly prefers passenger rail to be in the State Rail Plan to receive funding.
What is the feedback regarding a train passing through a small town at 120 mph?	The reviews are generally mixed: Pro – supportive reviews are typically based on the potential economic development associated with high-speed rail. Con – unsupportive reviews are typically based on safety or aesthetic impacts. The interstate route was suggested as possibly having fewer impacts on the smaller communities in the region. Environmental impacts will be explored during the environmental process.

Question/Comment	Response
What is a reasonable timeframe to expect planning to implementation and operation of a high-speed rail line?	California started studying routes in the 1990s and is getting close to construction. Florida has been studying high-speed rail since the 1990s and is getting close to completing the environmental documentation on a line from Orlando to Miami. The Southeast High Speed Rail corridor started with its first study in 1992. They have some existing passenger rail in North Carolina and are currently making progress upgrading infrastructure. Overall the timeframe varies, but historically it has been in the 20-year range.
Are potential future technology upgrades taken into consideration?	The study team will not make assumptions on possible technology that is not currently available. Recommendations are based on the best technology available today.

On January 8, 2014, a second stakeholder meeting was held. Again, approximately 300 invitations were sent out to a stakeholder list that included elected and appointed officials, economic development entities, Atlanta and Columbus airport staff, planners, regional commissions and other key stakeholders that are located in study area. Attendance at the meeting were approximately 30 representatives from cities and counties within the study area including representatives from the cities of LaGrange, Hamilton, Union City, Buena Vista, Midland, Pine Mountain, Coweta and Harris Counties, the River Valley Regional Commission, members of the Mayor's Commission, and the Technical Advisory Group. Some of the discussion points are shown in Table 2-3 with the complete meeting minutes included in Appendix B.

Table 2-3: Comments/Questions from the January 8, 2014 Stakeholder Meeting

Question/Comment	Response
How much does an interim stop cost in time?	The study estimates a dwell time to be approximately 5 minutes. Deceleration and acceleration times can take an additional 10 minutes. It also depends on technology, curves, etc. During the study it was thought that one intermediate stop would boost ridership and we found that to be the case.
Are we ruling out Emerging technology?	It is not that the study rules it out; however a Regional or Express technology would be more feasible based on this study. The environmental studies will continue to evaluate it as an option.

Question/Comment	Response
Did the study evaluate LaGrange as a potential stop?	Yes Route 5 comes close to LaGrange and one of the initial shared-use routes goes through downtown LaGrange. The study used Newnan as the intermediate stop; however, as we go into environmental studies, LaGrange will be evaluated more thoroughly.
Does this extend beyond Columbus?	This study did not evaluate beyond Columbus or Atlanta, but there is potential for additional connections from Columbus.

2.3.3 The Mayor's Commission for Passenger Rail

The Mayor's Commission for Passenger Rail was established to champion the initiative to bring high-speed rail from Columbus to Atlanta. Since the beginning of this feasibility study, the commission's monthly meetings have consisted of presentations by the consultant team, guest speakers and discussions as the study progressed. Meeting minutes from each of the meetings can be found in Appendix B.

2.4 PUBLIC INVOLVEMENT NEXT STEPS

This study is planning for the future growth of Columbus and will improve the quality of life and economy in the city. As the effort moves toward implementation, the business community needs to be involved in communicating the economic benefits of the project in order to help build support. Education and outreach will allow this project to move forward and will give Columbus a competitive advantage in the federal funding process. At the conclusion of the study, the Mayor's Commission on Passenger Rail will continue the initiative by:

- Developing a message that focuses on the significant benefits for the City of Columbus;
- Scheduling meetings with the City of Atlanta and Mayor Kasim Reed;
- Scheduling meetings with the City of Newnan and Mayor Keith Brady;
- Sending a high-level version of the report to U.S. Transportation Secretary Anthony Foxx to update him on the progress of the project; and
- Developing a high-level presentation and talking points for the Mayor and members of the Commission to educate their constituencies and the public about the effort.

3. EXISTING CONDITIONS

3.1 ASSESSMENT OF PREVIOUS AND ONGOING STUDIES

Assessing previous and ongoing studies helped gauge the perception of high-speed rail within each corridor. While the studies did not go into detail on the specifics of high-speed rail in their respective study areas, a broad understanding of high-speed rail perception gave the team insight into the overall feasibility of a high-speed corridor. The following relevant studies were reviewed:

- *Evaluation of High-Speed Rail Options in the Macon-Atlanta-Greenville-Charlotte Rail Corridor*, Volpe National Transportation System Center, 2008;
- *Georgia State Rail Plan*, Georgia Department of Transportation, 2009;
- *The Path to Georgia's 21st Century Knowledge Economy: Economic Development, Capital and Operating Cost Estimates, Station Area Plans, Market Assessment, and Financing Options for the Macon to Atlanta Passenger Rail Corridor*, Georgians for Passenger Rail, 2010;
- *High-Speed Rail Planning Services*, Georgia Department of Transportation, 2012; and
- *Georgia MultiModal Passenger Terminal*, Georgia Department of Transportation, ongoing.

More detail on each of these studies is below.

3.1.1 Evaluation of High-Speed Rail Options in the Macon-Atlanta-Greenville-Charlotte Rail Corridor

In 2008, the Volpe National Transportation System Center published the *Evaluation of High-Speed Rail Options in the Macon-Atlanta-Greenville-Charlotte Rail Corridor* (Volpe Study). This study conducted an analysis for the extension of the previous Volpe Center study on the Southeast High-Speed Rail Corridor (SEHSR) segment from Washington, D.C., to Charlotte, N.C., including: scenario development, demand and revenue estimation, capital cost estimation, operating and maintenance (O&M) cost estimation, corridor/network financial analysis, and societal impacts estimation.

This study included two stations located within the study area of this Columbus to Atlanta Feasibility Study including Griffin, Ga., and H-JAIA. The Volpe Study developed seven operating scenarios in which one or both of these stations were included.

The report concluded that the best scenario for the corridor is diesel high-speed rail technology, operating at 125 mph to 150 mph, with 14 station stops (including both stations mentioned between Atlanta and Griffin). The report states that this alternative "... balances passenger demand and revenues, operating costs and initial capital requirements." (Volpe, 2008)

3.1.2 Georgia State Rail Plan

GDOT's Intermodal Division last updated the State Rail Plan in 2009. The purpose of the plan is to coordinate freight rail plans and initiatives with that of passenger rail. GDOT takes into account a variety of factors, such as the issues and opportunities associated with the expansion of passenger rail in the state, and incorporates a comprehensive network of passenger rail corridors and their associated economic benefits.

As mentioned in the 2009 State Rail Plan, the Columbus to Atlanta corridor is one of 10 intercity lines planned to connect nine of Georgia's largest cities and towns within the Atlanta area. The plan indicates that the Columbus to Atlanta line will branch off the Atlanta-Griffin NS line. It will use a combination of NS line, abandoned freight segments and new alignment with direct service from Griffin (Spalding County) to Columbus (Muscogee County).

It should be noted that GDOT will begin updating the State Rail Plan in early 2014. As a result, the study team will coordinate the findings of this feasibility study with GDOT for incorporation into the updated State Rail Plan.

3.1.3 The Path to Georgia's 21st Century Knowledge Economy: Economic Development, Capital and Operating Cost Estimates, Station Area Plans, Market Assessment, and Financing Options for the Macon to Atlanta Passenger Rail Corridor

Over the past two decades, the corridor between Atlanta and Macon has been studied as a potential commuter rail line to serve populations traveling between these cities. In 2010, the non-profit group, Georgians for Passenger Rail, conducted a commuter rail study that encompassed a 103-mile corridor with 13 potential stations, including the Georgia MultiModal Passenger Terminal (MMPT) in Atlanta, and stations in Hapeville, Morrow, Hampton, Griffin, Forsyth, and Macon. The study recommended that the service be in operation by 2018 with 12 round trips during weekdays. The estimated capital cost for this project is \$400 million (in 2010 dollars) with operating costs estimated at approximately \$25 million per year. The study determined that much of the funding would be obtained through incremental tax revenue, tax allocation district bonds, county taxes and private sector contributions.

Spalding County proposed this project for inclusion in the Transportation Investment Act (TIA) referendum in 2012 for the Three Rivers Regional Commission, allowing for a one-percent regional sales tax to help fund the passenger rail line from Atlanta to Griffin. However, TIA did not pass in the Three Rivers Regional Commission or in the Atlanta Regional Commission, thus losing the potential funding source as outlined in the 2010 study. It should be noted that TIA did pass in the Columbus area (River Valley Regional Commission); however, the Columbus to Atlanta passenger rail line was not included in the project list, leaving the project eligible for only the smaller discretionary fund competing with other transportation projects in the region.

3.1.4 High-Speed Rail Planning Services

In 2012, GDOT completed feasibility studies of three high-speed rail corridors in the southeastern United States. All three corridors originate in Atlanta and terminate in Birmingham, Ala.; Jacksonville, Fla.; and Louisville, Ky. A representative route was elected for each corridor for both Emerging high-speed rail with speeds up to 79-110 mph, and Express high-speed rail with speeds up to 150-220 mph. Additionally, Maglev technology was included in the Atlanta to Louisville Corridor due to specialized earmarked funding for the Atlanta to Chattanooga portion of the corridor. The feasibility analysis for each corridor included capital costs, operation and maintenance costs, ridership and revenue, operating ratios, and funding and financing opportunities of the selected representative routes.

Each corridor was studied independently of one another, and the feasibility of each corridor was dependent upon the potential benefits anticipated from investment in transportation between the major cities and along each of the corridors. The study concluded that all three corridors were determined feasible to move onto the next phase of the FRA study process: the environmental phase.

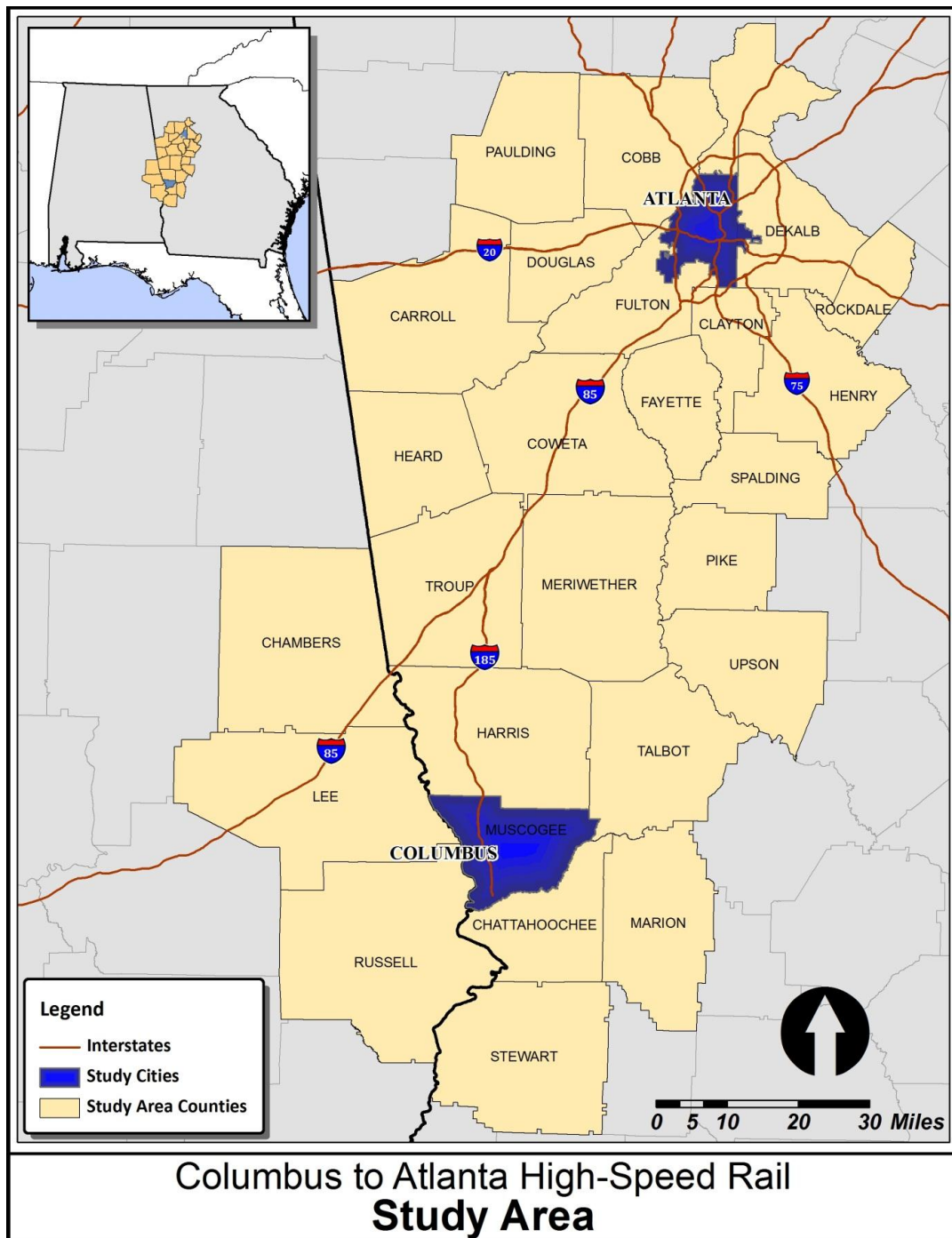
3.1.5 Georgia MultiModal Passenger Terminal

GDOT is currently studying the proposed Georgia MMPT to be located in downtown Atlanta. GDOT has started the development of the Draft EIS, which is being reviewed by the Federal Transit Administration (FTA), the lead federal agency. The proposed Georgia MMPT will serve as the Atlanta hub for high-speed rail, commuter rail, intra-city rail (MARTA) and other ground transportation, such as bus and taxi service.

3.2 BASELINE CONDITIONS

In order to estimate the improvements that high-speed rail will bring to the corridor, a baseline of existing conditions was collected and documented. A study area was established around a generalized corridor connecting Columbus to Atlanta in order to identify connections between cities and development opportunities in the southwest Georgia area between the two terminal cities. The existing conditions analysis focused on county-level data within the study area. A map of all Georgia and Alabama counties included in the study area can be seen in Figure 3-1. The existing conditions included population demographics and socioeconomic characteristics; employment patterns; land use patterns; existing alignment alternatives and their associated attributes; issues and opportunities and environmentally sensitive areas within the study area.

Figure 3-1: Columbus to Atlanta High-Speed Rail Study Area



3.2.1 Data Collection

Estimation of future conditions based on the inclusion of high-speed rail will only be accurate if the baseline conditions are taken from reliable data sources. Table 3-1 states the sources of data obtained for the existing conditions for the Columbus to Atlanta study area.

Table 3-1: Existing Conditions Data Sources

Area of Interest	Data	Level of Aggregation	Source
Demographics	2010 Total Population, Race, and Age	County	U.S. Census 2010
	2010 Total Employment	County	American Community Survey ³
Socioeconomic	2010 Median Household Income	County	American Community Survey
Land Use	Urbanized Areas	County	U.S. Census 2010
Transportation	Existing Alternative Alignments	Rail/Interstates	GDOT, Railroad Owners
	Air Travel	Cities	American Travel Survey, Federal Highway Administration
	Auto Traffic Volume	Interstates	State DOTs
Environmental	Endangered and Threatened Species	County	U.S. Fish and Wildlife
	Cultural Resources	County	National Register of Historic Places
	Protected Lands	County	Google Earth

3.2.2 Demographic and Socioeconomic Characteristics

Many different factors can influence the transportation needs in a region. Population, employment mix, land use and location of major travel destinations influence travel patterns and can impact mode choices. Therefore, a thorough analysis of exiting demographic and socioeconomic characteristics of the study area was performed for the 26-county study area.

³ The American Community Survey (ACS) is housed under the U.S. Census Bureau. However, unlike the decadal census, the ACS is conducted more frequently. One-year estimates are available for territories that have 65,000 people or more, but are less reliable than the 3-year and 5-year estimates. Surveys for territories with populations of 20,000 or more are available as 3-year estimates. The 5-year estimates are the most reliable and are available for all size territories (U.S. Census Bureau, 2011).

3.2.2.1 Total Population, Density, Race and Age

Understanding the distribution and characteristics of an area's population is critical to transportation planning. In order for high-speed rail to be feasible, it must serve areas of high population density that can produce sustainable ridership and revenues. Other characteristics, such as age and race, must be considered, as this can impact the population's propensity to use transit for business and personal travel.

For the purpose of assessing population, data was reviewed and aggregated at the county level from the 2010 U.S. Census. The total existing (2010) population of the 26 counties in the study area is approximately 4.2 million. As illustrated in Figure 3-2, the population density varies throughout the corridor with the highest densities in the Columbus and Atlanta metropolitan areas. The population densities between the two metropolitan areas are much lower, indicating that much of the corridor is rural. The *Columbus to Atlanta Existing Conditions Report* provides detailed 2010 total population by county.

Demographics, such as race and ethnicity, will become vital during environmental studies to understand potential environmental justice issues and to ensure that specific groups of people are not disproportionately impacted by or have access to the passenger rail service. The percentage of minority population is illustrated in Figure 3-3. The national average of minority population is 22%, whereas, the minority population for the State of Georgia is approximately 37% (2011)⁴. The highest percentages of minority populations are generally concentrated in or near the two metropolitan areas at the northern and southern ends of the corridor study area.

⁴ <http://quickfacts.census.gov/qfd/states/13000.html>

Figure 3-2: Study Area Population Density

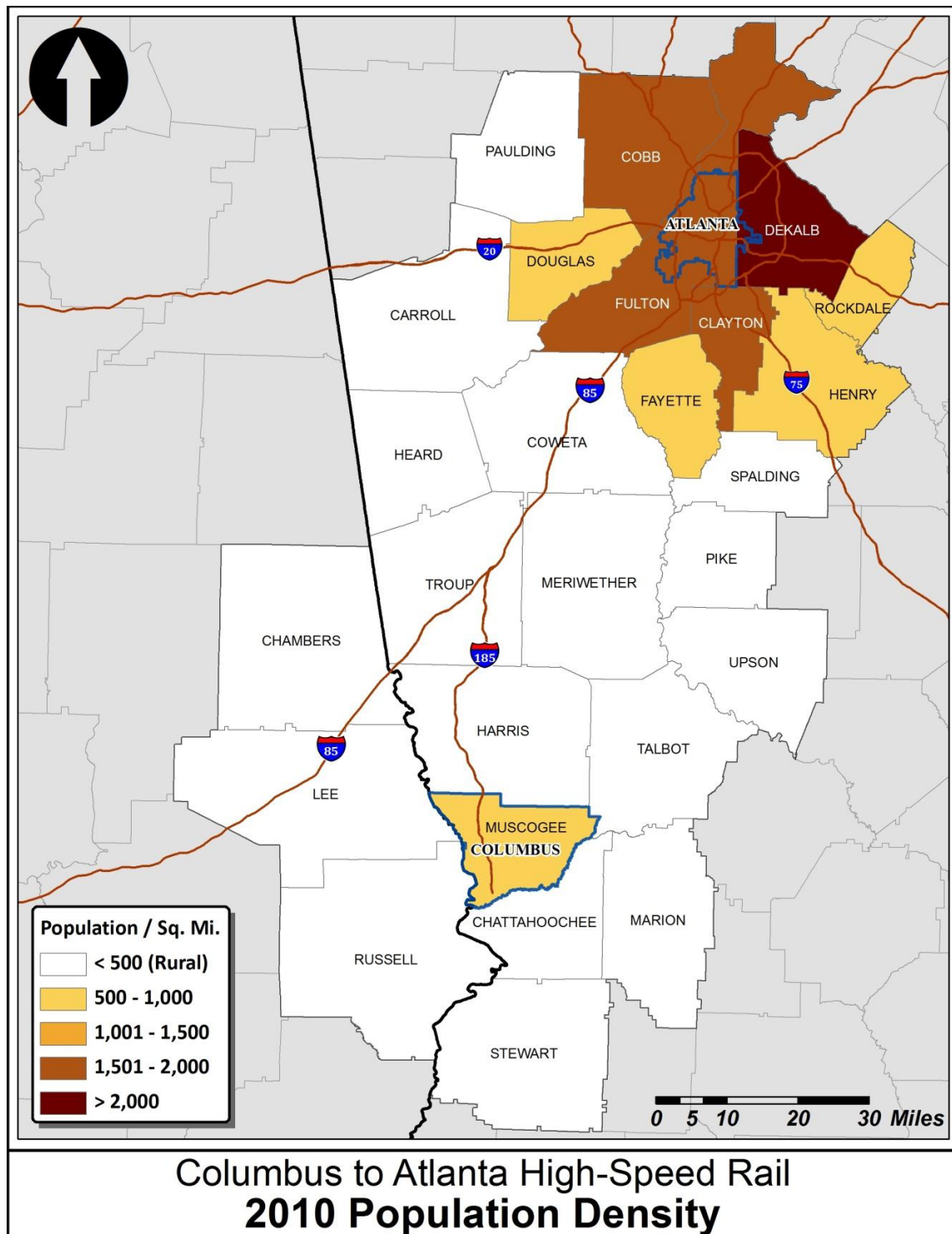
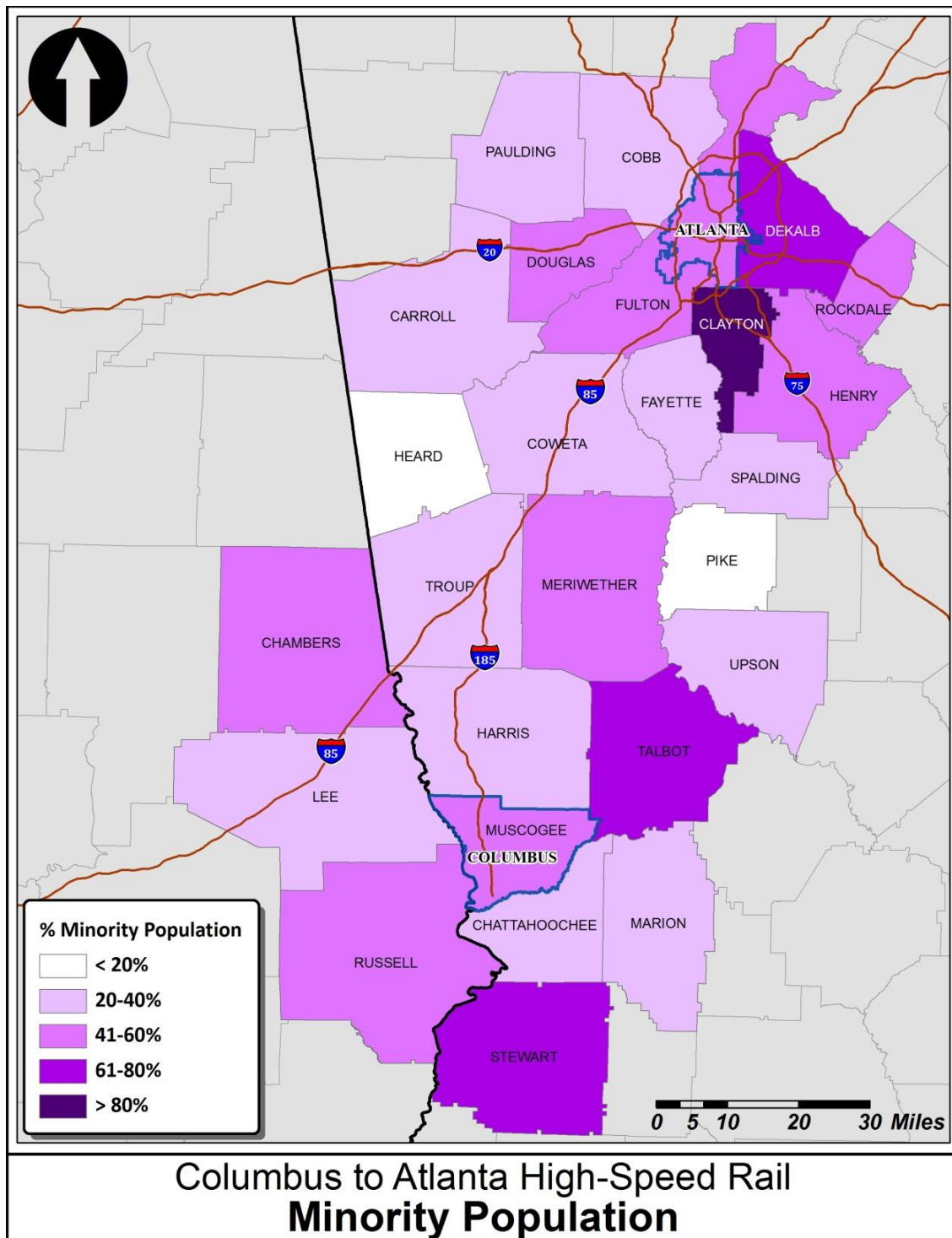
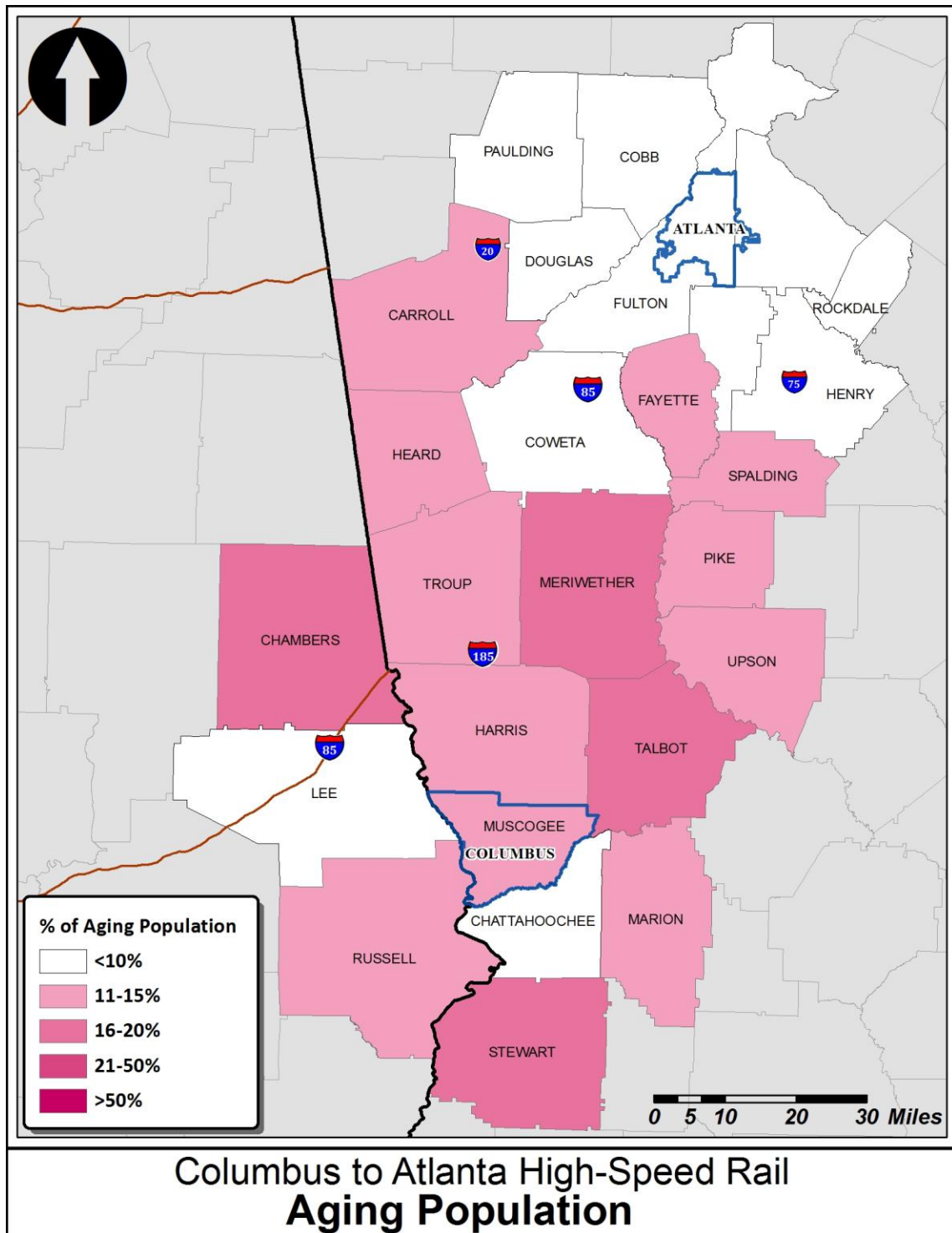


Figure 3-3: Study Area Minority Population



The ACS estimates aging populations for a five-year period (2007-2011) for the counties within the study area. In Alabama and Georgia, the aging populations (ages 65 and over) for each state make up approximately seven percent and six percent of the total population, respectively. Within the study area, however, the aging population is higher at 11 percent. The aging population is illustrated in Figure 3-4. The aging population can play a significant role in ridership for many rail and transit alternatives. Those that are transit dependent could utilize high-speed rail passenger service for their travels between the two major metropolitan areas, or from rural areas to urbanized areas for services including, but not limited to, medical treatment and shopping. The *Columbus to Atlanta Existing Conditions Report* provides the detailed 5-year ACS aging estimates by county.

Figure 3-4: Study Area Aging Population



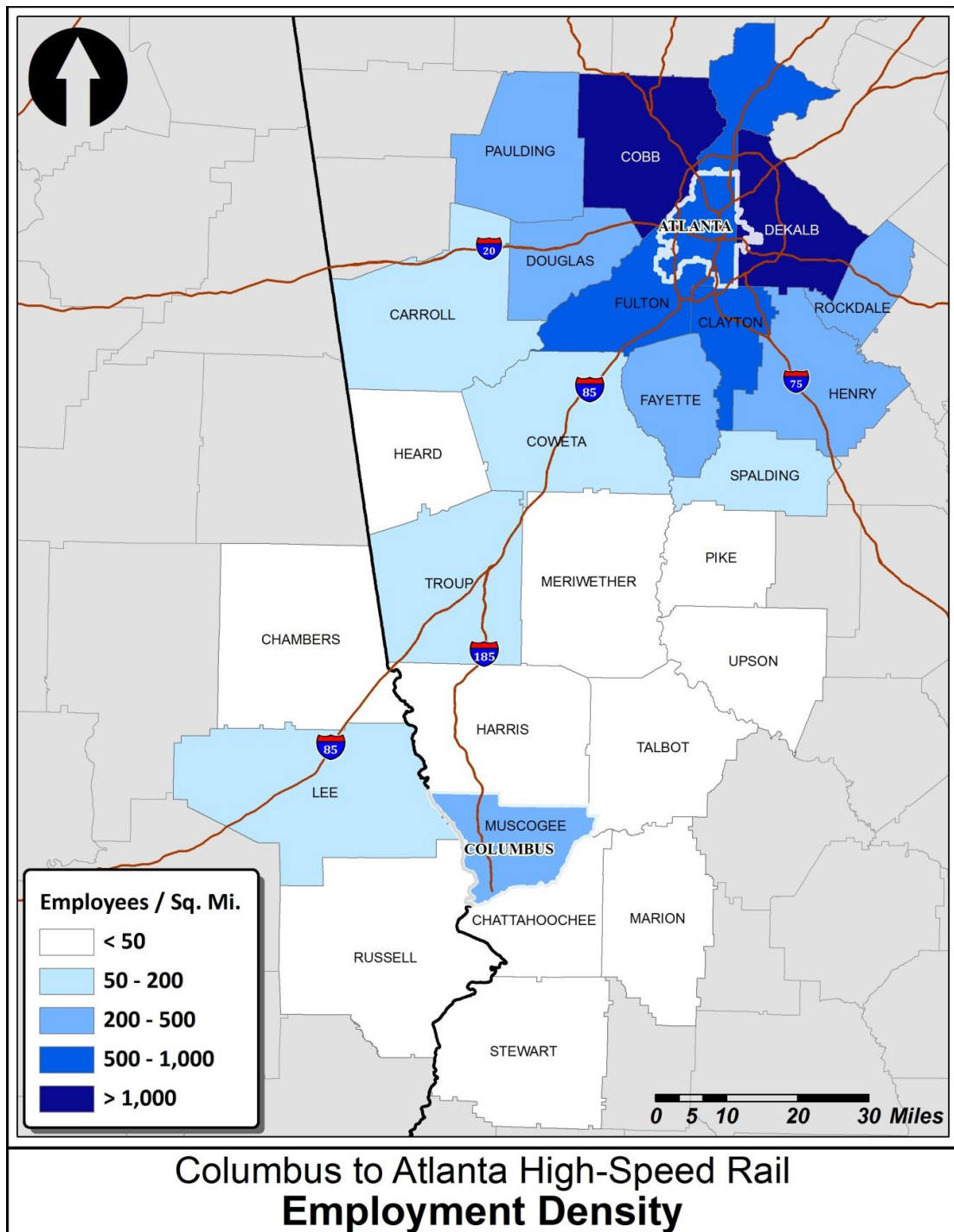
3.2.2.2 Employment and Employment Centers

Employment centers typically serve as the destination for most trips whether they are for work, school, shopping or medical purposes. Employment densities vary significantly throughout the study corridor, as illustrated in Figure 3-4. The highest employment densities are in the Columbus and Atlanta metropolitan areas. The *Columbus to Atlanta Existing Conditions Report* provides detailed 2010 employment data by county.

Atlanta has several large universities including Georgia Institute of Technology, Georgia State University and Emory University. Atlanta is also a healthcare hub with major hospitals including Grady Hospital, Piedmont Hospital, Emory Midtown Hospital, Northside Hospital, Emory Healthcare and Children's Healthcare of Atlanta. A number of Fortune 500 Companies are also among the highest employers in the Atlanta region. Some of these companies include Delta Airlines, SunTrust Bank, Southern Company, Coca-Cola, Home Depot and United States Parcel Service. Finally, Atlanta is home to the busiest international airport in the U.S., H-JAIA, which served nearly 90 million passengers in 2010.

In Columbus, Columbus State University is central to the academic community. Three major hospitals serve the area including Columbus Regional Healthcare System, St. Francis Hospital and West Central Georgia Regional Hospital. Aflac is the single Fortune 500 Company in Columbus and is a large employer in the area. Other large employers in the area include Fort Benning; Total Systems Services, Inc.; KIA Motors; Blue Cross Blue Shield; Synovus Financial Group and Callaway Gardens.

Figure 3-5: Study Area Employment Density



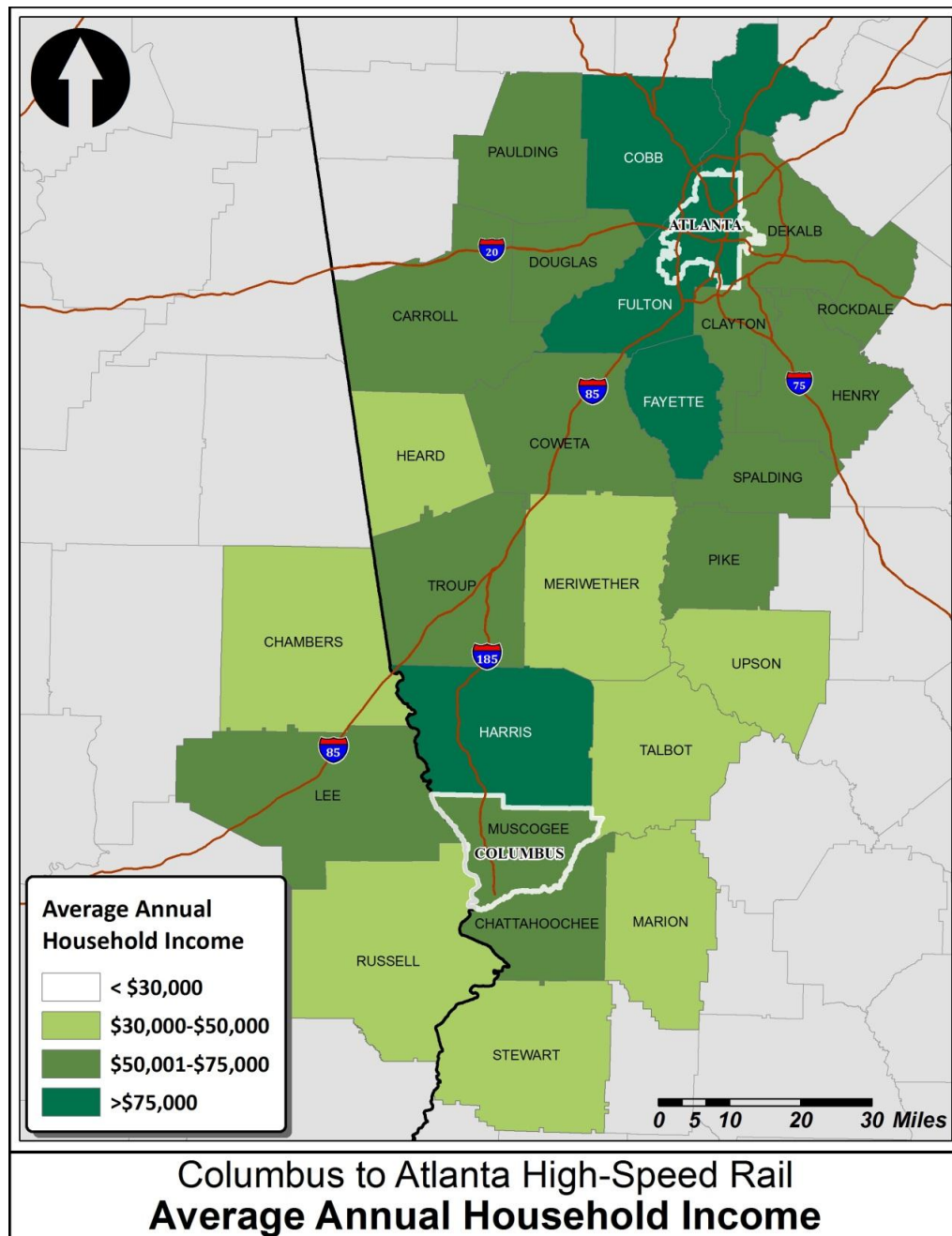
3.2.2.3 Household Income

Similar to minority population, income is used as an indicator of environmental justice and is key to understanding impacts and benefits to low-income populations as well as the propensity to use high-speed passenger rail. Figure 3-5 illustrates the average annual household income for counties in the study area. Several counties exceed the national average by more than 30 percent. All of the counties that far exceed the national average annual household income are located in the Atlanta metropolitan area with the exception of Harris County, which borders Columbus and is located in the Columbus Metropolitan Statistical Area. There are no counties in the study area with an average annual household income less than 30 percent below the national average. The *Columbus to Atlanta Existing Conditions Report* provides the detailed 2010 average annual household income by county.

3.2.3 Urban and Rural Areas

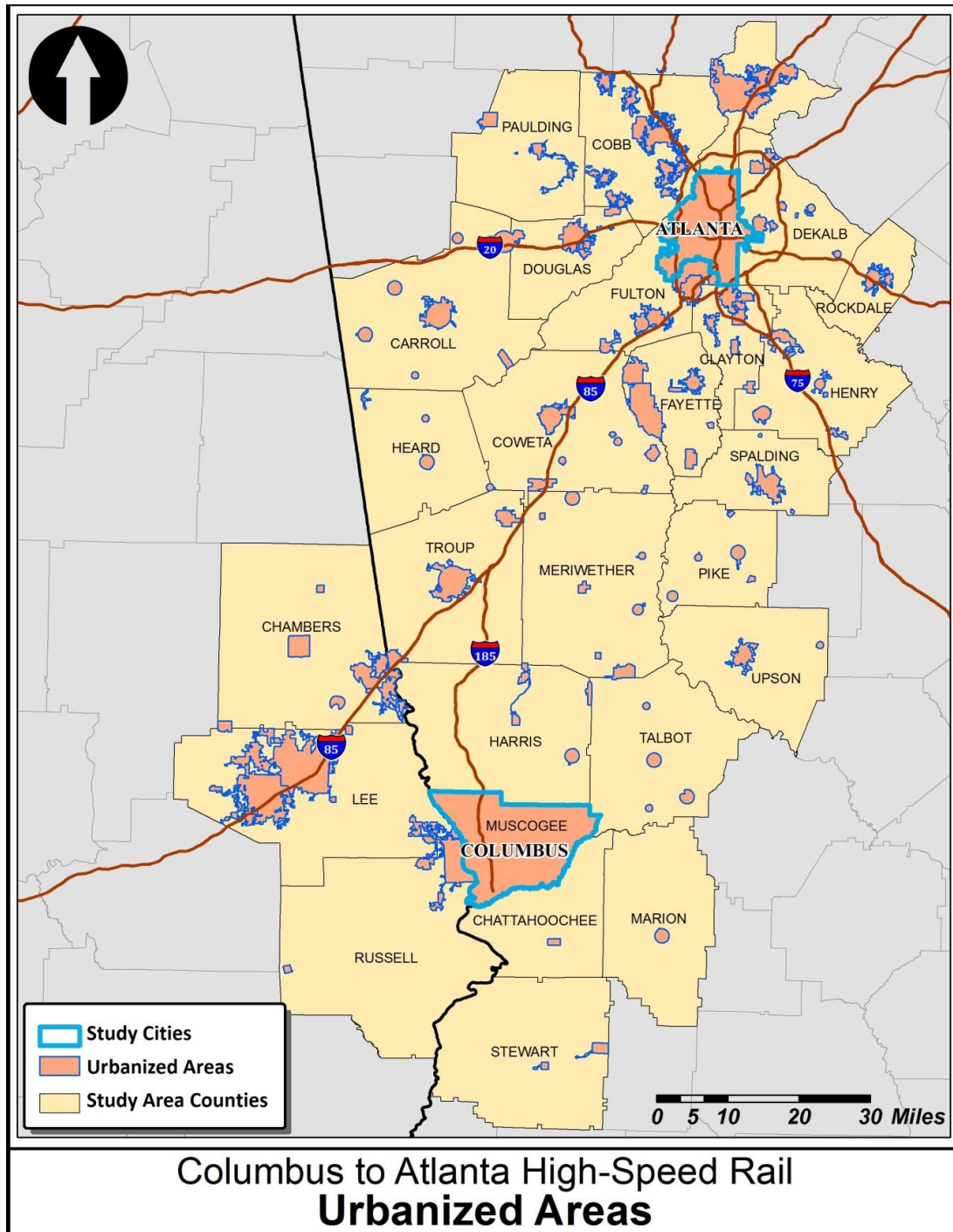
As noted in the discussion of population density, the study area consists of both urban and rural areas. The study termini, Columbus and Atlanta, have an overall density of at least 500 people per square mile and have dense commercial, office and residential development near the city centers. There are several additional pockets of dense urban development throughout the study corridor as illustrated in Figure 3-6; however, the majority of the corridor is rural, thus enhancing the support for high-speed rail to allow passengers to travel between the major destination centers in a shorter amount of time with more reliable, comfortable service compared to automobile travel.

Figure 3-6: Study Area Average Annual Household Income⁵



⁵ The national average income is \$51,144; the poverty line for household income for a family of four (two adults and two children) for 2012 is \$23,283. There are no counties within the study area that fall below the national poverty threshold.

Figure 3-7: Study Area Urbanized Areas⁶



⁶ 2010 U.S. Census Bureau, Urban Areas, <http://www.census.gov/cgi-bin/geo/shapefiles2012/layers.cgi>

3.2.4 Environmentally Sensitive Areas

Environmentally sensitive areas, for the purposes of this study, included the potential for threatened and endangered species and cultural resources, such as properties listed on the National Register of Historic Places as outlined in Section 4(f) of the Department of Transportation Act (DOT Act) of 1966. Section 4(f) prohibits the use of land of significant publicly owned parks, recreation areas, wildlife and waterfowl refuges, or land of a historic site for transportation projects, unless the following conditions apply: 1) there is no feasible and prudent alternative to the use of the land, and 2) the action includes all possible planning to minimize harm to the property resulting from use.

3.2.4.1 Threatened and Endangered Species

The study area was reviewed for the potential of threatened and endangered species of on a county basis. Of the 17 species identified within the study area, according to the United States Fish and Wildlife Services (USFWS) in Table 3-2, there are currently 11 species that are listed as endangered, four species that are considered threatened, and two have candidate status. A full list of species by county can be found in the *Columbus to Atlanta Existing Conditions Report*.

Table 3-2: Study Area Known Endangered and Threatened Species

Species	Status
Red-cockaded woodpecker	Endangered
Oval pigtoe	Endangered
Shinyrayed pocketbook	Endangered
Gulf moccasinshell	Endangered
Purple bankclimber (mussel)	Threatened
Finelined pocketbook	Threatened
Black spored quillwort	Endangered
Cherokee darter	Threatened
Amber darter	Endangered
Etowah darter	Endangered
Little amphianthus	Threatened
Fringed campion	Endangered
Michaux's sumac	Endangered
Relict trillium	Endangered
Georgia aster	Candidate

Species	Status
American chaffseed	Endangered
Gopher tortoise	Candidate

3.2.4.2 Cultural and Protected Resources

Using the same study area as the endangered species screening, the study looked at the National Register of Historic Places (National Register) to understand the magnitude of historic resources within the corridor. There are a total of 476 resources listed on the National Register (2013) within the study area. However, there could be additional resources that may be found during field surveys conducted in further environmental evaluations that are considered eligible for inclusion. Mitigation will be necessary where the alignments intersect the registered and other potentially eligible properties, and they will need to be taken into consideration when making a preferred alignment recommendation. A detailed list of the properties on the National Register located within the study area's counties can be found in the *Existing Conditions Report*.

In addition to historic resources, a high-level survey of parks, forests and other protected lands was conducted for the study area. The following list demonstrates some of the protected lands that will need to be taken into consideration, in the next step in the process: the National Environmental Policy Act (NEPA).

- 29th Street Recreation Center
- Pop Austin Recreation Center
- Franklin D. Roosevelt State Park
- Callaway Gardens Golf Resort
- Hogansville Golf Club
- Grantville Park
- Coweta County Fairgrounds
- C.J. Smith Park
- Coweta Club
- Wilkerson Mill Farris Park
- Durham Lakes Country Club
- South Fulton Tennis Center
- Columbus Rails-to-Trails
- Country Club of Columbus

- Cooper Creek Park
- Flat Rock Park
- Woodland Hills Golf Course
- Roosevelt's Little White House
- Beaver Lake Golf & Country Club
- Senoia City Park
- Planterra Ridge Golf Club
- Shamrock Park
- Linn Park
- Pines Golf Course
- Griffin Golf Course
- Lovejoy Regional Park
- Starr Park
- Hapeville Park
- Overlook Golf Links
- Orchard Hills Golf Club
- Cannongate I Golf Club

4. ROUTE IDENTIFICATION AND REPRESENTATIVE ROUTES

4.1 INITIAL ROUTE ALTERNATIVES

The first step in the feasibility analysis was identifying the various available route alternatives within the study area. Each of these individual route alternatives was evaluated at a high level to select representative alternatives. The representative route alternatives underwent a more detailed analysis to determine the overall feasibility of the corridor. These representative route alternatives are not preferred alternatives, as the process of selecting a preferred route and technology will be a part of the NEPA process that includes an even more detailed analysis and public input as outlined by FRA's NEPA policies.

4.1.1 Emerging (79-110 mph) Shared-Use Route Alternatives

There were four shared-use route alternatives that were identified in the Columbus to Atlanta corridor that could utilize Emerging rail technology (79-110 mph). Shared-use refers to the sharing of right-of-way and/or infrastructure with abandoned or active rail lines. These route alternatives use a combination of existing and abandoned freight rail infrastructure⁷ and are described below:

- **Route 1** – The first alternative utilizes an abandoned right-of-way starting near the Columbus Airport then traveling north through Pine Mountain, Ga., transitions to within or parallel⁸ to the

Federal Railroad Administration's Three High-Speed Rail Technologies: Emerging, Regional and Express

EMERGING HIGH-SPEED RAIL utilizes abandoned and active rail corridor right of way and is intended for developing corridors of 100-500 miles with a strong potential for future Regional or Express high speed rail services. Emerging rail uses diesel locomotives to achieve top speeds up to 79-110 mph.

REGIONAL HIGH-SPEED RAIL accommodates relatively frequent service between major and moderate population centers, 100-5—miles apart. Regional rail involves establishing a new passenger rail corridor but can utilize existing interstate and state highway corridors, private railroad right-of-way and greenfield alternatives. Diesel-electric locomotives achieve stop speeds of 110-150 mph.

EXPRESS HIGH-SPEED RAIL is frequent, quick service between major population centers with few intermediate stops. Top speeds range from 150-220 mph on completely grade-separated, dedicated rights-of-way. Electrified locomotives are used to achieve these top speeds. Express Rail involves establishing a dedicated passenger rail corridor along interstates, state highways and greenfield alternatives.

⁷ Existing freight rail right-of-way options will use all Class 1 passenger rail policies as guidance for the Columbus to Atlanta High Speed Rail Feasibility Study, including any speed and safety restrictions associated with the utilization of existing infrastructure. Any specific proposed route or alternative would have to undergo a specific evaluation. Class 1 railroads within the corridor study area include Norfolk Southern Railway (NS) and CSX Transportation (CSXT).

CSXT right-of-way⁹ traveling west to LaGrange before continuing north through Newnan, Ga., to travel to Atlanta. Once in the greater Atlanta area, the alternative stops at the H-JAIA area.

- **Route 2** – The second alternative is similar to the first and follows the abandoned right-of-way through Pine Mountain, but continues north to Raymond, Ga., transitioning within or parallel to the NS right-of-way heading west for approximately five miles and then transitioning within or parallel to the CSXT right-of-way in Newnan, Ga., to travel north to the H-JAIA area.
- **Route 3** – A third shared-use alternative uses abandoned right-of-way from near the Columbus Airport going northeast through Woodbury, Ga., where it transitions within or parallel to the CSXT right-of-way and travels north through Senoia, Ga., and Peachtree City, Ga., continuing to the H-JAIA area.
- **Route 4** – The fourth shared-use route alternative uses the same abandoned track as Route 3 from near the Columbus Airport through Woodbury and continues on abandoned right-of-way to where the line becomes active approximately eight miles southwest of Griffin, Ga., using NS right-of-way or parallel to it into Griffin and continuing within or parallel to the NS right-of-way to the H-JAIA area.

4.1.2 Regional (110-150 mph) and Express (150-220 mph) Dedicated-Use Route Alternatives

In addition to the four shared-use alternatives, one dedicated route alternative was evaluated. Dedicated routes are primarily passenger rail-only routes with the exception of terminal areas where they typically transition to a shared-use operation to access stations.

- **Route 5** – The proposed dedicated-use route alternative generally follows the I-185 and I-85 corridor. To maintain these higher speeds, a route requires minimal geometry (curves). Therefore, there may be instances along the corridor where curves must be eased and the route travels outside of the existing interstate right-of-way. However, for most of the dedicated-use route, tracks would run within the existing right-of-way, which is primarily a four-lane, rural facility with at least a 45-foot median, allowing for the trains to use the interstate median as the alignment. The corridor transitions to a six-lane facility with speed limits varying between 55 and 65 mph with more narrow

⁸ The terms “within” and “parallel to” right-of-way should not be treated as the same. These terms vary with different implications for operations, capital expenses, real estate acquisition expenses, and other feasibility considerations. Each segment of existing freight will be evaluated for speeds to determine whether the passenger rail line would be within or parallel to the existing right-of-way.

⁹ Norfolk Southern does not permit joint passenger and freight operations on its tracks in excess of 79 mph. Passenger operations in excess of 90 mph require a completely separate right-of-way. CSXT requires that any passenger train operating at speeds above 90 mph, including High Speed Rail, be on its own dedicated tracks and right-of-way and be separated by at least 30 ft. from freight rail service. Therefore, whenever a Norfolk Southern or CSXT corridor is considered as part of one of the studies alternatives, the operations would be subject to the relevant constraint.

medians both in the Columbus and Atlanta areas. In these instances, it will be necessary to use the shoulder of the interstate corridor for track infrastructure, which has been determined to fit within the existing right-of-way widths. As the route approaches both Columbus and Atlanta, it must transition to within or parallel to rail right-of-way, either CSXT or NS, in order to access the H-JAIA area.

4.1.3 Opportunities and Issues

Each of the high-speed rail alternatives has potential benefits, as well as obstacles for implementation. Opportunities for success include the potential to serve key communities and populations, save on travel times and further advance freight services. Issues include operational hurdles, environmental impacts and political concerns. These issues and opportunities, described in Table 4-1, were identified through technical analysis, as well as stakeholder input.

Figure 4-1: Initial Route Alternatives

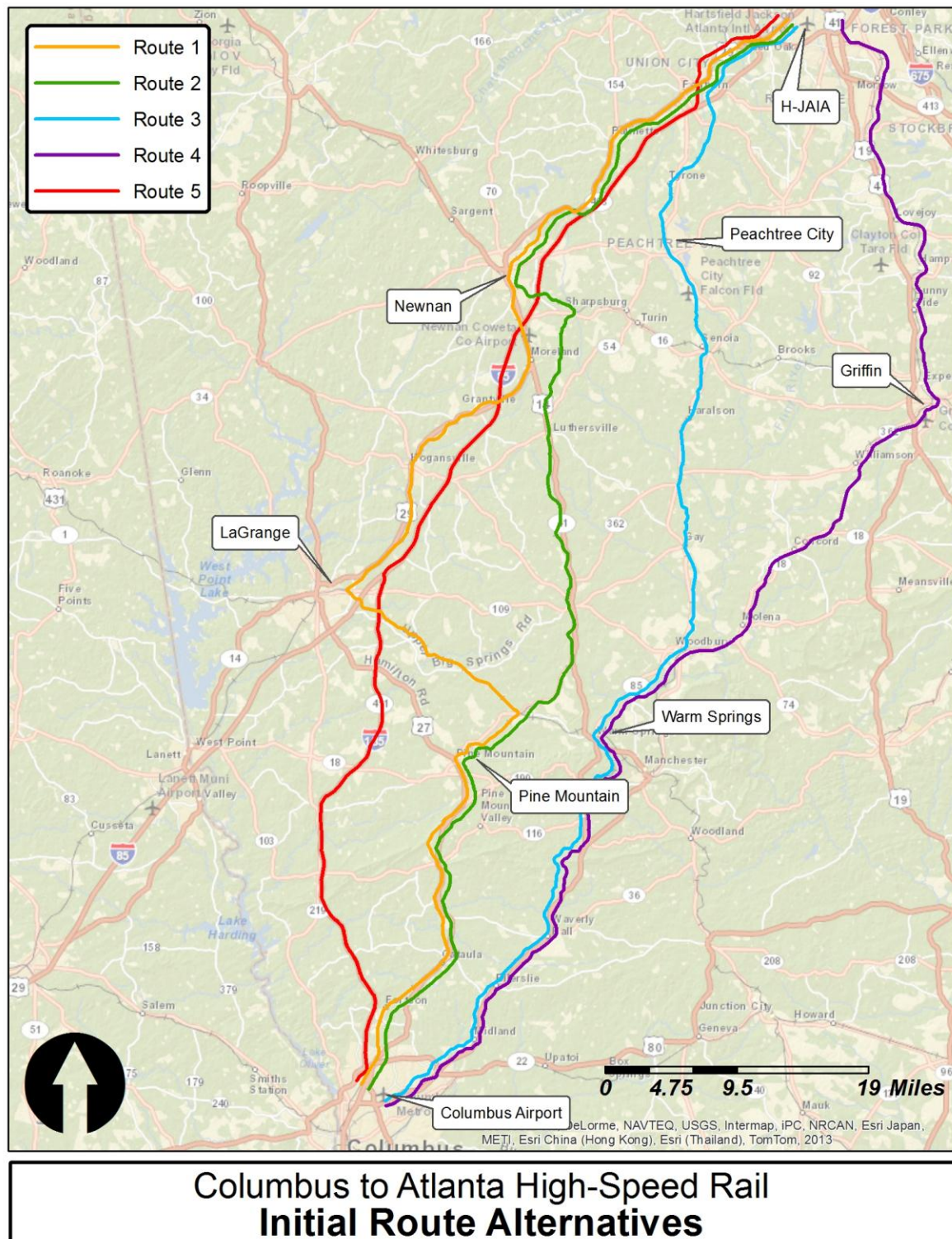


Table 4-1: Columbus to Atlanta HSR Corridor Opportunities and Issues

Initial Route Alternatives	Opportunities	Issues
Shared-Use Alternatives		
Route 1: Columbus to Durand (Abandoned), Durand to LaGrange to Atlanta (CSXT)	<ul style="list-style-type: none"> • Recreation and tourism opportunities near Pine Mountain and Callaway Gardens • Potential to serve LaGrange, Ga., and Newnan, Ga. (intermediate stations) • Relatively straight (averages 1.06 curves/mile > 1° 30')¹⁰ • Large portion of route on Class 4 track, likely requiring fewer improvements than lower class track • Serves west side (Domestic terminal) of H-JAIA • Provides direct connectivity to uptown Columbus train depot and rail yard • Indirect connectivity to West Point, Ga., and KIA plant (major employer) 	<ul style="list-style-type: none"> • High freight train volumes (averages over 19 trains/day), especially on CSXT between LaGrange and Atlanta, which could cause increased passenger train delay • CSXT and NS are freight companies and their property belongs to public shareholders. CSXT and NS have absolute legal duties to safeguard those assets, protect them from undue risk and to maximize their value • Major improvements likely needed on Class 1 track (Columbus to Durand) • Potential environmental concerns (e.g., Franklin D. Roosevelt State Park) • Need buy-in from major communities, especially those with potential intermediate stations • Longest route (125 miles) and estimated travel time (2 hours, 5 minutes) • Does not directly access Columbus Airport

¹⁰ One degree 30 minutes (1° 30') refers to the curvature of the track and is an indicator of travel delay. This is a threshold for track geometry for passenger trains traveling at top speeds of 110 mph.

Initial Route Alternatives	Opportunities	Issues
Route 2: Columbus to Raymond (Abandoned), Raymond to Newnan (NS), Newnan to Atlanta (CSXT)	<ul style="list-style-type: none"> • Recreation and tourism opportunities near Pine Mountain • Potential to serve Newnan, Ga. (intermediate station) • Relatively straight (averages 1.28 curves/mile > 1° 30') • Serves west side (Domestic terminal) of H-JAIA • Provides direct connectivity to Uptown Columbus train depot and rail yard 	<ul style="list-style-type: none"> • Large portion of route on Class 1 track that will likely need major improvements • CSXT and NS are freight companies and their property belongs to public shareholders. CSXT and NS have absolute legal duties to safeguard those assets, protect them from undue risk and to maximize their value • Changes in dispatch may cause increased passenger delay • Potential environmental concerns (e.g., Franklin D. Roosevelt State Park) • No ideal intermediate station in Columbus area • Need buy-in from major communities, especially those with potential intermediate stations • Second longest route (116 miles) and estimated travel time (1 hours, 56 minutes) • Does not directly access Columbus Airport
Route 3: Columbus to Woodbury (Abandoned), Woodbury to Atlanta (CSXT)	<ul style="list-style-type: none"> • Recreation and tourism opportunities near Warm Springs and Roosevelt's Little White House • Shortest route (106 miles) and estimated travel time (1 hour, 46 minutes) of the shared-use alternatives • Utilizes abandoned rail alignment, providing dedicated passenger route • Large portion of route on Class 4 track, likely requiring fewer improvements to the infrastructure than other routes with lower track class • Potential to serve Peachtree City, Ga., and Warm Springs, Ga. (intermediate stations) • Provides direct connectivity to Uptown Columbus train depot and rail yard • Provides closer access to Columbus Airport (compared to Routes 1 and 2) 	<ul style="list-style-type: none"> • High train volumes (averages over 15 trains/day), which could cause increased passenger train delay • CSXT and NS are freight companies and their property belongs to public shareholders. CSXT and NS have absolute legal duties to safeguard those assets, protect them from undue risk and to maximize their value • Second highest average number of curves > 1° 30' (1.60 curves/mile) • Abandoned rail portion may be owned by multiple property owners, requiring right-of-way acquisition • Existing and active Rails-to-Trails program from Uptown Columbus to Harris County line • Need buy-in from major communities, especially those with potential intermediate stations • Potential environmental concerns (e.g., Roosevelt's Little White House)

Initial Route Alternatives	Opportunities	Issues
Route 4: Columbus to Griffin (Abandoned), Griffin to Atlanta (NS)	<ul style="list-style-type: none"> • Recreation and tourism opportunities near Warm Springs and Roosevelt's Little White House • Second shortest route (116 miles) and estimated travel time (1 hour, 53 minutes) of the shared-use alternatives • Utilizes abandoned rail alignment, providing dedicated passenger route • Low freight traffic (averages just over 1 train/day) • Potential to serve Griffin, Ga., and Warm Springs, Ga. (intermediate stations) • Provides direct connectivity to Uptown Columbus train depot and rail yard • Provides closer access to Columbus Airport (compared to Routes 1 and 2) 	<ul style="list-style-type: none"> • Abandoned rail portion may be owned by multiple property owners, requiring right-of-way acquisition • Existing and active Rails-to-Trails program from Uptown Columbus to Harris County line • Need buy-in from major communities, especially those with potential intermediate stations • Potential environmental concerns (e.g., Roosevelt's Little White House) • Griffin already a part of proposed commuter service to Atlanta • Highest average number of curves > 1° 30' (1.70 curves/mile)
Initial Route Alternatives	Opportunities	Issues
Dedicated-Use Route Alternative		
Route 5: I-185 and I-85	<ul style="list-style-type: none"> • Utilizes highway right-of-way for nearly the entire route • Dedicated passenger route, reducing potential freight traffic delays for the majority of the corridor • Lowest average number of curves > 1° 30' (0.46 curves/mile) • Fastest estimated travel time (1 hour, 10 minutes) • Potential to serve LaGrange, Ga., and Newnan, Ga. (intermediate stations) • Least amount of environmental concerns 	<ul style="list-style-type: none"> • Requires construction of completely new rail infrastructure resulting in significantly higher capital cost than shared-use alternatives • Does not directly access Columbus Airport and would require shuttle or greenfield alignment into airport terminal • Need buy-in from major communities, especially those with potential intermediate stations • Will require right-of-way acquisition to transition from interstate highways to shared-use facilities in Columbus and metro Atlanta

4.2 INITIAL SCREENING PROCESS AND RESULTS

A high-level screening analysis was applied to the five identified potential route alternatives to select the representative routes for further evaluation. As previously discussed, a representative route was identified for a shared-use option and a dedicated-use option. As outlined in Appendix A, a screening and analysis methodology was employed to identify the representative routes and consisted of four steps:

1. Identification of initial universe of route alternatives;
2. Screening of individual route alternatives to identify representative routes;

3. Refining representative routes, including potential station locations; and
4. Evaluation of the representative routes for corridor feasibility.

The following sections outline the high-level screening analysis performed to select the representative routes (Step 2).

4.2.1 Evaluation Criteria

The following list identifies the shared-use and dedicated-use screening variables that were taken into account for the high-level evaluation of the five route alternatives outlined in Section 4.1.

- Technology
- Route Miles
- Population Served
- Track Class¹¹
- Degree of Curvature
- Average Trains per Day^{12 13}
- Estimated Travel Time¹⁴
- Average Speed
- Property Ownership
- Stakeholder Input

¹¹ Track class refers to the class of infrastructure -- not the Railroad owner operating class. For more information please refer to 49 CFR 213.9 Classes of Track: Operating Speed Limits.

¹² Train counts were acquired in June 2013 from the Federal Railroad Administration Office of Safety Analysis, Highway-Rail Crossing Inventory (<http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/crossing/xingqryloc.aspx>). Calculations for the corridor used a weighted calculation of miles of track and average train counts along each section of the corridor. Future train counts will estimate a two percent increase per year, per FRA guidance.

¹³ Current operations on a line may not be representative of the current capacity of the rail facility including the right-of-way, and is based on public information available. Future studies will need to include a capacity model to understand the full implications of passenger rail on existing and future freight capacities.

¹⁴ Travel time is based on an average speed of 60 mph for shared-use route alternatives and 95 mph for dedicated-use route alternatives. The routes were compared with comparable routes in other high-speed rail feasibility studies to estimate the average speed based on curves per mile. Detailed travel times will be calculated for representative route alternatives based on unique characteristics of the routes.

4.2.2 Evaluation Results

Table 4-2 indicates that of the shared-use alternatives, Routes 2 and 3 illustrated the best travel times given an estimated 60 mph average speed. Route 2 also showed the least amount of existing freight traffic as well as less curves to mitigate, thereby helping to increase speed and decrease travel time.

In addition to the quantitative analysis provided in the table, the evaluation also took property ownership and stakeholder input into consideration. Many of the shared-use route alternatives would utilize a portion of abandoned rail. A review of property ownership of these sections was evaluated using local county tax assessor data along each route. It was found that for Routes 3 and 4 from the Columbus Airport to Woodbury, Ga., a majority of the property along the abandoned rail had been deeded back to adjacent property owners. This is considered a fatal flaw from the aspect of right-of-way acquisition. To purchase and acquire this property would result in significant cost, as well as an increase in the schedule for construction.

After discussions of the route alternatives with the Commission, the TAG and the stakeholders within the study area, it was found that there is a unanimous consensus that the goal of this corridor is to provide Express passenger rail service between Columbus and Atlanta, where travel time is of primary importance while also implementing a sustainable service that will maintain ridership levels. Therefore, Route 2 was determined as the representative shared-use alternative for the study.

4.2.3 Representative Routes and Potential Station Locations

Based on high-level quantitative and qualitative analysis, two representative routes were selected to determine feasibility of the Columbus to Atlanta corridor. Route 2 from Columbus to Atlanta via Raymond, Newnan and the H-JAIA area was selected as the shared-use route alternative due to the relatively faster travel time, minimal property acquisition and higher populations along the route.

Since there was only one potential dedicated route identified, Route 5, this route also screened through as a representative route between the two cities.

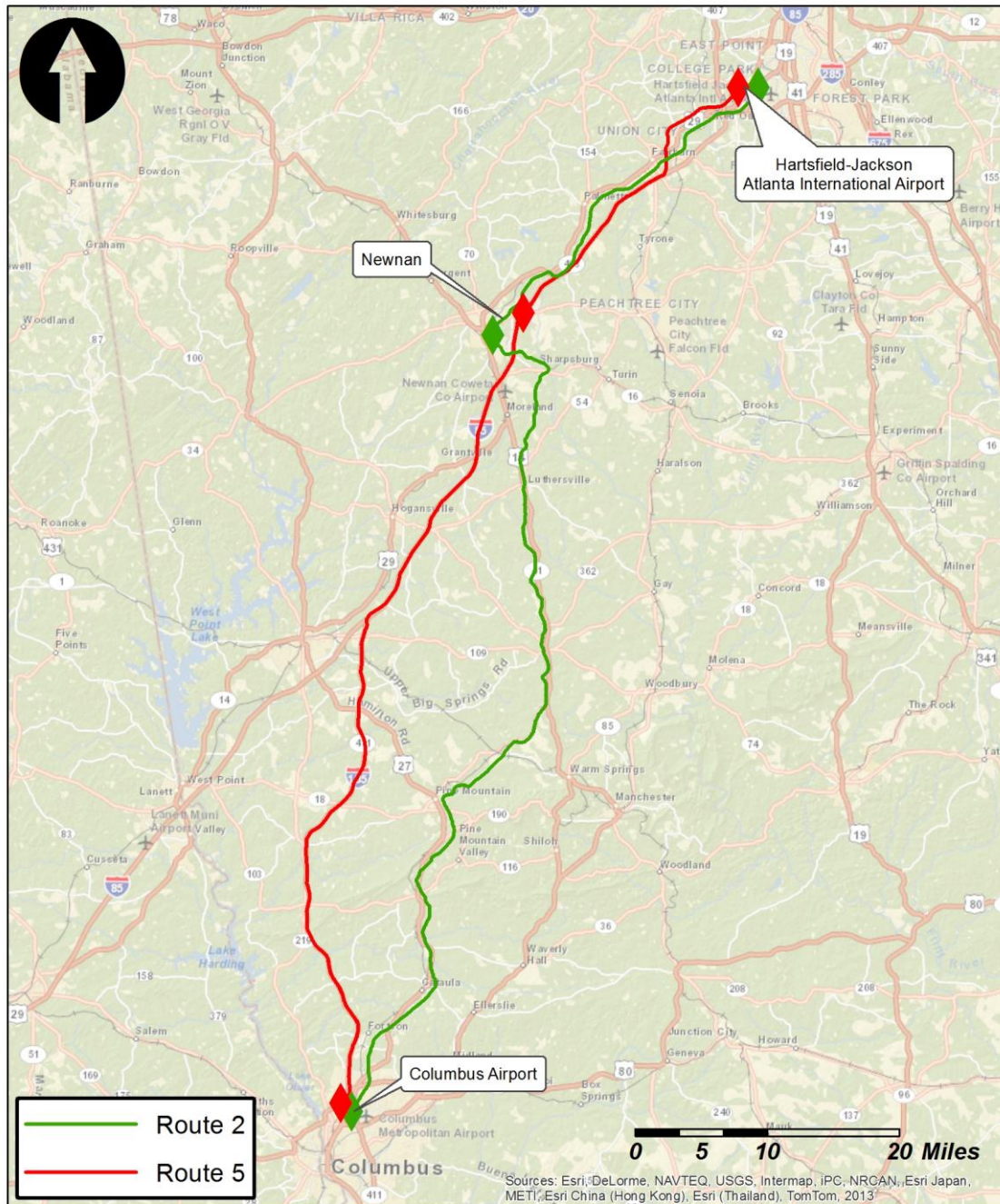
Once the representative routes were selected, both routes were evaluated for any intermediate station needs. Two stations were initially identified in the terminal areas: the Columbus Airport area as well as the H-JAIA area. The H-JAIA location was taken from the Atlanta to Charlotte Passenger Rail Corridor Investment Plan (PRCIP) that is currently being conducted by GDOT. After a review of urban areas (refer back to Figure 3-6) along Routes 2 and 5, the Newnan area was selected as a potential intermediate station location. It should be noted that the stations are generalized areas. Specific locations for stations will be identified during the NEPA process as outlined by FRA guidance. For the purpose of this analysis, potential locations were identified in order to estimate travel times, ridership and operating and maintenance (O&M) costs, but should not be considered a final destination for station locations.

Figure 4-2 illustrates the selected representative routes and the potential station locations that were used for the more detailed feasibility analysis.

Table 4-2: Proposed Initial Route Alternatives Characteristics

Initial Route Alternatives	Technology	Miles	Population Served per Route Mile (within 20 mi of route)	Track Class	Curves > 1° 30' per Route Mile	Average Trains/Day	Est. Travel Time	Average Speed
Shared-Use Alternatives								
Route 1: Columbus to Durand (Abandoned), Durand to LaGrange to Atlanta (CSXT)	Diesel (79-110 mph)	125	26,504	Abandoned/3	1.06	12.0	2 hr, 5 min	60 mph
Route 2: Columbus to Raymond (Abandoned), Raymond to Newnan (NS), Newnan to Atlanta (CSXT)	Diesel (79-110 mph)	116	28,508	Abandoned/3	1.28	5.4	1 hr, 56 min	60 mph
Route 3: Columbus to Woodbury (Abandoned), Woodbury to Atlanta (CSXT)	Diesel (79-110 mph)	106	31,479	Abandoned/3	1.60	9.8	1 hr, 46 min	60 mph
Route 4: Columbus to Griffin (Abandoned), Griffin to Atlanta (NS)	Diesel (79-110 mph)	113	29,470	Abandoned/3	1.70	2.5	1 hr, 53 min	60 mph
Dedicated-Use Alternatives								
Route 5: I-185 and I-85	Electrified (150-220 mph)	112	29,729	N/A	0.46	N/A	1 hr, 10 mins	95 mph

Figure 4-2: Columbus to Atlanta Selected Representative Route Alternatives and Potential Station Locations



Columbus to Atlanta High-Speed Rail Refined Route Alternatives

4.2.4 Representative Technology Alternatives

Also taken into consideration during this study were the potential technologies for the representative route alternatives. As noted in Chapter 1.2, current high-speed trains range from Emerging high-speed rail with top speeds of 79 - 110 mph, Regional high-speed rail with top speeds of 110-150 mph, and Express high-speed rail with 150-220 mph top speeds. For Emerging and Regional high-speed rail, diesel-powered trains would be used to attain the top speeds for the routes. To attain the top speed of 150-220 mph, electrified powered trains would be required. Express uses the same base infrastructure as Emerging and Regional such as right-of-way, steel tracks and stations, but with the addition of an overhead catenary wire system and a third electrified steel track along with an associated signaling and communication system. Table 4-3 is an overview of the technology alternatives used for this feasibility study.

Table 4-3: Technology Alternatives

	Route 2: Emerging	Route 5: Regional	Route 5: Express
Top Speed	79-110 mph	110-150 mph	150-220 mph
Fuel/Energy	Diesel	Diesel	Electric
Route	Shared/Abandoned Freight Route	Dedicated Interstate Route	
Track	Single Track with Sidings	Double Track	
Train Delay Probability	Medium	Low	

5. OPERATING PLAN AND SCHEDULE

The first step of the feasibility analysis of representative routes was to outline an operating plan and schedule for each route alternative and the associated technologies (speed regimes outlined in Section 4.1). This allowed for more accurate estimations of ridership, ticket revenue and O&M costs.

Both Route 2 and Route 5 went through a Train Performance Calculator (TPC) analysis using a Rail Traffic Controller (RTC) model.¹⁵ This TPC took into account the route and train characteristic information (e.g., route miles, curve data, train length and equipment weight) to estimate travel time, average speeds and preliminary schedules, including station stops. The TPC was calculated for:

- Route 2, Emerging high-speed rail (top speeds of 79-110 mph)
- Route 5, Express high-speed rail (top speeds of 150-220 mph)

The Route 5, Regional high-speed rail is an average of the two TPC runs to estimate the travel time and operating schedule.

5.1 EMERGING HIGH-SPEED RAIL

5.1.1 Speed Profile and Timetable

For Route 2, using the Emerging high-speed rail, the total travel time for a one-way trip was estimated at 1 hour, 37 minutes. Figure 5-1 illustrates the speed profile for the route taking into account the curves along the route that impact speed. Within the figure, the red line indicates the optimal train performance given the curves along the route. The green line illustrates the actual performance that the train achieves, taking into account when a train must start braking and begin accelerating. The average speed, including station stops, is 55 mph.

In addition to the speed profile, the RTC model also provides a mock schedule to understand one-way travel time. Table 5-1 shows this mock schedule for the 1 hour, 37 minutes.

As seen in Figure 5-1, although the technology would be capable of operating at 110 mph or higher, the curves on the existing abandoned NS and CSXT rail would restrict the train to lower speeds topping out at approximately 79 mph. Table 5-1 indicates a travel time similar to that of auto travel time between the two terminal areas.

¹⁵ The Rail Traffic Controller model, from Berkeley Simulation Software, is a software used to understand rail capacities, operations, and infrastructure inefficiencies. Within the model is a Train Performance Calculator that can measure travel times, on-time performance, More information regarding this software can be found at <http://www.berkeleysimulation.com/rtc.php>.

Figure 5-1: Route 2 Emerging High-Speed Rail Speed Profile

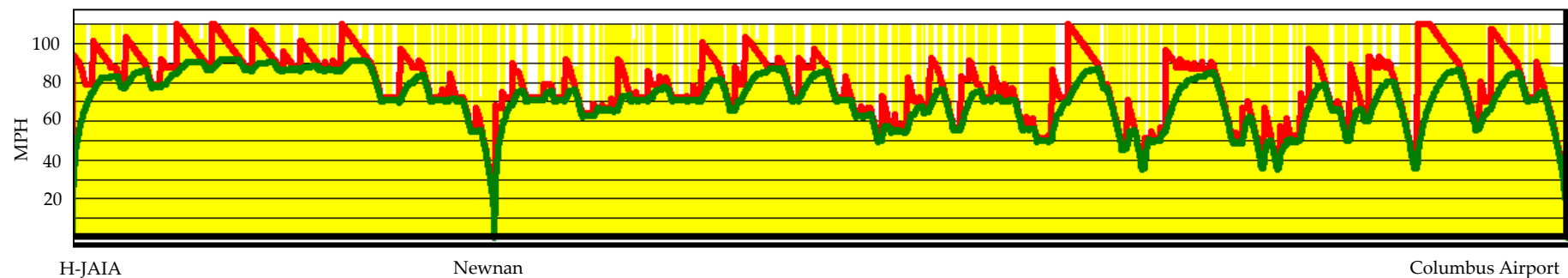


Table 5-1: Route 2 Emerging High-Speed Rail –RTC One-Way Mock Timetable

SB (Atlanta to Columbus)	NB (Columbus to Atlanta)	Station
Arrive 07:37	Depart 06:00	Columbus
Arrive 06:23, Depart 06:28	Arrive 07:07, Depart 07:12	Newnan
Depart 06:00	Arrive 07:37	H-JAIA

All times in the table are AM

5.1.2 Operating Plan

The running times were used along with potential train frequencies to develop ridership forecasts for the Columbus to Atlanta corridor. The operating plan and ridership forecasting was an iterative process in which there were frequency adjustments so that each technology assessed would operate at the most efficient levels. The Emerging operations are projected to run four round trips per day, with 288 seats per train. Given the combination of train frequencies and running times, six train-sets would be required to cover the equipment rotation.

Table 5-2: Emerging High-Speed Rail Train Frequency and Size

Round Trips per Day	# of Seats per Train	# of Train Sets
4	288	6

5.2 REGIONAL AND EXPRESS DEDICATED-USE

5.2.1 Speed Profile and Timetable

The Route 5 dedicated route alternative was evaluated for both the Regional and Express technologies. As aforementioned, the Regional travel time was interpolated using the RTC runs from the Emerging and Express technologies. Figure 5-2 illustrates the speed profile for the Express alternative. The average speed is 71 mph, including station stops, with top speeds reaching only 120 mph, even though the technology can accommodate 150-220 mph. This is due to the curvature along the existing interstate (I-185 and I-85) between Columbus and Atlanta.

Similar to the Route 2 – shared-use, Emerging technology, a mock schedule was developed. The schedule indicates that the one-way travel time is 1 hour, 1 minute. This travel time is less than the auto travel time by approximately 30 minutes.

After reviewing the Emerging and Express travel times, the Regional technology average speed and travel time was interpolated. It was estimated that the average speed would be 63 mph with a one-way travel time of 1 hour, 26 minutes.

Figure 5-2: Route 5 Express High-Speed Rail Speed Profile

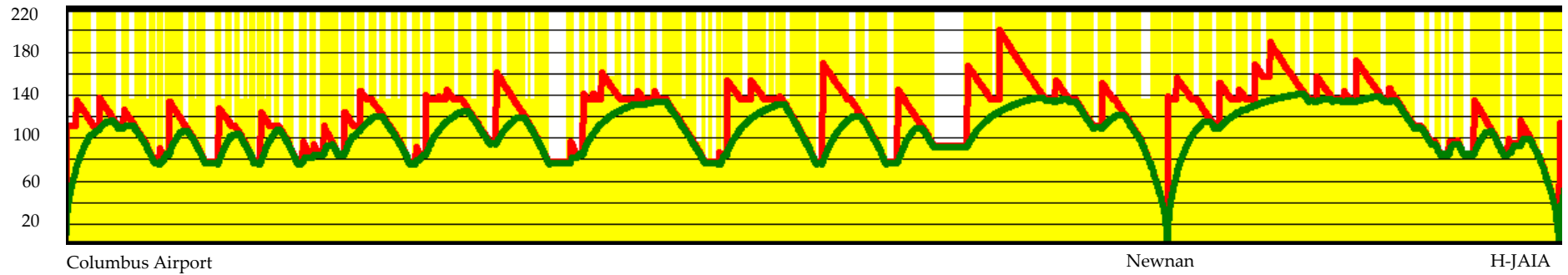


Table 5-3: Route 5 Express High-Speed Rail One-Way Schedule

SB (Atlanta to Columbus)	NB (Columbus to Atlanta)	Station
Arrive 07:01	Depart 06:00	Columbus
Arrive 06:15, Depart 06:20	Arrive 06:41, Depart 06:46	Newnan
Depart 06:00	Arrive 07:01	H-JAIA

All times in the table are AM

5.2.2 Operating Plan

Similar to the Emerging technology, the running times were used in conjunction with the potential train frequencies to develop the ridership forecasts for the Regional and Express alternatives. Table 5-4 shows the respective train frequencies and number of train sets required for the daily train operations.

Table 5-4: Regional and Express High-Speed Rail Train Frequency and Size

Technology Option	Round Trips per Day	Number of Seats per Train	Number of Train-Sets
Regional	5	360	6
Express	6	432	8

5.3 OPERATING SUMMARIES

Table 5-5 illustrates a comparative analysis of operations for all three technology alternatives (and two routes).

Table 5-5: Comparative Analysis of Operations

Technology Option	Calculated Travel Time	Average Speed	Auto Travel Time
Emerging	1:36	55 mph	N/A
Regional	1:26	63 mph	1:23
Express	1:01	71 mph	1:23

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6. TECHNICAL EVALUATION RESULTS

6.1 RIDERSHIP AND REVENUE

This chapter presents the ridership and revenue forecasts for the modeled representative route alternatives. The forecasting methodology and process is described in detail in Appendix C.

Based on the operating plan outlined in Chapter 5, the ridership and revenue analysis focused on the following input variables listed in Table 6-1 below.

Table 6-1: Input Variables for Ridership and Revenue Forecasts

Alignments	Train Technology ¹⁶	Fare	Estimated Fare Total	Frequencies (Daily Round Trips)
Route 2	Emerging	\$0.28/mile + \$5 boarding fee	\$33.50	4
Route 5	Regional	\$0.40/mile + \$5 boarding fee	\$41.42	5
	Express	\$0.40/mile + \$5 boarding fee	\$41.42	6

The ridership and revenue were first forecasted for the years 2030, 2040 and 2050. These are presented for each station pair, using each set of input variables for the forecast years. Forecasts for intermediate years 2031 to 2039 were obtained by linear interpolation of the 2030 and 2040 forecasts. Similarly, forecasts for years 2041 through 2049 were obtained by linear interpolation of the 2040 and 2050 forecasts. Total high-speed rail ridership for the intermediate years is provided in Appendix C.

6.1.1 Ridership and Revenue Summaries

As described in the operating plan (Chapter 5), the frequency of service was an iterative process between operations and ridership and revenue forecasting, with multiple scenarios evaluated. The goal of the process was to find the most efficient service providing enough capacity to accommodate the ridership demand while taking into account an increase of O&M costs with increased frequencies.

Tables 6-2 through 6-4 illustrate the annual ridership and revenue forecasts for 2030, 2040 and 2050 for each technology, route alternative and final frequency determination.

¹⁶ Operating plan for each train technology accounts for number of seats per train, number of train-sets and number of round trips per day.

Table 6-2: Emerging Annual Ridership and Revenue Forecasts

Origin	Destination	Year 2030		Year 2040		Year 2050	
		Ridership	Revenue	Ridership	Revenue	Ridership	Revenue
Atlanta Airport	Newnan	230,959	\$3,167,956	282,425	\$3,873,888	346,399	\$4,751,398
Atlanta Airport	Columbus	114,550	\$4,031,837	143,058	\$5,035,242	179,999	\$6,335,467
Newnan	Atlanta Airport	230,959	\$3,167,956	282,425	\$3,873,888	346,399	\$4,751,398
Newnan	Columbus	42,275	\$1,130,161	47,071	\$1,258,385	52,488	\$1,403,206
Columbus	Atlanta Airport	114,365	\$4,025,330	142,834	\$5,027,365	179,728	\$6,325,926
Columbus	Newnan	42,275	\$1,130,161	47,071	\$1,258,385	52,488	\$1,403,206
Total		775,382	\$16,653,402	944,883	\$20,327,152	1,157,502	\$24,970,600

Table 6-3: Regional Annual Ridership and Revenue Forecasts

Origin	Destination	Year 2030		Year 2040		Year 2050	
		Ridership	Revenue	Ridership	Revenue	Ridership	Revenue
Atlanta Airport	Newnan	289,444	\$4,413,060	353,811	\$5,394,439	433,758	\$6,613,360
Atlanta Airport	Columbus	140,953	\$6,117,267	176,008	\$7,638,611	221,394	\$9,608,322
Newnan	Atlanta Airport	289,444	\$4,413,060	353,811	\$5,394,439	433,758	\$6,613,360
Newnan	Columbus	53,355	\$1,782,357	59,390	\$1,983,957	66,200	\$2,211,460
Columbus	Atlanta Airport	141,263	\$6,130,719	176,383	\$7,654,894	221,848	\$9,628,044
Columbus	Newnan	53,355	\$1,782,357	59,390	\$1,983,957	66,200	\$2,211,460
Total		967,815	\$24,638,819	1,178,793	\$30,050,298	1,443,158	\$36,886,005

Table 6-4: Express Annual Ridership and Revenue Forecasts

Origin	Destination	Year 2030		Year 2040		Year 2050	
		Ridership	Revenue	Ridership	Revenue	Ridership	Revenue
Atlanta Airport	Newnan	338,538	\$5,161,577	413,708	\$6,307,669	507,017	\$7,730,315
Atlanta Airport	Columbus	160,695	\$6,974,044	200,627	\$8,707,063	252,295	\$10,949,416
Newnan	Atlanta Airport	338,538	\$5,161,577	413,708	\$6,307,669	507,017	\$7,730,315
Newnan	Columbus	62,281	\$2,080,536	69,311	\$2,315,379	77,240	\$2,580,243
Columbus	Atlanta Airport	161,130	\$6,992,899	201,153	\$8,729,887	252,932	\$10,977,061
Columbus	Newnan	62,281	\$2,080,536	69,311	\$2,315,379	77,240	\$2,580,243
Total		1,123,463	\$28,451,170	1,367,818	\$34,683,047	1,673,740	\$42,547,593

The tables indicate that the Emerging alternative attracts the least amount of ridership, with 775,000 passengers annually during the opening year and increasing to 1.2 million by 2050. Alternatively, the Regional and Express ridership forecasts maintain higher ridership forecasts, with the Regional carrying 968,000 in 2030 and increasing to 1.4 million in 2050, and Express showing 1.1 million in 2030 and 1.7 million in 2050. These forecasts will be used in conjunction with O&M costs in subsequent sections to compare the operating efficiency through operating ratios.

6.1.2 Boardings and Alighting Summaries

In order to understand the full performance of each technology alternative and route, detailed boardings and alightings were calculated as a part of the ridership forecasting analysis. Tables 6-5 through 6-7 demonstrate these detailed results.

Table 6-5: Emerging Ridership Boardings and Alightings

	Year 2030		Year 2040		Year 2050	
Southbound Direction						
Station	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Atlanta Airport	345,509	0	425,483	0	526,398	0
Newnan	42,275	230,959	47,071	282,425	52,488	346,399
Columbus	0	156,825	0	190,129	0	232,487
Annual	387,784	387,784	472,554	472,554	578,886	578,886
Northbound Direction						
Station	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Columbus	156,640	0	189,905	0	232,216	0
Newnan	230,959	42,275	282,425	47,071	346,399	52,488
Atlanta Airport	0	345,324	0	425,259	0	526,127
Annual	387,599	387,599	472,330	472,330	578,615	578,615

Table 6-6: Regional Ridership Boardings and Alightings

	Year 2030		Year 2040		Year 2050	
Southbound Direction						
Station	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Atlanta Airport	430,398	0	529,819	0	655,152	0
Newnan	53,354	289,444	59,390	353,811	66,200	433,758
Columbus	0	194,308	0	235,398	0	287,594
Annual	483,753	483,752	589,209	589,209	721,352	721,352
Northbound Direction						
Station	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Columbus	194,618	0	235,773	0	288,048	0
Newnan	289,444	53,355	353,811	59,390	433,758	66,200
Atlanta Airport	0	430,708	0	530,194	0	655,606
Annual	484,062	484,062	589,584	589,584	721,806	721,806

Table 6-7: Express Ridership Boardings and Alightings

	Year 2030		Year 2040		Year 2050	
Southbound Direction						
Station	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Atlanta Airport	499,233	0	614,335	0	759,312	0
Newnan	62,281	338,538	69,311	413,708	77,240	507,017
Columbus	0	222,976	0	269,938	0	329,535
Annual	561,514	561,514	683,646	683,646	836,552	836,552
Northbound Direction						
Station	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
Columbus	223,411	0	270,464	0	330,172	0
Newnan	338,538	62,281	413,708	69,311	507,017	77,240
Atlanta Airport	0	499,668	0	614,861	0	759,949
Annual	561,949	561,949	684,172	684,172	837,189	837,189

These tables illustrate that 60 percent of the total ridership occurs between Atlanta and Newnan, 30 percent between Atlanta and Columbus and only 10 percent between Columbus and Newnan. This is primarily attributed to the number of auto trips between Atlanta and Newnan. Further, the higher ridership between Atlanta and Columbus is due to the availability of the air market between Atlanta and Columbus (i.e. connecting air trips from other regions).

It should be noted that the Georgia MMPT was not considered as part of this feasibility study. Since the Georgia MMPT is also in the planning phase, this study evaluates the feasibility of the Columbus to Atlanta corridor should the Georgia MMPT project be delayed from providing rail service at the time the Columbus to Atlanta corridor opens for operation. However, the Georgia MMPT is included in most other similar high-speed rail studies within the region allowing for a high-level estimation of increased ridership should the Columbus to Atlanta corridor service extend further to the Georgia MMPT. It is anticipated, based on other corridor ridership forecasts, that a large number of trips would be generated between H-JAIA and the Georgia MMPT. As was observed in the Atlanta-Birmingham High-Speed Rail Feasibility Study, nearly 40 percent of total ridership would occur between H-JAIA and the Georgia MMPT. Given that estimate, it is anticipated that a similar effect would be seen for the Columbus to Atlanta corridor.

6.2 OPERATING AND MAINTENANCE COSTS

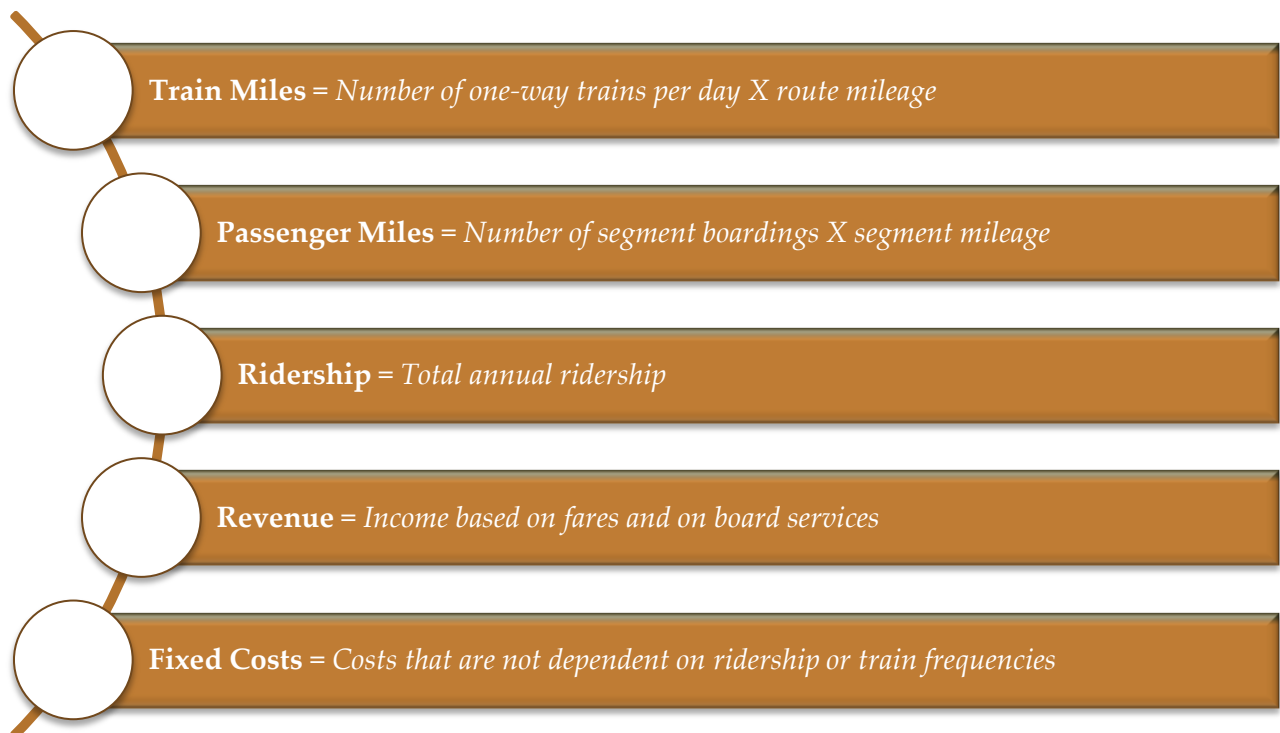
6.2.1 Unit Costs

Forecasting for the O&M costs required analyzing the routes, technologies and, most importantly, the associated ridership demand. This feasibility study gathered regional and national data to estimate total

O&M costs for the Columbus to Atlanta corridor, as outlined in the *Methodology Technical Memorandum* (Appendix A).

Drivers for the O&M analysis included train-miles, passenger-miles, dedicated and shared-use track length, and on-board revenues. These drivers helped to build the overall O&M costs for the three technology alternatives, as outlined in Figure 6-1.

Figure 6-1: Drivers for Operating and Maintenance Costs



Unit costs were derived from the Atlanta to Charlotte PRCIP and were also compared with other regional sources for accuracy. Table 6-8 illustrates the unit costs for each of the alternatives as these vary due to technology and operational plans.

Table 6-8: Columbus to Atlanta O&M Unit Costs

Unit Cost	Driver	Emerging	Regional	Express
Equipment Maintenance	Train Miles	\$15.43	\$12.70	\$11.27
Train Crew		\$6.59	\$4.92	\$4.92
Fuel or Energy		\$8.71	\$8.71	\$2.80
On Board Services (Labor)		\$3.66	\$2.56	\$2.56
Track (Shared)		\$2.37	N/A	N/A
Operations and Dispatch		50.8¢	50.8¢	50.8¢
Administration and Management		\$1.84	\$1.84	\$1.84
Insurance	Passenger Miles	1.4¢	1.4¢	1.4¢
Administration and Management (Call Center: Variable Riders)	Riders	70.9¢	70.9¢	70.9¢
Credit Card and Travel Agency Commissions	Percent of Revenue	2.8%	2.8%	2.8%
On Board Services (Goods Sold)	% of OBS Revenue	50%	50%	50%
Stations	Fixed	\$4.27 million	\$7.74 million	\$7.74 million
Administration and Management (Fixed)		\$14.35 million	\$14.35 million	\$14.35 million

It should be noted that these unit costs are only preliminary estimates, and actual costs for the corridor will be dependent upon possible re-alignments, which may change speed and dwell times for all alternatives, and in turn would affect ridership and revenue estimates.

6.2.2 O&M Cost Forecasts

The difference in the total O&M cost for the Columbus to Atlanta corridor is approximately \$5 million annually between Emerging and Express alternatives. Tables 6-9 through 6-11 illustrate the projected annual O&M costs for 2030, 2040 and 2050. The detailed cost tables can be found in Appendix D.

Table 6-9: Columbus to Atlanta Annual Emerging O&M Costs (in millions)

	2030	2040	2050
Variable O&M Costs	\$16.7	\$19.8	\$23.0
Fixed O&M Costs	\$3.2	\$3.2	\$3.2
Total O&M Costs	\$19.9	\$23.0	\$26.2

Table 6-10: Columbus to Atlanta Annual Regional O&M Costs (in millions)

	2030	2040	2050
Variable O&M Costs	\$18.3	\$21.0	\$23.9
Fixed O&M Costs	\$3.2	\$3.2	\$3.2
Total O&M Costs	\$21.5	\$24.2	\$27.1

Table 6-11: Columbus to Atlanta Annual Express O&M Costs (in millions)

	2030	2040	2050
Variable O&M Costs	\$20.3	\$22.7	\$25.1
Fixed O&M Costs	\$3.2	\$3.2	\$3.2
Total O&M Costs	\$23.5	\$25.9	\$28.3

6.2.3 Sensitivity Factors and Considerations

The ridership numbers determine the appropriate number of train sets. If the train sets vary in future studies, the ridership will be affected, as will the O&M costs. Additional factors for consideration are the number of days of service (312 days) which includes minimal service during weekends. Changes to the number of days of service will alter the present O&M estimates.

6.3 CAPITAL COSTS

6.3.1 Cost Estimates

The capital costs associated with the Columbus to Atlanta corridor were estimated for each of the three technology alternatives and both representative routes. The Emerging alternative is the lowest cost

alternative while the Express alternative involves the highest cost. Each of the alternatives requires various levels of infrastructure improvements to meet the necessary operating characteristics of the services, as outlined in Chapter 4. Overall, for the Emerging and Regional alternative services, more than 50 percent of the total cost is associated with FRA's Standard Cost Categories (SCC) 10 and 70 (Track & Structures and Equipment). For the Express service, more than 60 percent of the total cost is associated with SCC 10 & 60 (Track & Structures and Electrification).

Similar to O&M costs, the FRA SCC categories were based on unit costs taken from the Atlanta to Charlotte PRCIP and compared with other regional and national sources for accuracy.

Table 6-12 presents the estimated capital costs for each service alternative, per the FRA SCC. The capital costs include the cost for materials, labor, contractor overhead and profit, and taxes, as well as accounting for a 30 percent contingency. The detailed SCC sheets can be found in Appendix E.

Table 6-12: Summary of Capital Costs for Each Service Alternative (millions)

FRA Standard Cost Categories	Emerging (Shared-Use)	Regional (Dedicated-Use)	Express (Dedicated-Use)
10 Track & Structures	\$491.5	\$864.9	\$1,026.1
20 Stations	\$14.6	\$14.6	\$14.6
30 Support Facilities	\$0	\$0	\$0
40 Sitework & ROW	\$85.2	\$404.1	\$410.6
50 Signals & Communications	\$265.9	\$199.2	\$284.8
60 Electrification	\$0	\$0	\$1,264.8
70 Equipment	\$365.0	\$365.0	\$507.5
80 Professional Services	\$102.9	\$177.9	\$360.1
Total Capital Cost	\$1,325.1	\$2,025.8	\$3,868.5
Cost per Mile	\$13.0	\$22.2	\$42.5

Source: FRA Standard Costing Categories, Atlanta to Charlotte PRCIP

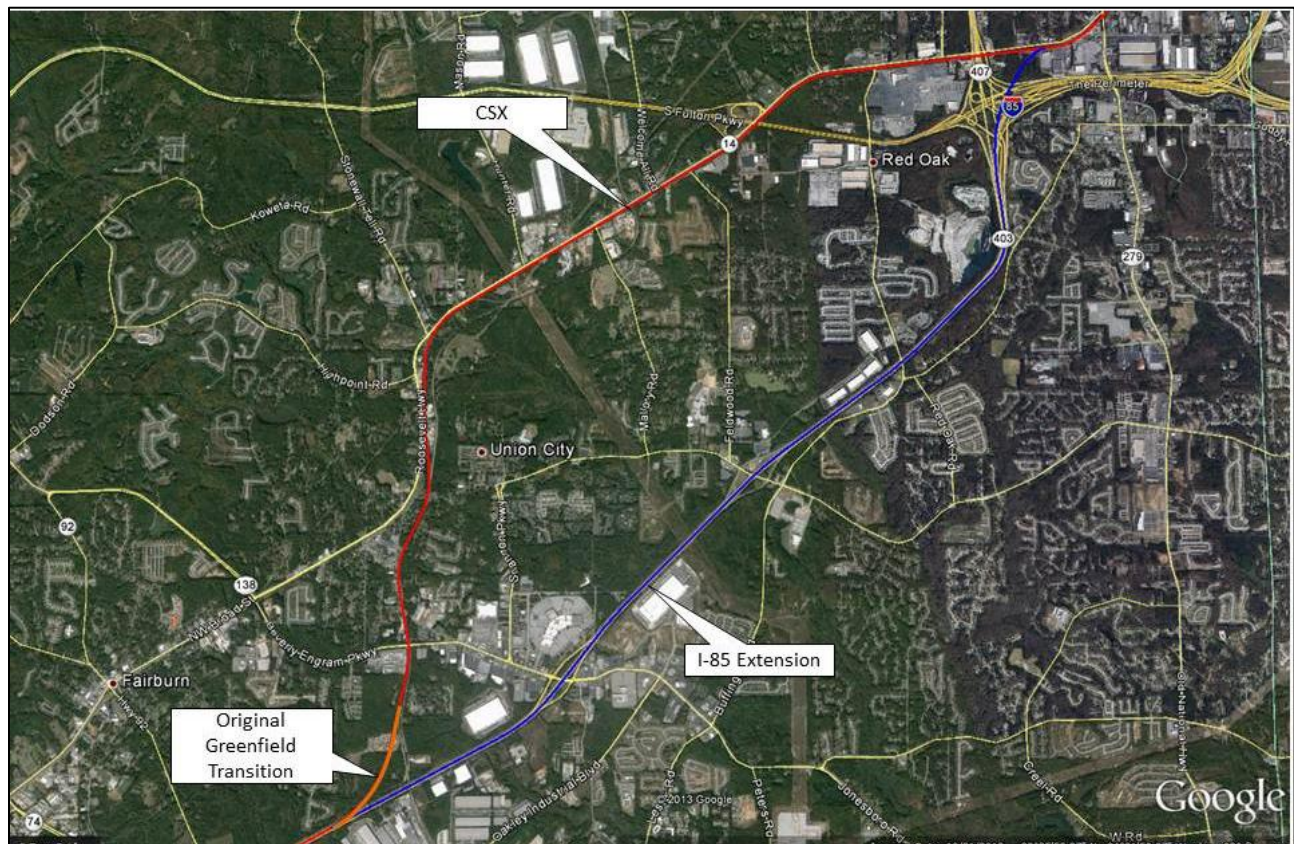
6.3.2 Sensitivity Factors and Considerations

A comparison evaluation was conducted for Route 5, which compared two alignments, one that utilizes the CSXT freight corridor from Fairburn, Ga., to H-JAIA and utilizes the I-85 corridor further north before diverging to the CSXT freight corridor just south of the H-JAIA station¹⁷. The comparison determined that utilizing the I-85 corridor further to the north resulted in a decrease of approximately four minutes in travel time and an approximate increased capital cost of \$287 million, which equates to approximately

¹⁷ The alternative evaluated for feasibility transitions from dedicated-use to CSXT near Fairburn, GA

\$71.25 million for every minute saved in travel time. Figure 6-2 illustrates the two dedicated-use alignment options, where the red line illustrates the costs used in the forecasts and the blue indicates the potential extension.

Figure 6-2: Route 5 Alignment Options



Source: Google Earth

It should be noted that no cost for maintenance facilities and the H-JAIA Airport Station was incorporated, as it is assumed that these costs are included in the capital costs for the Atlanta to Charlotte PRCIP.

6.3.3 Comparison to Other Mode Investment

In order to understand the magnitude of capital cost investment required to implement passenger rail service, it is important to understand the costs relative to other transportation modes. Research of other modes was conducted to understand the per mile costs for modes, such as other intercity passenger rail, light rail, street car and interstates. Table 6-13 illustrates these costs. It is interesting to note that the costs

of intercity passenger rail are comparable to that of interstate new construction, and especially interstate widening.

Table 6-13: Typical Capital Cost Investment for Modes of Transportation (in millions)

Mode of Transportation	Range of Capital Investment
Intercity Passenger Rail	\$10.7-\$42.5 ¹⁸
Streetcar	\$25.6 ¹⁹
Light Rail	\$132.0 ²⁰
I-185	~\$7.8 ²¹
Interstate (new 4-lane)	\$6.4-\$12.4 ²²
Interstate (widening)	\$9.5-\$17.6 ²⁰

¹⁸ Based on conceptual engineering and unit costs from other regional studies

¹⁹ <http://streetcar.atlantaga.gov/how-is-the-project-funded/>

²⁰ <http://www.itsmarta.com/Clifton-Corr.aspx>

²¹ <http://www.fhwa.dot.gov/highwayhistory/data/page03.cfm>, costs inflated to 2013\$ by 2.5% annual inflation rate

²² GDOT Office of Engineering, Cost Estimating System Unit Costs

7. FINANCIAL EVALUATION RESULTS

The FRA is interested in understanding the financial performance of intercity passenger rail corridors and uses them as a metric when deciding which corridors to prioritize for federal funding. The financial evaluation provides a high-level overview of financial performance for the Columbus to Atlanta corridor including annual pro formas (annual operating surplus or deficit), annual operating ratios and net present values (NPV). Methodologies for these metrics can be found in the *Methodology Technical Memorandum* (Appendix A).

7.1 ANNUAL PRO FORMAS

Pro forma income statements are predictions about the financial performance of potential passenger rail scenarios moving into the future. These predictions will incorporate the forecasted flows of estimated revenues and costs. A statement was created for each year and for each scenario alternative between 2030 and 2050. An example is described in Table 7-1 below.

Table 7-1 Example Pro Forma Rail Scenario Income Statement

Rail Scenario Income Statement	
<u>Income/Revenues:</u>	<u>2030 - 2050</u>
Revenues associated with operations such as ticket revenue and on-board services	A
<u>Operating Expenses:</u>	
Fixed and variable O&M costs including energy and fuel, train maintenance, crew expenses, administration, station costs, marketing and insurance	B
<i>Net Operating Income (NOI)</i>	A - B

The pro forma income statements used in this analysis focused on a single measure of income. Net operating income is the difference between revenue and expenditures associated with operations and maintenance. A negative value indicates the need for an operating subsidy. This study does not indicate how those subsidies may be funded.

Typically, income statements will include other line items, in particular, debt service. The debt service can then be used to estimate net income and financial ratios, such as the debt service ratio. However, an estimation of debt service requires a determination of the specific debt structure that will be used to finance the project. While a qualitative discussion of funding and financing options is discussed in Chapter 9, a specific determination of the debt structure and schedule will not be determined until a preferred

alternative is selected. Tables 7-2 through 7-4 provide an overview of the pro forma for 2030, 2040 and 2050 for each alternative. Annual pro formas can be found in Appendix F.

Table 7-2: Emerging Annual Pro Forma (in millions)

	2030	2040	2050
Total Revenue	\$16.7	\$20.3	\$25.0
Total Cost	\$20.0	\$23.1	\$26.2
NOI	-\$3.3	-\$2.8	-\$1.2

Table 7-3: Regional Annual Pro Forma (in millions)

	2030	2040	2050
Total Revenue	\$24.6	\$30.1	\$36.9
Total Cost	\$21.5	\$24.3	\$27.1
NOI	\$3.1	\$5.8	\$9.8

Table 7-4: Express Annual Pro Forma (in millions)

	2030	2040	2050
Total Revenue	\$28.5	\$34.7	\$42.6
Total Cost	\$23.5	\$25.9	\$28.4
NOI	\$5.0	\$8.8	\$14.2

7.2 OPERATING RATIOS

The operating ratio refers to the ratio of operating expenses to revenue and is a key metric of financial feasibility. The operating ratio is calculated from the pro forma income statements by dividing operating revenue by expenses:

$$\text{operating ratio} = \text{operating revenue} / \text{operating expenses}$$

The operating ratio indicates the proportion of revenues to expenses. FRA seeks operating ratios greater than 1.0, as an excess of 1.0 provides funds that can be used to cover non-operating expenses such as debt service, and it indicates a more “efficiently” run rail system that is generating revenue. The operating ratio is independent of the rail system’s capital structure or financing decisions. Tables 7-5 through 7-7 illustrate annual operating ratios for each service alternative. The table shows that the Emerging alternative does not achieve a positive (>1.0) operating ratio until sometime after 2050. Regional and Express alternatives demonstrate a positive operating ratio during the first year of operation in 2030.

Table 7-5: Emerging Annual Operating Ratio (in millions)

	2030	2040	2050
Total Revenue	\$16.7	\$20.3	\$25.0
Total Cost	\$20.0	\$23.1	\$26.2
Operating Ratio	0.83	0.88	0.95

Table 7-6: Regional Annual Operating Ratio (in millions)

	2030	2040	2050
Total Revenue	\$24.6	\$30.1	\$36.9
Total Cost	\$21.5	\$24.3	\$27.1
Operating Ratio	1.15	1.24	1.36

Table 7-7: Express Annual Operating Ratio (in millions)

	2030	2040	2050
Total Revenue	\$28.5	\$34.7	\$42.6
Total Cost	\$23.5	\$25.9	\$28.4
Operating Ratio	1.21	1.34	1.50

7.3 NET PRESENT VALUE

The present value of net operating income, PV(NOI), is a single number that represents the sum of the net operating incomes from the annual pro forma income statements. Because of the time value of money, dollars received at different times are not equivalent. By applying an appropriate discount rate, the

PV(NOI) converts future dollars to their value in the present time period where they can be summed. For this project, net revenues are received from 2030 through 2050 and these values are discounted back to 2013. To be complete, a term is also included in the calculation, PV_{2051} , in order to capture the present value of the stream of returns occurring after 2050 (i.e., the present value of the terminal value). PV(NOI) is a measure of total net operating revenues that are generated by the project without any consideration of the capital costs. A thorough description of these terms can be found in the *Methodology Technical Memorandum* (Appendix A).

A positive NPV indicates that the project generates more in revenue than its costs; a negative NPV indicates that the project costs more than it generates in revenue. However, a project with a negative NPV might still be chosen if there are non-monetary benefits not accounted for in the NPV analysis. Section 7.3.1 explains these non-monetary benefits. Future studies will quantify these benefits as more detailed information become available about the corridor and specific routes being evaluated.

Table 7-8: Net Present Values

	Emerging	Regional	Express
NPV (2013\$)	(\$907,941,519)	(\$1,494,601,438)	(\$2,827,873,410)

All alternatives indicate negative NPVs. Due to its relatively low capital costs, the Emerging scenario has the lowest NPV but runs a deficit each year, thereby requiring an annual operating subsidy.

In order to account for the uncertainty regarding these assumptions, a sensitivity analysis was performed using Monte Carlo methods. Using this methodology, the NPV was repeatedly re-estimated using multiple possible combinations of the assumed variables.²³ The result was a distribution of possible NPV values from which 95 percent confidence-level bands were constructed. These confidence bands and the associated mean (average) NPV for each of the scenarios are described in Table 7-9.

Table 7-9: Monte Carlo Simulation Results

		Mean	95% Confidence Interval
Rail Scenario	Emerging	-\$908,269,507	-\$918,115,585 ⇔ -\$898,423,429
	Regional	-\$1,494,607,013	-\$1,530,037,627 ⇔ -\$1,459,176,398
	Express	-\$2,828,625,203	-\$2,877,458,324 ⇔ -\$2,779,792,082

²³ The NPV calculation was performed 500 times for each route and frequency using randomly chosen values of ridership, revenue, passenger miles and operating costs. These random values for each of the variables were chosen assuming a normal distribution with the mean equal to the initial values and a standard deviation equal to 10% of the mean.

The simulation results indicate that none of these scenarios have a positive expected NPV. The Emerging alternative has the best NPV, a loss of over \$900 million. The 95 percent of the NPV simulations for the Emerging alternative were between -\$898 million and -\$918 million.

It should be noted that the negative NPV values in Table 7-9 include a 30 percent contingency for capital costs. If these additional costs are not realized the NPV values could improve. These improved results are described in Table 7-10 below.

Table 7-10: Net Present Values without Contingency

	Emerging	Regional	Express
NPV (2013\$)	-\$723,382,755	-\$1,145,098,158	-\$2,186,288,795

7.3.1 Non-Monetary Benefits

There are numerous public benefits that can be taken into consideration in addition to the quantitative factors. In many cases, there are benefits to users and to the public-at-large that are not typically quantified but should be taken into consideration when evaluating the potential for public investment.

7.3.1.1 Consumer Surplus

The users of high-speed passenger rail experience benefits including travel time savings, travel time reliability, frequency of available trips over air travel frequency, personal vehicle cost savings (wear and tear, fuel), and the ability to be productive personally or professionally during travel. These benefits are typically referred to as “consumer surplus” and are realized when a user obtains more value from the rail trip than actually represented in the fare. In many cases, high-speed rail delivers fast, efficient transportation so that riders can spend less time traveling and more time doing business. Fast boarding times, no security delays and no waiting for baggage (or lost bags) translates to less time spent getting to and from destinations compared to other modes. Because of the reliability of trains and the reduced total trip time, an overnight stay is not always required, saving additional time and money. High-speed rail offers greater flexibility to plan last minute trips, purchase tickets on short notice, and make changes to schedules without large monetary penalties.

The U.S. High-Speed Rail Association, as a part of a high-speed rail study between Chicago and St. Louis, found that “... true high speed rail (Express) shortens trip times more than 70 percent over slower,

conventional rail.” Additionally, it was found in the Chicago-Milwaukee corridor that the consumer surplus ranged from \$1.7 billion for 125 mph technology to \$4.1 billion for a 300 mph technology.²⁴

7.3.1.2 Non-User Benefits

The non-users, those travelers who continue to drive or fly as well as those people simply living and working in the high-speed rail corridor, also benefit from high-speed passenger rail development. The non-users experience reduced traffic congestion and a decrease in travel delay as trips shift from highway or air to rail. There is a resulting decrease in travel time creating a benefit of less “non-productive” time spent by those continuing to travel by vehicle or air. In addition to time savings, the reduction of congestion also leads to increased vehicle operating speeds resulting in shorter travel times and less fuel consumption. The decrease in excess fuel consumption results in air quality improvement and a reduction of the cost of fuel to the consumer.

The 1997 FRA Commercial Feasibility Study calculated travel time saved by air passengers (those not diverted to rail) due to reduced congestion, deviations from scheduled flight arrival and departure times, and additional time spent on the taxiway or en route. Based on the study, air passenger delay reduction benefits per diverted air trip were estimated at \$24.60. For its study corridors, the FRA study also estimated the benefits to air carriers as benefits per diverted air trip at \$13.40. The diversion of travelers to rail from air also generates emissions savings estimated as \$5.38 per diverted air trip.

7.3.1.3 Emission Reduction

Both users and non-users benefit from improved air quality due to reduction of air pollution from emissions as traffic is diverted from the highway and air to rail. The U.S. High Speed Rail Association states that, “... building an electrically-powered national high-speed rail network across America is the single most powerful thing we can do to get the nation into a secure, sustainable form of mobility. A national network of high speed trains can be powered by a combination of renewable energy sources including wind, solar, geothermal, and ocean/tidal energy.”²⁵ The California High Speed Rail Authority studied 13 modes of transportation and found high-speed rail used the second lowest energy per person-mile, finishing behind only a peak-period transit bus. In carbon dioxide emissions, high-speed rail again finished second to a peak-period bus. For both measures, high-speed rail was lower than any aircraft or any private vehicle.

²⁴ *Tri-State High Speed Rail Study Chicago-Milwaukee-Twin Cities Corridor* (1991). Prepared by Transportation Management Systems, Inc. and Alfred Benesch & Company for the Illinois Department of Transportation, Minnesota Department of Transportation, and the Wisconsin Department of Transportation.

²⁵ <http://www.ushsr.com/benefits/energysecurity.html>

According to studies in the Sacramento-Central Valley Area, California²⁶, high-speed rail in California would reduce oil consumption by an estimated 12.7 million barrels per year, reducing CO₂ emissions by 12 billion pounds per year with the direct benefits of air pollution reduction being calculated at \$48.3 million.

²⁶ *The Economic Impacts of the California High-Speed Rail in the Sacramento/Central Valley Area* (2008). Prepared by Shwan Cantor, University of California, Merced.

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8. ECONOMIC AND SOCIAL IMPACT EVALUATION RESULTS

The U.S. High Speed Rail Association states, “[H]igh-speed rail delivers fast, efficient transportation so riders can save time, energy and money. High-speed rail is extremely reliable and operates in all weather conditions. [It] is not subject to congestion, so it operates on schedule every day without delay -- especially during rush hour and peak travel times. High-speed rail spurs the revitalization of cities by encouraging high density, mixed-use real estate development around the stations, and fosters economic development in second-tier cities along train routes. High-speed rail links cities together into integrated regions that can then function as a single stronger economy. Further, high-speed rail broadens labor markets and offers workers a wider network of employers to choose from. Rail encourages and enables the development of technology clusters with fast easy access between locations and expands visitor markets and tourism while increasing visitor spending.”²⁷

8.1 ECONOMIC IMPACTS

Through development of high-speed rail systems, jobs will be created across numerous fields with opportunities for temporary job creation in the planning, design and construction industries. Additionally, permanent jobs will be created in the management and operations of stations, trains and track infrastructure. There will also be jobs created through a new industrial boom in the design and manufacturing of high-speed trains and all the components going into a train as FRA follows “Buy America.” Additional jobs may also be created in real estate development and construction with regard to transit oriented developments around the rail stations.

There are various models that economists use to develop job estimates, and most involve input-output modeling whereby industry-by-industry requirements and purchases through an economy are aggregated. Models typically include three types of employment impacts:

- **Direct:** jobs created directly from the expenditure, such as hiring construction workers;
- **Indirect:** jobs created by secondary activity related to the expenditures, such as the jobs generated in the professional services industry in support of the larger construction project; and

In 2010, The Economic Development Research Group for the U.S. Conference of Mayor's studied the economic impact of high-speed rail in Los Angeles, Calif.; Chicago, Ill.; Orlando, Fla.; and Albany, N.Y., and found five common impacts regarding high-speed rail development:

1. High-speed rail service can help drive higher density, mixed use development at train stations;
2. High-speed rail service can increase business productivity through travel efficiency gains;
3. High-speed rail service can help expand visitor markets and generate additional spending;
4. High-speed rail service can broaden regional labor markets; and
5. High-speed rail service can support the growth of technology clusters.

²⁷ <http://www.ushsr.org>

- **Induced:** jobs created by additional spending through the economy. These are the employment effects that occur when employees spend their money in other industries, such as wages being used for retail purchases.²⁸

There are several sources for projected job creation based on total capital cost expended in the development of a high-speed passenger rail line. In most cases, job estimates for the nation as a whole will be higher than a specific state or region, as most states do not produce every type of equipment needed for transit operations, and thus must procure these from out of state or even import them. Table 8-1 provides job estimates based on expenditure and range from 10,000 to 28,000 jobs per \$1 billion spent.

Table 8-1: Projected Job Creation Based on Capital Expenditure

Source	Job Creation Projection (Jobs/\$1 Billion in Capital Expenditure)
California HSR Business Plan	20,000
American Public Transit Association	24,000
American Association of Railroads	20,000
Federal highway Administration	27,800
Washington State DOT	11,400
Council of Economic Advisors for the American Recovery and Reinvestment Act	10,854
Congressional Research Service	11,786

Source: American Public Transportation Association: *High-Speed Rail Investment Background* February 11, 2011

If these metrics are used for the Columbus to Atlanta corridor, based on the estimated corridor capital cost (\$1 billion to \$4 billion), the number of jobs that may be created could range from 11,000 to 112,000.

Additionally, the residential population in the vicinity of the rail line ultimately has improved access to employment in the region connected by the high-speed rail system. The employment base can depend on reliable and cost-effective transportation to connect them to otherwise inaccessible viable employment centers. Employers can also benefit from these larger employment pools, making this corridor potentially more attractive for new businesses and to retain existing businesses.

²⁸ Induced jobs can occur in a much larger area beyond the Columbus to Atlanta corridor. Job creation in future studies should focus on direct and indirect.

8.2 REVENUES AND BENEFITS

8.2.1 Potential Station Area Development Impacts

Transit-oriented development (TOD) creates vibrant, compact, livable, walkable communities centered on high-quality train systems. These developments encompass the integration of community design with rail system planning. High-speed rail, as the backbone of the system, combined with other modes of transportation, enables well-connected mobility throughout cities and regions. Coordinating and encouraging compact, mixed-use development around the rail stations completes the system by enabling people to live and work along the system without the need for a car. Together, these development components save time, money and energy, and improve the overall quality of life.

TOD encourages dense development and often involves redevelopment of areas or infill urban development. In redevelopment or infill areas, the cost of public services such as police, fire, trash collection and public works are less expensive to manage, as the geography is physically smaller. In addition, fewer acres of new development means fewer public tax dollars needed for new public infrastructure such as sewer, water and highways. In the American Public Transportation Association's study regarding Florida's Super Region, they found that, "... roads occupy an average of at least 20 percent of developed land area. Using a Florida Department of Transportation estimated cost of \$10 million per-mile for a 2-4 lane 'rural' road, the savings quickly add up. By choosing the alternative scenario, Florida's Super Region can collectively expect to save approximately \$178 billion by 2030 and \$270 billion by 2050 in new road construction costs."

8.2.1.1 Stanford, Connecticut Transportation Center

An example of how a regional passenger rail line and proximity to a large city can help spur economic growth for other cities and communities along the rail line can be found in the TOD development along a regional passenger rail line from Stanford, Conn., to New York City. Following 9/11/2001, many New York City businesses wanted to move out of the city and relocated to Stanford, Conn., along the New Haven line (approximately 60 miles in which Stanford is a mid-point station). Specifically, two large banks, UBS and RBS, were built adjacent to the existing station. These developments immediately spurred economic development on either side of the station. Because of the proximity of businesses and connectivity to New York City and New Haven, the line allowed people to commute from both ends and created reverse commute options.



Image 1: Stanford, CT Transportation Center

Because of this new interest in the Stanford Station, a TOD plan has been designed and is currently in the procurement phase for a public-private partnership for construction. The TOD will include commuter parking spaces, retail, and business and residential development. It is anticipated that this station TOD update will continue to spur economic development in Stanford and continue to increase ridership along the New Haven line.

8.2.2 Regional Economic Benefits

According to a California High Speed Rail Authority Economic Impact Analysis conducted in 2011²⁹, evidence was presented to illustrate that cities within two hours of a major economic center show the most economic benefit from rail connections. Bakersfield, Fresno and other Central Valley California cities, all of which will be within two hours by rail to both San Francisco and Los Angeles, were projected to have positive economic benefits through the high-speed rail connection to Los Angeles and San Francisco. The high-speed rail network in California has the potential to increase business-to-business interaction between Southern and Northern California, integrate the economies of the Central Valley, and provide capacity in the congested airport hubs for higher value international connections.

A high-speed passenger rail line between Columbus and Atlanta would create an efficient connection within the two hour travel time between the Columbus and H-JAIA area and potentially the Georgia MMPT if the service were to extend to the downtown area.

8.2.2.1 Portland to Brunswick Downeaster Route

A route that is similar to the demographics of the Columbus to Atlanta corridor is the Portland, Maine to Brunswick, Maine Amtrak route. This is an extension of train service from Boston, Mass., to Portland.

²⁹ http://www.hsr.ca.gov/docs/about/business_plans/BPlan_2012EIR.pdf

Construction of the line began in 2008 and concluded in 2012. Before construction there were areas along the rail line that were dilapidated and abandoned. After breaking ground, many areas, including Brunswick's Maine Street Station, saw an influx of redevelopment. Today, passengers who stop at the Maine Street Station can dine, shop and lodge. According to a local news article, "... [T]he prospect of passenger rail service fueled the successful conversion of Maine Street Station from a symbol of decay to a downtown renewal success story."³⁰ During the design phases, the extension was estimated that within 20 years, the line would create 800 jobs and generate \$325 million in construction contracts. It was also estimated that the first year of service would deliver 35,600 riders. In a recent article, it was found that the actual ridership for the first year of operation was nearly 50 percent higher with an estimate of 52,000 riders.³¹ This ridership provides "a base for the state's tourism, lodging and restaurant industry to tap."³²

8.3 IMPACTS FOR COLUMBUS TO ATLANTA

Based on these case studies and estimates from other locations, it is expected that there will be positive economic impacts along the rail line from Columbus to Atlanta. It appears that regardless of speed or technology in other areas, development around stations is certain. One unique aspect of this corridor compared to others in the state is its relatively short distance, making the corridor a prime candidate for increased commuter options from Columbus to Atlanta. This could result in regional benefits connecting businesses and providing opportunities for larger employment pools and reverse commute alternatives.

In addition to regional benefits along the corridor, passenger rail may result in added benefits to the Columbus Airport with an adjacent passenger rail station. According to a U.S. Government Accountability Office (USGAO) study in 2013, "... [A]ir-rail connectivity may provide a range of mobility, economic, and environmental benefits... USGAO found a general consensus that air-rail connectivity can provide a range of mobility benefits to travelers."³³ Future studies will need to evaluate and quantify the co-benefits of an air-rail connection at Columbus Airport including impacts to accessibility, fares and additional flights.

NEPA studies, as a part of the impact evaluation will take a closer look at the potential economic impacts to this corridor and will quantify employment opportunities, development opportunities, and increased tax bases to local communities as more detailed information is available regarding the corridor, routes and station locations.

³⁰ *Bangor Daily News*, Published November 12, 2012

³¹ *Associated press*, Published November 14, 2013

³² *Bangor Daily News*, Published November 12, 2012

³³ <http://www.gao.gov/products/GAO-13-691>

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9. SYSTEM PLANNING, ASSESSMENT AND IMPLEMENTATION

After reviewing the various potential route alternatives, two representative routes were identified to base the feasibility of passenger rail operations between Columbus and Atlanta. Three technologies were evaluated on the two routes: Emerging, Regional and Express high-speed rail. The following sections provide a summary of technical results from previous chapters and outline key conclusions and next steps for the corridor.

9.1 CORRIDOR COMPARISON

Table 9-1 compares the three technologies and two routes. Based on the table, the Express technology performs well when compared to the other corridors; however, incurs the highest capital costs primarily due to the electrification of the route. Both the Emerging and Regional alternatives demonstrate lower costs, but also show lower operating ratios due to the relatively lower ridership and revenue results.

Table 9-1: Corridor Route Comparison

	Emerging (Route 2)	Regional (Route 5)	Express (Route 5)
Route Length	101.79	91.05	91.05
Travel Time (hour : minute)	1:36	1:26	1:01
Average Speed	55 mph	63 mph	71 mph
Total Ridership (2030-2050)*	20.1 million	25.0 million	29.1 million
Total Revenue (2030-2050)*	\$319.8 million	\$472.7 million	\$545.5 million
Total Capital Cost*	\$1.3 billion	\$2.0 billion	\$3.9 billion
Total Cost per Mile*	\$13.0 million	\$22.2 million	\$42.5 million
Total O&M Costs (2030-2050)*	\$359.4 million	\$336.6 million	\$368.2 million
Operating Ratio			
2030	0.83	1.15	1.21
2040	0.88	1.24	1.34
2050	0.95	1.36	1.50

* Includes all the interim years (20 years of annual numbers).

9.2 KEY FINDINGS

The following are key findings for the Columbus to Atlanta corridor:

- There are multiple routes available between the two cities to implement passenger rail service using abandoned rail lines, existing rail right-of-ways, and fully dedicated routes using the interstate connection.
- There are three available technologies in the corridor: Emerging, Regional and Express high-speed rail.
- The Emerging has the lowest capital costs and O&M costs while the Express incurs the highest capital and O&M costs.
- The Express has the highest ridership and revenue, and illustrates operating ratios above 1.0 during the first year of operation and maintaining a higher operating ratio through the first 20 years.
- The Emerging operating ratios are less than 1.0 during the first year of operation and do not illustrate an operating ratio of 1.0 or greater by 2050.
- All alternatives demonstrate a negative NPV, but there are non-monetary benefits associated with all three.
- The Express would demonstrate the highest non-monetary benefits due to the faster travel time and clean electric technology.

9.3 SYSTEM INTEGRATION ANALYSIS

The feasibility analysis examined the corridor as a free-standing service operating independently of other corridors. However, there are significant ridership benefits when a corridor service operates as part of a larger passenger rail network. Within Georgia, there are multiple corridors under various stages of study with a proposed Georgia MMPT hub in which each of these corridors can feed ridership to the others at the connection point. Future studies will estimate this network effect on the Columbus to Atlanta corridor as more detailed information on the other corridors out of Atlanta are available.

9.4 FUNDING AND FINANCING STRATEGIES

As of December 2013, the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) and the Rail Safety Improvement Act of 2008 (RSIA) are two of the most popular federal funding sources for passenger rail and are under review for reauthorization by the U.S. Congress. Currently, the FRA has more than \$18 billion invested in passenger and freight rail throughout the U.S.³⁴ The following sections describe the programs that have been used in the past to fund high-speed rail projects.

³⁴ John Porcari, Deputy Secretary, USDOT, Statement before the US House subcommittee on Railroads, pipelines, and hazardous materials committee on transportation and infrastructure. July 9, 2013.

9.4.1 High-Speed Intercity Passenger Rail Program

The High-Speed Intercity Passenger Rail Program is a collaborative and competitive grant program. Initially, there was \$8 billion in funding through the American Recovery and Reinvestment Act (ARRA) in 2008. Since that time, an additional \$2.1 billion from PRIIA has been invested. To date, a total of \$10.1 billion has been spent. In Georgia, investment through this program has gone to studies including the following corridors:

- Atlanta to Birmingham, Ala.;
- Atlanta to Jacksonville, Fla.;
- Atlanta to Louisville, Ky.; and
- Atlanta to Charlotte, N.C.

9.4.2 Railroad Rehabilitation and Improvement Financing Program

The Railroad Rehabilitation and Improvement Financing Program (RRIF) provides direct federal loans and loan guarantees to finance the development of railroad infrastructure. The program was authorized to spend \$35 billion, of which \$7 billion was earmarked for freight. To date, only \$1.73 billion has been awarded.

9.4.3 Transportation Investment Generating Economic Recovery Program

The Transportation Investment Generating Economic Recovery Program (TIGER) is a discretionary grant program for rail and other transportation projects. This program is highly competitive and has awarded funding through four rounds. To date, TIGER has awarded \$3.1 billion to fund 218 projects.

9.4.4 Transportation Special Purpose Local-Option Sales Tax

One method that has become very popular for funding local transportation projects is the use of a Special Purpose Local-Option Sales Tax (SPLOST). Communities (typically Counties in Georgia) may vote on raising sales taxes by a certain amount or percentage in order to help fund public projects, including transportation projects. This has been historically successful in Georgia and around the nation for local projects.

In 2010, Georgia passed the Transportation Investment Act (TIA), a regional Transportation SPLOST (T-SPLOST) that allowed regional commissions (groups of counties) to vote on increasing sales tax for the region to fund regional transportation projects. Each region developed a list of projects to be included in the program, and GDOT pledged to complete the projects within a 10-year timeframe. The regions voted on the T-SPLOST in 2012, and the referendum only passed in three of the 12 regional commissions (River Valley, Central of Georgia Altamaha and Central Savannah River Area).

While there was not a project related to the Columbus to Atlanta high-speed rail on the project list for the River Valley Regional Commission, this method is a potential local funding source for funding future studies, as well as design and construction of a high-speed rail line. Recently, there have been discussions of allowing counties to form partnerships among themselves to pass SPLOSTs, but no official legislation has been introduced.

9.4.5 Future Funding Potential

The U.S. Presidential Administration's FY 2014 Budget has proposed a five-year reauthorization which contains the following:

- Creation of a National High-Performance Rail System (NHPRS) to consolidate existing rail programs into two sub-programs:
 - Current Passenger Rail Service - focusing on maintenance of the existing network serviced by Amtrak; and
 - Rail Service Improvement Program - focusing on expansion and maintenance of other freight and rail networks.
- The NHPRS would receive \$6.4 billion in FY 2014 and \$40 billion over the next five years.
- There is a proposed \$3.25 billion to be spent on the construction of passenger corridors.
- Broader Transportation Trust Fund to include rail and allow proposed high-speed rail projects to more effectively leverage private dollars.

Whether or not the President's budget proposal is passed, it is clear that future rail funding will have to include some form of "innovative financing," using Federal resources to leverage other resources, both public and private.

In a recent House of Representative hearing on the "Role of Innovative Finance in Intercity Passenger Rail,"³⁵ the chairman of the Committee on Transportation and Infrastructure stated, "I also strongly believe that the only way we will be able to tackle the large capital needs for passenger rail is to partner with the private sector." He continued, "... [P]rograms like the ... RRIF ... and the ... TIFIA ... allow the Federal government to leverage scarce resources and share risk with the private sector. We've seen such a model work for highway and transit projects, and I believe we can utilize similar models for intercity passenger rail."

The Chairman of the Subcommittee on Railroads, Pipelines and Hazardous Materials expressed similar sentiments³⁶ stating, "[O]ne area the next rail bill will likely need to address is the role innovative financing

³⁵ <http://transportation.house.gov/hearing/role-innovative-finance-intercity-passenger-rail>

³⁶ John Porcari, Deputy Secretary, USDOT, Statement before the US House subcommittee on Railroads, pipelines and hazardous materials committee on transportation and infrastructure. July 9, 2013.

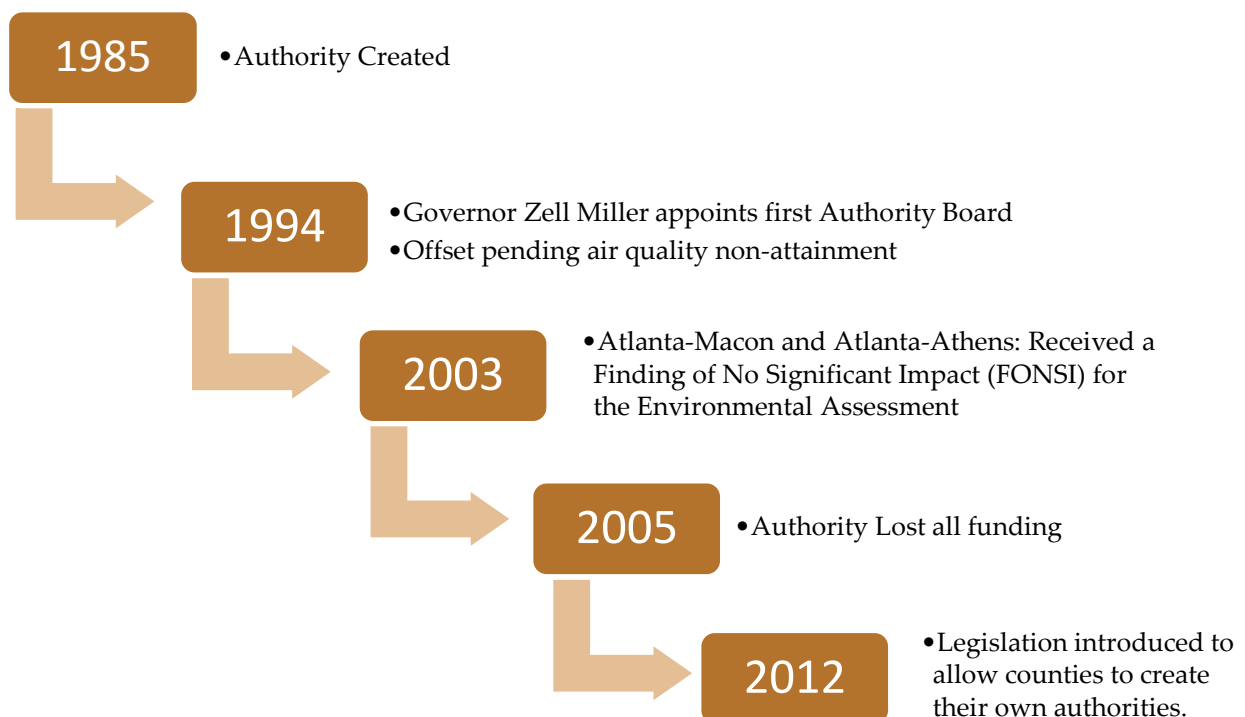
tools can plan to advance intercity passenger rail projects.” The Chairman also stated that, “RRIF and other Federal credit programs can accelerate large infrastructure projects, if stakeholders come together to identify repayment sources.”

9.4.6 Public Private Partnerships

9.4.6.1 Georgia Rail Passenger Authority

During the course of the feasibility analysis, a review of the Georgia Rail Passenger Authority was conducted as a potential strategy for implementation. The initial purpose of the group was to lead and manage the construction, financing, operation and development of passenger rail service and other public transportation projects within the State of Georgia. Figure 9-1 demonstrates the history of the Authority.

Figure 9-1: Georgia Rail Passenger Authority History



After a review of the Georgia State legislation (O.C.G.A: §49-9), it was found that the Authority’s Board must be appointed by the Georgia Governor. The only Board that has been appointed since its creation

was in 1994 by Governor Zell Miller. The Board is comprised of 12 members and two At-Large members. Currently, the Authority is defunct, but could be revived with appointments by the Governor.

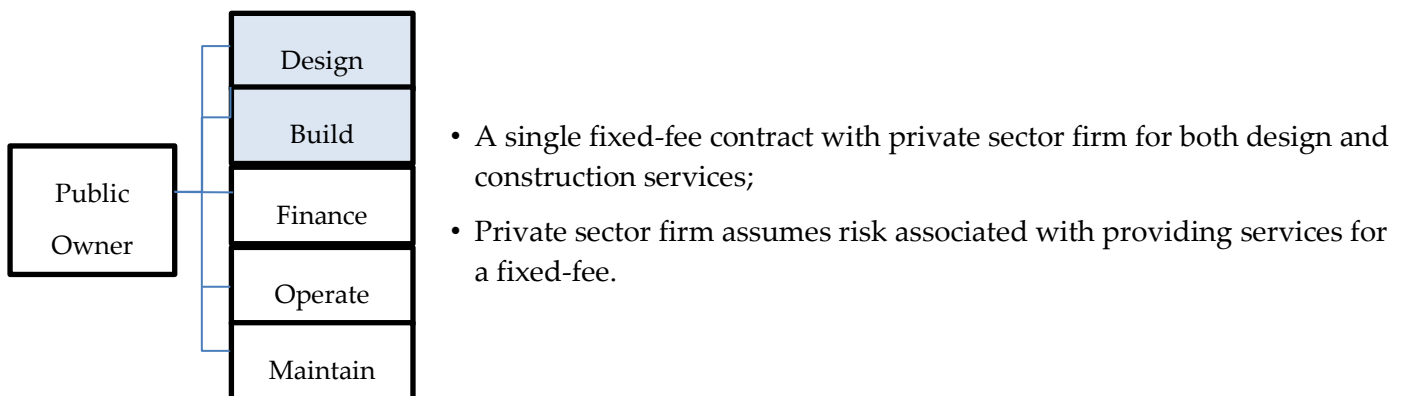
According to the Georgia statute, the Georgia Rail Passenger Authority has broad and long existing powers including the powers to execute contracts for the planning, design, construction, financing, operations and sales of passenger rail projects. They have the authority to acquire (purchase, lease, condemn) and dispose of real and personal property (i.e., Eminent Domain). They may also acquire loans, grants and leases for the purposes of constructing and operating rail projects. The Authority may be a conduit for issuing unlimited bond financing for the purposes of financing rail projects and may also initiate coordination and partnerships with state and local governments.

While this Authority has been inactive for a number of years, there is a possibility of reactivating the Authority and utilizing its powers to help keep the Columbus to Atlanta corridor moving through the necessary steps for implementation.

9.4.6.2 Public-Private Partnership Organization Strategies

The delivery of large public infrastructure projects entails five main components: design, construction, financing, operations and maintenance. Rather than completing each of these separate components entirely “in-house,” public entities typically use some sort of public-private partnership (P3) to complete the project. P3s bundle together a subset of the components for private provision, capturing the expertise and cost efficiencies of the private sector while allowing for “off-balance” sheet capital investment. The following figures and summaries illustrate several types of P3 arrangements.³⁷

Figure 9-2: Design-Build



³⁷ U.S. Department of Transportation, Federal Highway Administration, <http://www.fhwa.dot.gov/idp/pd/index.htm> accessed December 10, 2013.

Figure 9-3: Private Contract Fee Service

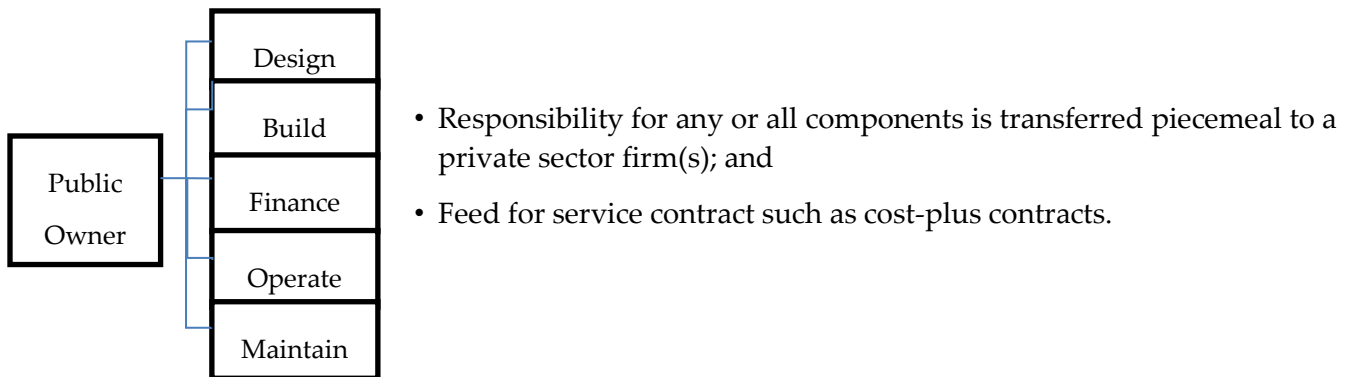


Figure 9-4: Design-Build-Finance

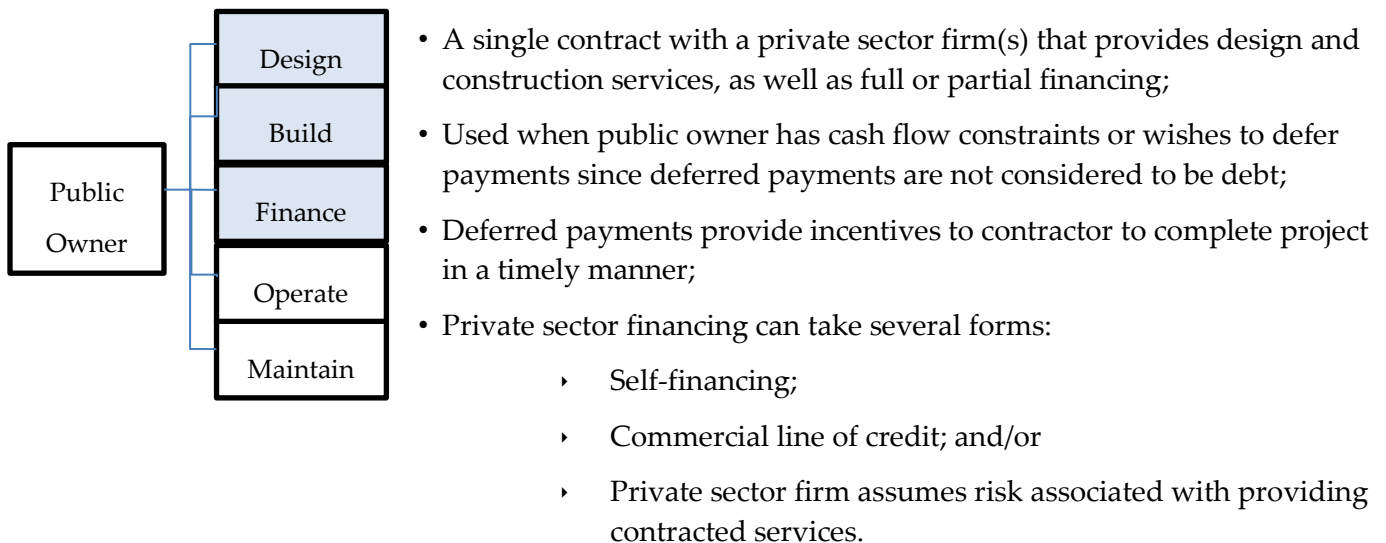
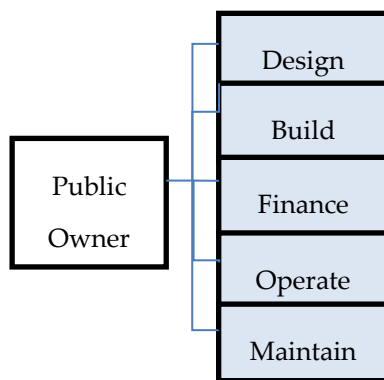
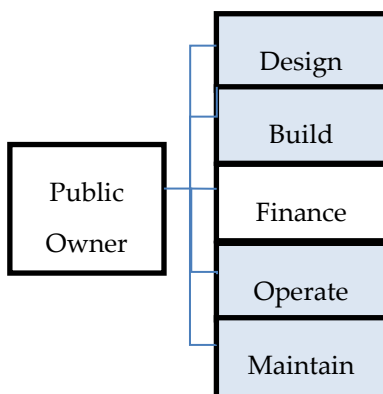


Figure 9-5: Design-Build-Finance-Operation-Maintain

- All responsibilities bundled together in contract with private sector.
- Commonly financed by:
 - Incurring debt which leverages revenue streams associated with the project (e.g., tolls from toll roads or other user fees);
 - Public sector grants and payments-in-kind such as rights-of-way; and
 - Private activity bonds which allow the private entity to issue tax-exempt bonds for some highway and rail projects. Revenue risk can be shared between the public and private entity through availability payments. Under this arrangement, the public owner pledges payments to the private partner in order to guarantee a fixed income stream.

Figure 9-6: Design-Build-Operate-Maintain

- A single contract with private sector firm(s) that provides design, construction, operation and maintenance while the public owner provides financing;
- Allows private entity to take advantage of economies of scale, efficiencies arising from providing seemingly disparate services (e.g., designs made at the design stage and in choosing construction materials can make operation and maintenance less costly); and
- Gives incentive for private partner to use “lifecycle costing” reducing the public sector financial risk associated with long-term maintenance.

According to Georgia statute³⁸, authority to begin the process of forming a P3 as part of a transportation project resides with GDOT. GDOT evaluates a project to determine the appropriate level of private participation in a proposed project. If GDOT deems that private funding or financing of a project is a possibility, then it issues a written request for proposals. After a period set aside for public comment,

³⁸ O.C.G.A §32-2-80

GDOT then engages in a series of presentations and interviews with the respondents. At the conclusion of these discussions, GDOT ranks the respondents in order of acceptability. Preliminary negotiations regarding the exact terms of the P3 are then conducted with each private entity. After consultation with all involved public entities, a final contract or contracts are negotiated and awarded. These P3 contracts may allocate funding to the private entities from such sources as tolls, fares, or other user fees and tax increments.

In addition, Georgia statutes allow for the department to pursue federal, state or local loans or grants in order to provide additional funding for the project. GDOT is also allowed to use these funding sources to make grants or loans to the contracted private entity. Finally, any private entity engaging in a P3 with GDOT is required to provide performance and payment security.

Georgia has also expanded the use of P3s beyond transportation. In May 2011, Governor Nathan Deal signed legislation that allows the use of P3s for the financing and construction of water supply projects.³⁹

A current example of the use of a design-build-finance P3 for transportation infrastructure in Georgia is the Northwest Corridor Project. The plans are to expand I-75 and I-575 northwest of Atlanta with tolled managed lanes. The project began as a design-build-finance-operate-maintain public-private partnership but was changed in 2011 to a design-build-finance arrangement. GDOT awarded the contract to NorthWest Express Roadbuilders in late 2013.⁴⁰

9.4.6.3 Innovative Financing Examples within the P3 Framework

Below are some examples of the types of innovative financing that have been used in recent infrastructure projects using the P3 framework. As these examples illustrate, innovative financing does not simply mean the bundling together of various grants and loans to fund a project, but also includes innovative ways to generate revenue to repay these types of obligations, as well as partnering with private entities who provide financing in return for a portion of the project's future revenue stream.

Denver Union Station⁴¹

Voter approved in 2004, the Denver Union Station is scheduled to be completed in 2014. The station will bring together several different transportation modes including inter-city rail, commuter rail and bus transportation. Upon completion, the station will have an estimated total cost of \$500 million, funded by nine financing sources and coordinated by five public-private partners.

Along with other Federal and State grants, the project is being funded by \$145 million in Transportation Infrastructure Finance and Innovation Act (TIFIA) loans and \$155 million in RRIF loans. The TIFIA loan is

³⁹ O.C.G.A §36-91-100.

⁴⁰ <http://www.dot.ga.gov/doingbusiness/p3/projects/NWC/Pages/default.aspx>

⁴¹ http://www.iscvt.org/where_we_work/usa/article/low_carbon_transportation/barrett_denver.pdf

to be repaid by revenue generated by the Regional Transportation District. Sources of District revenue are passenger fares, sales and use taxes within the District, and Federal grants. The RRIF loan is to be repaid from tax increment revenue pledged by the City of Denver for the next 30 years. Tax increment financing allows the local taxing authority to divert some or all of the new property taxes resulting from an investment project to assist in funding that project. In case the tax increment revenue fails to cover the loan payment, the city has obligated itself to appropriate up to \$8 million annually to make up any shortfall. In addition to the above funding sources, the project has received over \$35 million in private financing through the sale of some of its real estate assets.

Seagirt Marine Terminal⁴²

The primary container facility in the Port of Baltimore is owned by the Maryland Transportation Authority, which had significant investments in existing facilities, and is operated by the Maryland Port Authority, which relied on revenue from the terminal as one of its sources of income. In 2010, in order to fund the significant capital costs associated with upgrades at the terminal, a public-private partnership was formed between these two public entities and two private entities: Highstar Capital and Ports America. The private entities were given rights to the terminal's future revenue stream for 50 years in return for making the necessary capital improvements in addition to:

- \$140 million up-front payment to the Maryland Transportation Authority; and
- \$378 million of fixed annual payments and \$699 of variable payments to the Maryland Port Authority over the term of the agreement.

The construction portion of the project is currently two years ahead of schedule.

9.5 PHASING PLAN – INTERIM STEPS FOR IMPLEMENTATION

Looking forward to implementing passenger rail service can be a critical component of the planning phases. There are a number of strategies that can be applied to save time and effort during the land acquisition and construction phases. Two primary implementation strategies that have been discussed in previous studies across the nation are *phasing the corridor* and *phasing technology*.

Phasing the corridor would be to construct the corridor in various sections. This allows for the service to start in the first section and begin building revenues to help fund subsequent sections. Phasing in corridor segments would be based on the projected ridership between stations. Based on the ridership projections in the Columbus to Atlanta corridor, the H-JAIA to Newnan station-pairs show the strongest ridership levels.

A corridor may also be phased using incremental technology. Previous feasibility studies in Georgia recognized that a strategy to decrease initial capital costs would be to implement diesel technologies

⁴² <http://transportation.house.gov/sites/republicans.transportation.house.gov/files/documents/2013-07-09-Swaim-Staley.pdf>

(Regional) initially, and as ridership and revenues begin to build, the corridor could be retrofitted to accommodate fully electrified service (Express), spreading the capital cost investment over a longer period of time.

There are other strategies that can be implemented as the corridor goes through the various planning and design phases. These include:

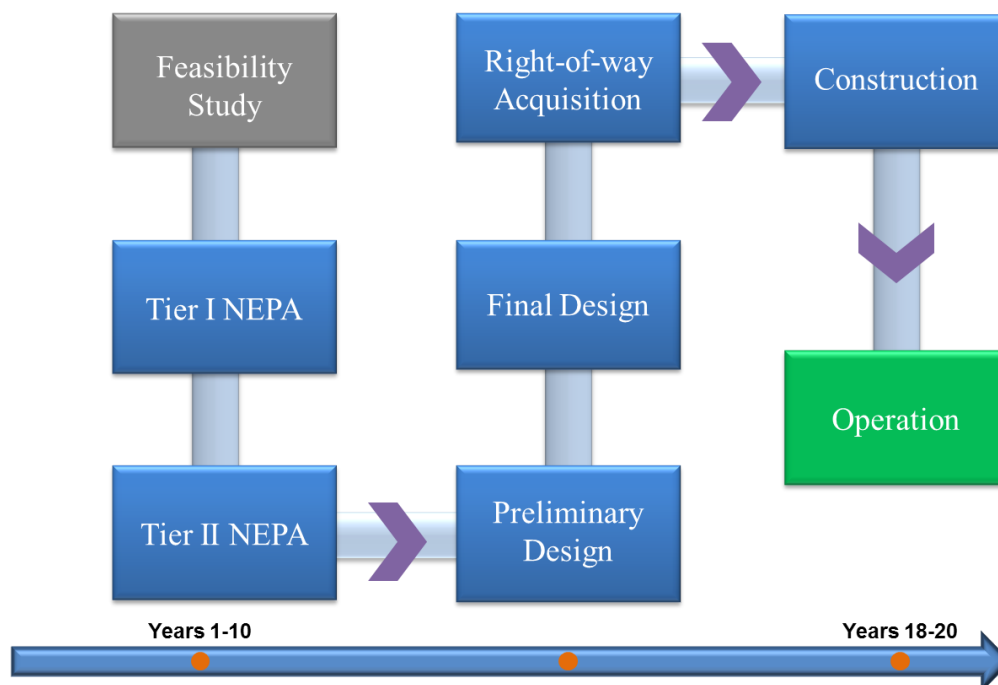
- Develop official maps preserving a route alternative. Prior to this activity, the corridor will need to go through NEPA to determine a preferred route alternative.
- Purchase any necessary right-of-way for the preferred route.
- Adjust future highway program projects to reflect structure and right-of-way needs if the preferred route (selected during NEPA) is along the interstates.

As the Columbus to Atlanta corridor continues to advance, there may be more phasing options that are identified that reflect the unique characteristics of the corridor and route alternatives.

9.6 IMPLEMENTATION PLAN

A feasibility study is the first step of a larger implementation plan for passenger rail. Figure 9-7 illustrates this implementation schedule as outlined by FRA guidance.

Figure 9-7: Federal Implementation Plan for Passenger Rail Service



The Columbus Consolidated Government (CCG) will continue to look ahead to future steps for implementation and take advantage of opportunities for phasing options outlined in Section 9.5; however, the CCG will primarily focus on funding and financing strategies and work with key stakeholders including GDOT and FRA to begin the immediate next steps in the process. The CCG is currently looking for strategies to fund a NEPA analysis and put together a schedule of activities to begin this process.

Appendix A: Technical Methodologies and Existing Conditions

Appendix B: Public Involvement

Appendix C: Ridership/Revenue Result Spreadsheets

Appendix D: Operating and Maintenance Cost Result Spreadsheets

Appendix E: Standard Costing Category Spreadsheets

Appendix F: Annual Pro Formas
