Commuter Rail Plan Update

A Report to the

Transit Planning Board, Georgia Department of Transportation, and Metro Atlanta Chamber of Commerce

Executive Summary

Purpose

The purpose of this three-month study is to update ridership and cost information developed in previous Atlanta region commuter rail studies. Data from this study is to be utilized, in general, by the Atlanta region to better understand the current implementation challenges of commuter rail, and in particular, in the Transit Planning Board's (TPB) development of a regional transit network and vision.

Previous studies (2003, 2001 and 1995) identified the following seven prospective commuter rail corridors. The principal freight railroad operating on each corridor is indicated.

Athens (CSX)
Macon (Norfolk Southern)
Gainesville (Norfolk Southern)
Madison (CSX)
Bremen (Norfolk Southern)
Senoia (CSX)
Canton (CSX and Georgia Northeastern)

Figure 1 on the following page, a 2002 map taken from the Georgia Department of Transportation website, shows (in yellow) the proposed commuter rail routes.

Key Features of This Study

In addition to updating ridership and cost information and providing data suitable for use in the TPB development of a regional transit network and vision, two important features of this study deserve special emphasis: (1) a review of peer cities having implemented commuter rail service, in order to obtain information relevant to Atlanta, such as "success factors" and implementation challenges, and (2) recognition of the significant issues related to access to the Atlanta region's privately-owned freight railroads.

Reserved for Figure 1 Proposed Commuter Rail Routes

Organization and Study Reviews

R.L. Banks & Associates, Inc., (RLBA), and Wilbur Smith Associates, the consultant team selected to perform this study, made three presentations to the Metro Atlanta Chamber of Commerce (MACOC) Steering Committee, on July 10, August 16 and October 9. In the first, RLBA described the scope of work. In the second, RLBA described results to date, and in the third, RLBA presented the study results. A Management Committee, composed of representatives of MACOC, TPB, Georgia Department of Transportation (GDOT), Atlanta Regional Commission (ARC), Georgia Regional Transportation Authority (GRTA) and Metropolitan Atlanta Rapid Transit Authority (MARTA), provided guidance to the consultant team, and assisted in gathering data for the three-month study, and in answering questions. The Management Committee had meetings with the consultant team on July 9, August 16 and September 17, in addition to a conference call on September 25.

Interpretation of Study Results

It is very important to understand the assumptions on which this study is based, the significance of the ridership and cost estimates resulting from this study, and that the results of this study differ from the results of previous studies.

Differences from previous studies

The ridership estimates in this study are different from previous studies because different prediction methodologies are used and because of demographic changes which have occurred in the Atlanta region over time. RLBA recommends the attachment of no great sense of precision to these (or any other) commuter rail ridership estimates. Ridership forecasts are estimates, and not precise predictions. What the demand estimates of this study (and those of previous studies) indicate is that commuter rail in the Atlanta region is feasible on most or all of the seven corridors investigated. The ridership estimates of this study (and previous Atlanta commuter rail studies) are comparable with “steady state” ridership results on peer city systems.

For other reasons, cost estimates may not be taken as precise or final. No one knows what it will cost to obtain commuter train access to freight railroad rights of way until an agreement is negotiated with the freight railroad. Atlanta is an important freight rail hub, and one which is capacity-constrained. RLBA has considered the robust growth trend in freight rail volumes, has estimated what track and signal and other infrastructure improvements will be required in a future negotiated agreement, and has calculated costs accordingly.

Last, it warrants calling out here that this study did not include any cost estimate for construction of a multi-modal passenger terminal (MMPT). This work has already been completed in previous studies, so the only line-item cost associated with the MMPT is the track necessary to connect commuter rail lines to it.

Corridor vs. system analysis

There is yet another dimension of this study which must be understood. Estimates – ridership and cost – are made on a corridor by corridor basis; this was understood at the study's kickoff meeting. The estimates do not necessarily represent a fully-built system of seven operating commuter rail corridors. It is possible – perhaps likely – that railroad right of way infrastructure costs will rise considerably in a fully-built seven-corridor commuter rail system, because the presence of many commuter trains on multiple corridors at the Atlanta hub during peak commuter travel periods will cause considerable interference with freight traffic. RLBA understands that a Capacity Analysis of the Atlanta Terminal, sponsored by Georgia Department of Transportation, is under way and will be completed next year.

Future ridership estimates in the absence of land development changes

The future ridership estimates presented in this study are based on the most recent 2030 Atlanta Regional Commission (ARC) forecast of population and employment within the ARC 20 counties area and on Woods and Poole forecasts outside of the ARC area. These forecasts do not take into account potential additional land development changes due to the commuter rail investment itself. This decision was made for several reasons:

- Projecting ridership based on existing socio-economic forecasts is the industry standard for all transit projects, following Federal Transit Administration (FTA) guidelines on forecasting ridership;
- This method provides a uniform baseline for comparing all transit projects equally. Each transit mode currently being evaluated by the TPB used the same 2030 socio-economic data; and
- This method removes subjectivity. It is the role and responsibility of the local Metropolitan Planning Organization (ARC in Atlanta) to forecast future land development patterns. Altering those projections would introduce additional subjective variables into an already complex analysis.

That said, national experience indicates that development patterns often change in response to such infrastructure investment in a way that boosts ridership. The results, therefore, may be considered to be conservative given appropriate commuter rail service levels.

Corridor ridership estimates vs. populations/density levels

Relative ridership estimates, in many cases, are reflective of the relative population levels within the individual commuter rail lines' "catchment" areas (the geographic area bounding the commuter rail lines likely to attract riders); there will be higher ridership in areas of higher population. There is not, however, a

one-to-one relationship between population levels and ridership levels, because commuter rail ridership forecasts are based on:

1. How many employees live within the commuter rail "catchment" area, defined as within 10 miles of a station outside of 35 miles from city center and within 5 miles of a station within 35 miles of the city center.
2. How many of those employees' employment destinations are served by the commuter rail line (i.e. a person's job is near an outlying station or in the Midtown-Downtown activity center).
3. The propensity for those employees to choose commuter rail as their travel mode.

Below is tabulated the total number of employees within each commuter rail line's catchment area as well as the total number of employees in that catchment area whose destinations are served by that corridor.

Corridor	Daily Work Trips From Catchment Areas	Daily Work Trips Served by the Corridor
Athens	926,550	135,756
Bremen	316,847	52,975
Canton	564,891	98,347
Gainesville	714,206	99,655
Macon	475,256	110,283
Madison	514,683	111,981
Senoia	241,917	62,304

One can see that an employee's destination is as much a driver of ridership as the number of people who live near a commuter rail line.

Existing Study Review/Peer Review

Perhaps the most important trends related to the Atlanta metropolitan region and affecting the current study are (1) growth in population and (2) growth in freight railroad traffic. Both trends have been robust.

Peer City Review

The first Management Committee meeting strongly endorsed the utility of peer city review to provide helpful "lessons" to Atlanta and as a basis for forming a service plan and general guidance which was to influence the remainder of the study.

Essential Conditions

Perhaps the most important result of the peer city review was recognition of the importance of the following general conditions essential to implementation of new commuter rail service:

- Demand
- Available railroad corridor(s)
- Funding

"Demand" means the inclination to use prospective commuter rail service. The infamous traffic of the Los Angeles region was certainly instrumental in creating a demand for Metrolink, that region's commuter rail service, implemented in 1992. Availability of railroad corridor(s) is self-explanatory, as is funding. Availability of funding results from the "political will" to institute the service. The latter was an important success factor in all of the peer review cities, which, in addition to Metrolink, included Trinity Railway Express (Dallas-Fort Worth), Tri-Rail (Miami-Fort Lauderdale) and Virginia Railway Express (Northern Virginia-Washington, DC). Availability of railroad corridors not only means their physical presence, but the willingness of the two parties – public transportation entity and privately-owned freight railroad – to negotiate an agreement allowing access of commuter trains to the privately-owned freight railroad right of way. And the willingness of the public entity to pay for that access.

Decision-Making Framework

RLBA developed a decision-making implementation framework, which is summarized as follows.

- Determine commuter rail lines which should be implemented.
- Plan organizational means for managing and operating commuter rail service.
- Obtain funding.
- Prepare strategy for negotiation of track access.
- Negotiate track access.
- Construct facilities and procure equipment.
- Implement commuter rail service.

Operating Profile

The consultant team developed the following operating profile to be used in the updating of ridership and costs:

- At least three inbound morning peak trains
- At least three outbound afternoon peak trains
- More trains, if the demand supports them
- Mid-day service
- Free and ample parking, and
- Feeder bus service as needed.

Market Analysis

Demographics

Wilbur Smith Associates evaluated socio-economic forecast assumptions, comparing data from earlier studies with more recent data. Comparisons of population and employment forecasts are presented. The consultant team decided to use ARC data for the 20 counties region comprising ARC, and Woods and Poole data for counties outside the ARC region.

Inventory of Rail Corridors

RLBA inventoried the seven rail corridors corresponding to the seven prospective commuter rail lines which are the subject of this study, utilizing a number of sources, but depending primarily on current timetable, track chart and traffic information obtained directly from the railroads. All three freight railroads – CSX, Georgia Northeastern, and Norfolk Southern – cooperated in this study. Valuation (val) maps were obtained from GDOT's consultant and also from the freight railroads, and these were utilized to determine width of right of way, in order to assist in determining corridor capacity, for example, ability to add track structure. A brief characterization of land use along the corridor was also made.

The inventory of rail corridors provides essential information regarding existing conditions, which information is the basis for Task 3 cost updates.

Feasibility Analysis

Station Locations

A review of station locations, as provided in the 2003, 2001 and 1995 studies, was made. In a handful of potential station locations, it appears that changes since the earlier studies may warrant slight (short distance) relocation, which may be effected during the implementation process.

Interface with Other Modes

Public transportation is used when it is convenient to the user, especially when the travel time is reliable, and when it is deemed convenient in comparison to use of the automobile. Connections between transportation systems/co-location of stations – for example, prospective commuter rail, MARTA and buses – should be planned wherever possible. Parking for commuters who use commuter rail services should be free and abundant, so that those who otherwise use their automobiles are more inclined to utilize public transportation.

Ridership/Travel Demand Forecast

Following is an alphabetical order listing of the daily ridership estimates (total daily boardings) by corridor, for two operating scenarios: three trains per day at each peak period (morning and afternoon), and for six trains at each peak period. Each operating scenario also will have mid-day service. The total daily boardings are shown as ranges, rounded to the nearest hundred, and based on a year 2030 forecast.

Line	Daily Work Trips From Catchment Areas	Daily Work Trips Served by the Corridor	Total Daily Boardings Three Trains per Peak Period	Total Daily Boardings Six Trains per Peak Period
Athens	926,550	135,756	3,000-3,700	6,100-7,500
Bremen	316,847	52,975	1,600-2,200	3,400-4,600
Canton	564,891	98,347	2,300-3,400	4,700-6,700
Gainesville	714,206	99,655	1,200-2,500	2,800-5,300
Macon	475,256	110,283	1,700-2,200	3,700-4,500
Madison	514,683	111,981	3,200-4,700	6,400-9,000
Senoia	241,917	62,304	1,200-1,700	2,600-3,600

The ridership estimates are shown as ranges because demand forecasting is not an exact science. It is a most useful and necessary tool in the investigation of commuter rail feasibility. However, ridership forecasts made before the beginning of service are but estimates, and actual post-start-of-service ridership figures are most often different.

The relationship between daily work trips served by a corridor and expected daily commuter rail ridership is not necessarily linear. From corridor to corridor, ridership will vary not only with relative population levels and catchment areas, but also with whether employees' employment destinations are served by the commuter rail line, and the distances involved. The highest capture rates for commuter rail are for longer total trip distances, and downtown destinations. Table 7 on page 61 illustrates this relationship between expected ridership, trip distance and downtown destination.

In August, Metro Atlanta Chamber of Commerce asked that the consultant team include ridership and cost estimations for commuter rail service on segments of the Athens and Macon corridors, respectively, between Tucker and Atlanta on the Athens corridor, and between Lovejoy and Atlanta on the Macon corridor, for 2015. Following are the estimates for those "sub-corridors".

Line	Ridership - Three Trains per Peak Period	Ridership - Six Trains per Peak Period
Lovejoy	900	2,300
Tucker	300	900

The RLBA Team does not attempt to explain the differences between another consultant's work and RLBA Team forecasts, except to say that different methodologies were used. Compared with actual starting ridership figures in peer city commuter rail implementations, all estimated riderships are roughly comparable, with the exception of Tucker-Atlanta. Thus peer city comparisons indicate that Atlanta commuter rail is feasible on all seven corridors. It is believed that the Tucker-Atlanta estimate is low because of the relatively short distance of that prospective commuter rail service.

Capital and Operating and Maintenance Cost Estimates

An important aspect of this study is that cost estimates are not merely updated. Rather, the starting basis for these new estimates is existing infrastructure conditions (for example, track characteristics, number of tracks, width of right of way, and existing signal system), and existing and future freight rail traffic. The latter basis – existing and future freight traffic -- has become increasingly important as a factor in any ultimate agreement, by a freight railroad, to allow commuter rail access on its right of way. This is a key point in this study, and the growing trend of increasing freight rail traffic in the United States in general, and in the Atlanta region in particular, accounts for the more-than-annual-inflation increases (compared with earlier studies) in the capital costs estimated in this study. As but one recent example, in the neighboring state of Florida, and relating to one of the two principal freight railroads serving the Atlanta region, the Governor of Florida announced in 2006 a one-half billion dollar agreement with CSX in order to guarantee commuter rail access on certain CSX rail lines in the Orlando region. The point is that commuter rail access agreements, especially where freight rail traffic is significant, require considerable investment.

It is important to recognize that the Atlanta rail hub is already congested and at capacity in places, and that another study, the Atlanta Terminal Study, is to be completed in 2008 in order to determine capacity needs associated with introduction of commuter rail service. Solution to the downtown Atlanta and/or near-Atlanta rail network capacity issues is a very important step in the process, following this study, of implementing any commuter rail service (with the exception of Lovejoy-Atlanta service, since it is understood that the State and Norfolk Southern have already come to terms). Thus the cost estimates of this study must be presented in that context; resolution of Atlanta rail hub capacity issues may require significant new infrastructure which it is beyond the scope of this study to define.

Following are tabulated the estimated costs[1]:

	Capital Costs		Annual Operating and Maintenance Costs	
	Three Trains per Peak Period (millions)	**Six Trains per Peak Period (millions)**	**Three Trains per Peak Period (millions)**	**Six Trains per Peak Period (millions)**
Athens	$471	$526	$15.0	$21.9
Bremen	$157	$186	$11.7	$17.4
Canton	$144	$189	$10.6	$16.0
Gainesville	$144	$166	$11.7	$17.2
Macon	$366	$395	$17.2	$26.1
Madison	$150	$198	$13.9	$20.1
Senoia	$106	$128	$9.2	$13.8
Lovejoy	$78	$107	$8.6	$12.3
Tucker	$176	$192	$7.2	$9.8

Capital costs include estimated infrastructure improvements required by the freight railroads for commuter rail access, other infrastructure costs such as stations, maintenance facilities and overnight train storage yards, and passenger equipment (rolling stock – locomotives and passenger coaches).

For comparison purposes, following are the cost estimates from previous studies.

Line	Study Date	Capital Costs (millions)	Operating and Maintenance Costs (millions)
Athens	2003	$378 (2002)	$16.8 (2002)
Bremen	1995	$48.4 (1994)	$5.9 (1994)
Canton	1995	$90.1 (1994)	$4.7 (1994)
Gainesville	1995	$72.7 (1994)	$8.3 (1994)
Macon	2001	$326 (2000)	$16.2 (2000)
Madison	1995	$72.4 (1994)	$7.4 (1994)
Senoia	1995	$52.1 (1994)	$4.9 (1994)

Notes: Years in parentheses indicate the year-dollars of the estimates. Lovejoy and Tucker were not separate service options in the 1995, 2001 and 2003 studies.

Differences between current cost estimates and those made earlier may be generally explained in two ways. First, current track charts show infrastructure changes. Over the past four to 13 years, there have been trackage changes. Second, and perhaps more important, previous studies were performed in a different freight rail environment. Freight rail traffic has grown mightily over the past 13 years, and today the major freight railroads face important chokepoint and capacity issues. A key issue in this study was

[1] Estimated Macon-Atlanta commuter rail line operating and maintenance costs are relatively high because, at 102 route-miles, this is by far the longest of the seven prospective commuter rail corridors. The next longest corridor is Athens-Atlanta, at 74 route-miles, and the shortest corridor is Senoia-Atlanta at 38 route-miles. The principal components of operating and maintenance costs include locomotive fuel, equipment maintenance, railroad access fees and maintenance of way, insurance, and contractor management and fees. The estimated cost of all of these components increases with increasing length of rail corridor. Also station maintenance and operations costs are higher on the Macon-Atlanta line because there are more proposed stations on it.

the development of reasonable assumptions regarding what infrastructure improvements may be agreed to by Atlanta's freight railroads in order to allow commuter train access on their rights of way.

Another difference between current study cost estimates and those of previous studies has to do with number of peak period commuter trains assumed. In the 2003 Athens study, the operating plan includes two morning peak trains originating from Athens, and seven morning peak trains originating from Cedars Road. In the 2001 Macon study, there are two morning peak trains originating from Macon, and four morning peak trains originating from Griffin. The 1995 Study assumes three morning peak trains on all corridors.

The October 2004 Canton Study provided "Early Start" capital costs of $37.6 million, including track work, rolling stock, buses, grade crossing upgrades and stations. This was for a 45 to 50 minutes running time for the prospective commuter rail service. For a 33 to 38 minute running time, curve elimination and other improvements raised the total to $96.7 million in that study.

Feasibility Assessment

Following are commonly-cited benefits of commuter rail:

Reduced congestion costs
Improved quality of life (by providing alternative means of transportation)
Reduced road/highway maintenance costs
Improved air quality
Improved commute time for commuter rail passengers
Avoided cost of automobile operations
Economic development
More efficient use of nonrenewable resources (conserves fuel use)
Enhancement of safety (train travel is safer than highway travel)
Stimulation of more efficient and economic land use by concentrating development along corridors

The most important issue/limitation with regard to prospective Atlanta commuter rail is the fact of heavily-trafficked freight rail corridors intersecting in Atlanta. With the exception of the Macon and Madison lines, which carry relatively smaller volumes of freight traffic[2], all other commuter rail corridors face the requirement for significant infrastructure investments in order to gain access to freight railroad tracks.

[2] Despite its carrying relatively smaller volumes of freight traffic, the Macon-Atlanta line would require a relatively high capital investment ($395 million in the case of six peak trains) because of: its length and the distance of necessary track rehabilitation (at 102 route miles, longer by far than any other commuter rail corridor), the requirement to restore the Edgewood wye, many grade crossings which would have to be improved, installation of CTC (centralized traffic control), new track between Hapeville and Forest Park, and land and parking requirements at the many stations (more stations than any other line). These cost estimates appear in Table 16, at Appendix C.

So that feasibility may be discussed, the alphabetical order listing of ridership estimates by corridor is repeated here:

Line	Daily Work Trips From Catchment Areas	Daily Work Trips Served by the Corridor	Total Daily Boardings Three Trains per Peak Period	Total Daily Boardings Six Trains per Peak Period
Athens	926,550	135,756	3,000-3,700	6,100-7,500
Bremen	316,847	52,975	1,600-2,200	3,400-4,600
Canton	564,891	98,347	2,300-3,400	4,700-6,700
Gainesville	714,206	99,655	1,200-2,500	2,800-5,300
Macon	475,256	110,283	1,700-2,200	3,700-4,500
Madison	514,683	111,981	3,200-4,700	6,400-9,000
Senoia	241,917	62,304	1,200-1,700	2,600-3,600

Based upon a comparison with actual daily boardings on new start commuter rail service in peer cities, RLBA believes that Atlanta commuter rail is feasible on all seven corridors.

Peer cities began commuter rail service with actual first year ridership within these ranges, with regard to the three peak trains column. Assuming workable agreements negotiated with the freight railroads, and adequate funding, RLBA expects that commuter rail ridership would start relatively low and then grow with time. This has been the pattern of commuter rail new starts over the past two decades.

Regarding the Lovejoy-Atlanta (part of the Macon corridor) and Tucker-Atlanta (part of the Athens corridor) sub-corridors, the estimated ridership figures shown earlier also are repeated here:

Line	Ridership - Three Trains per Peak Period	Ridership - Six Trains per Peak Period
Lovejoy	900	2,300
Tucker	300	900

The Tucker ridership estimate is believed to be low because of the relatively short distance between Tucker and Atlanta MMPT, which short distance does not correspond to “typical” commuter rail. It is, therefore, a policy decision about whether to build this line – or the Atlanta-Lovejoy line, for that matter – as the first phase of construction for eventually completing the entire line.

Judgments regarding feasibility, and comparisons of prospective commuter rail corridors, may be made in a number of ways, in addition to estimates of ridership. Perhaps the best way would be a detailed examination of benefits and comparison with costs, which is beyond the scope of this study.

Following is a comparison of the prospective corridors showing indices of capital cost per rider and operating cost per rider, using the six-trains-per-peak-period operating

scenario. Capital costs will be the most significant investment costs associated with implementation of new service in the Atlanta region.

	Daily Riders (Boardings)	Capital cost per rider ($2007)	Operating cost per rider ($2007)
Athens	6,100-7,500	10.2	0.43
Bremen	3,400-4,600	6.2	0.58
Canton	4,700-6,700	4.4	0.37
Gainesville	2,800-5,300	5.4	0.56
Macon	3,700-4,500	12.8	0.84
Madison	6,400-9,000	3.4	0.35
Senoia	2,600-3,600	5.5	0.59
Lovejoy	2,300	6.2	0.71
Tucker	900	28.3	1.45

The figures in the "Capital cost per rider" column are the result of dividing capital cost in millions of dollars by 30 years of boardings.[3] The figures in the "Operating cost per rider column result from dividing annual operating cost in millions of dollars by 30 years of boardings. The numbers shown in the two columns on the right hand side are merely indices, providing relative costs per rider.

Institutional and Jurisdictional Issues

The freight railroads CSX and Norfolk Southern say that they may permit commuter rail access on their rail lines, assuming a railroad corridor sharing agreement can be negotiated which:

- Fully compensates the freight railroad for use of its property,
- Provides sufficient capacity (track and other infrastructure improvements) so that passenger operations will not interfere with freight operations, when passenger operations begin, and at some time in the future, and
- Adds no safety issues, or risk or liability to the freight railroad.

The second bullet assumes that right of way width is sufficient for the addition of necessary infrastructure where capacity increase is required.

With regard to the "fully compensates" bullet above, this is of course a matter of negotiation.

Conclusions

The RLBA Team concludes that <u>implementation of commuter rail in the Atlanta region is feasible</u>.

[3] This very simplified calculation is made merely to arrive at simple indices which may be compared.

Following the pattern of other "peer city" new commuter rail implementations, ridership is expected to begin modestly in the first year and then will grow, more or less, depending upon highway congestion and quality of the commuter rail service, which from the prospective passenger's perspective includes:

- Reliability (train schedules are maintained)
- Sufficient number of rail passenger cars (patrons do not have to stand)
- Sufficient number of trains (providing options for the patrons),
- Convenient transit connections, and, importantly,
- Availability of parking (preferably free) at outlying commuter rail stations.

With the exception of the Lovejoy line, where freight traffic is relatively modest and where the State of Georgia and Norfolk Southern apparently already have an agreement, commuter rail will require a significant investment, as do all new fixed guideway transportation investments. Freight railroads look upon the addition of commuter trains to their lines as a business decision in which:

- Safety and liability issues must be resolved,
- Commuter rail should not interfere with movement of freight, now and in the future, and
- Commuter rail should pay its way (in terms of access to the freight railroad corridor).

The "Commuter rail should pay its way" bullet is lifted from one of the railroad's policy statements, meaning that the freight railroads expect to be financially compensated for allowing commuter trains to use their tracks and/or right-of-way. Again, this is a subject to be negotiated. ("Pay its way" does not mean that commuter rail should cover its expenses with its fare revenues. Indeed, there are virtually no unsubsidized passenger rail systems in the world.)

It is important to recognize, and therefore it is re-stated here: Neither the cost nor the ridership numbers should be focused on as anything but indicators. No one knows costs until agreements are negotiated with the freight railroads; RLBA has made assumptions considered reasonable and prudent. Ridership estimates are merely estimates, providing an indication of how many people will be attracted to the commuter rail service.

Task 1: Existing Study Review/Peer Review

Requirement

Explore the market for the seven Georgia DOT-identified commuter rail lines, out a distance of 80 miles from downtown Atlanta. Identify current and past trends, and review relevant plans.

Identify and evaluate peer cities that have implemented commuter rail operations. Based on this, identify conditions needed for successful commuter rail service. Discuss and highlight progress of and challenges faced by at least four of the following systems: Dallas, TX (TRE); Los Angeles, CA (Metrolink); Nashville, TN (Music City Star); Santa Fe, NM (Rail Runner Express); Southern Florida (Tri-Rail); and Northern Virginia/Washington DC (VRE). Peer city discussion will highlight, contrast and compare:

- *Implementation environment: missteps, challenges overcome, and opportunities harnessed,*
- *Ridership growth trends,*
- *Economic development, real estate value and development changes, and*
- *Circumstances that led to successful implementation.*

From the implementation of other commuter rail projects, develop a decision-making framework. In addition to success factors from other systems, include evaluation and factors currently under consideration by the Transit Planning Board (TPB) in development of a regional transit network.

Identify preferred operating profiles for use in Task 2 and Task 3, operating profiles that may change with time as ridership changes.

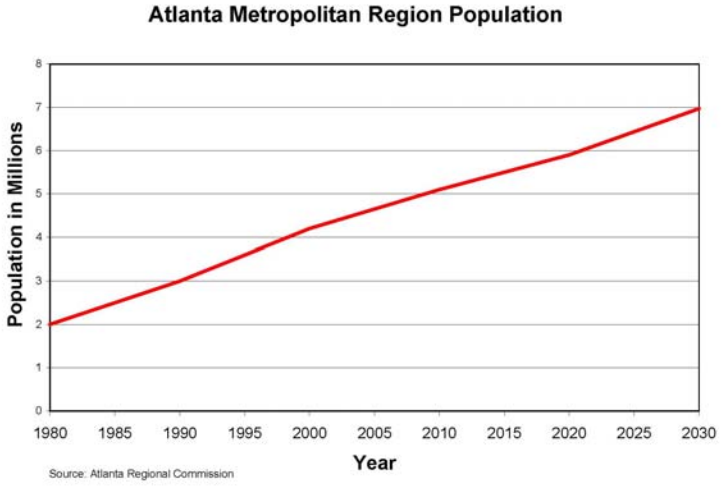
Discussion

Explore Market and Review Previous Studies

This study begins with a brief exploration of the market and a review of previous work done with regard to the seven prospective Atlanta commuter rail corridors connecting Atlanta to the following cities (over the freight railroad lines indicated):

Athens (CSX)
Macon (Norfolk Southern)
Gainesville (Norfolk Southern)
Madison (CSX)
Bremen (Norfolk Southern)
Senoia (CSX)
Canton (CSX and Georgia Northeastern)

Atlanta Regional Commission figures indicate continuing population growth of the Atlanta metropolitan area.



U.S. Census Bureau figures indicate that the Atlanta metropolitan statistical area is the ninth largest in the United States.[4] The top six metropolitan areas have commuter rail; the seventh, Houston, is studying it; the eighth, Washington DC, has it; number ten, Detroit does not; and the next three – Boston, San Francisco-Oakland, and Riverside-San Bernardino (California) have it. Seattle-Tacoma, San Diego, and Baltimore, respectively number 15, 17 and 19, have commuter rail. Although this does not mean that Atlanta should also initiate commuter rail service, it is an indication that the "market is there" in Atlanta.

Relevant plans reviewed include the following:

1995 study: Georgia Department of Transportation: Commuter Rail Plan: Final Report, September 1995, and associated reports, LS Transit Systems.

2001 study: Environmental Assessment: Commuter Rail and Express Bus Service: Macon to Atlanta, November 2001, Georgia Rail Consultants (GRC)

2003 study: Athens-Atlanta Corridor Commuter Rail Service:
Patronage Projection Methodology and Results Report, July 2003, GRC
Environmental Assessment, December 2003, GRC

[4] Year 2005 metropolitan statistical area data, www.census.gov/compendia/smadb/TableE-13.xls

Following are summaries of the three studies.

1995 Study. The Georgia Department of Transportation Commuter Rail Plan: Final Report, September 1995, determined that of the twelve railroad corridors in Northern Georgia, six could feasibly host commuter rail. The six feasible corridors were those with end points at Athens, Senoia, Bremen, Madison, Gainesville and Canton. It was envisioned that when fully implemented by 2010 there would be commuter rail service to 40 stations in 18 counties with an estimated population of 4.2 million.[5] Capital improvements of the various lines were to include double tracking of selected portions of the rights-of-way, construction of passing sidings, and bridge and signal improvements. Each corridor would have three morning and three evening peak period trains. Service to Athens and Gainesville were to have five and four peak period trains respectively.

2001 Study. The commuter rail alternative identified in the 2001 Environmental Assessment for the Commuter Rail and Express Bus Service, Macon to Atlanta, addressed service on Norfolk Southern's "S" line, described as "a low freight traffic density rail line between Atlanta and Macon through Griffin."[6] The existing line would be upgraded with passing sidings, storage tracks, layover facilities and additional main track in order to facilitate commuter rail service.

Commuter rail service would consist of six morning trains and six evening trains with morning peak service featuring two six-car trains originating in Macon and four five-car trains originating in Griffin, with all trains terminating in downtown Atlanta. Shuttle transfers to the Atlanta airport would be available at East Point.

2003 Study. The commuter rail alternative identified in the 2003 Athens-Atlanta Corridor Commuter Rail Service Environmental Assessment would offer service primarily on CSX's Abbeville Subdivision between Athens and Armour (railroad location in north Atlanta, where the Decatur Belt Line connects with the Norfolk Southern line to Gainesville) and a small portion of NS right-of-way into downtown Atlanta. Improvements would include passing sidings between Athens and Cedars Road/SR 316 and a second main track between Cedars Road/SR 316 and Atlanta.

Commuter rail service would feature nine morning trains and nine evening trains (all eight car trains) with two of the morning trains originating in Athens and seven originating at Cedars Road/SR316.

Briefly summarized, the earlier studies proposed the following commuter rail services:

[5] Georgia Department of Transportation, Commuter Rail Plan Final Report, September 1995, pages vi-viii.

[6] Macon-Atlanta Corridor Draft Environmental Assessment, August 30, 2001, Georgia Rail Consultants, page 2-41.

Corridor	Study Date	Daily Trips	Operating Plan, Morning Peak
Athens	2003	9,380 (year 2025)	2 trains from Athens, 7 trains from Cedars Road/SR 316
Macon	2001	7,260 (year 2025)	2 trains from Macon, 4 from Griffin
Gainesville	1995	7,041 (year 2010)	3 trains inbound
Madison	1995	4,527 (year 2010)	3 trains inbound
Bremen	1995	3,857 (year 2010)	3 trains inbound
Senoia	1995	4.209 (year 2010)	3 trains inbound
Canton	1995	4,129 (year 2010)	3 trains inbound

Note that, because of differing study dates (1995, 2001, and 2003), the ridership data may not be comparable.

Most Important Trends Since Earlier Studies

Perhaps the most important trends related to the Atlanta metropolitan region and affecting the current study are (1) growth in population and (2) growth in freight railroad traffic. Both trends have been robust.

Peer City Review

This section identifies peer cities which have implemented commuter rail operations and identifies the conditions needed for successful commuter rail service. It also discusses the challenges faced by four of these peer cities with regard to:

- Implementation environment
- Ridership growth trends
- Economic development, real estate value and development changes, and
- Circumstances that led to successful implementation.

Definition

Commuter rail may be defined generally as passenger railroad operations which convey commuters to and from work over freight railroad corridors, using conventional passenger railcars.

Large Metropolitan Regions in the U.S.

The following table shows the top major metropolitan areas in the United States[7] and indicates which have commuter rail systems.

[7] Year 2005 metropolitan statistical area data, www.census.gov/compendia/smadb/TableE-13.xls

	Metropolitan Statistical Area	Commuter Rail	Annual Unlinked Trips (million)
1	New York	Yes	237.9
2	Los Angeles	1992 Metrolink	7.9
3	Chicago	Yes	73.1
4	Philadelphia	Yes	31.0
5	Dallas-Fort Worth	1996 TRE	2.1
6	Miami-Fort Lauderdale	1990 Tri-Rail	2.5
7	Houston	No	
8	Washington	1992 VRE	2.7
9	Atlanta	No	
10	Detroit	No	
11	Boston	Yes	39.2
12	San Francisco-Oakland	Yes	8.1
13	Riverside-San Bernardino	Yes (Metrolink)	
14	Phoenix	No	
15	Seattle-Tacoma	2000 Sounder	0.8
16	Minneapolis-St Paul	Being implemented	
17	San Diego	1995 Coaster	1.2
18	St Louis	No	
19	Baltimore	Yes (MARC)	5.9
20	Tampa-St Petersburg	No	

Sources: U.S. Census Bureau, American Public Transportation Association 2004 Public Transportation Fact Book, RLBA research.

Not in the top 20 metropolitan areas, the following also have commuter rail.

Metropolitan Area	Commuter Rail	Annual Unlinked Trips (million)
Stockton-San Jose	1998 ACE	0.8
Nashville	2006 Music City Star	Not available
Albuquerque	2006 Rail Runner	Not available

Sources: American Public Transportation Association 2004 Public Transportation Fact Book, RLBA research.

It is pertinent to focus on the commuter rail new starts which have occurred in the last 20 years, in that they provide relevant lessons regarding implementation of new commuter rail systems:

Metropolitan Area	Commuter Rail	Annual Unlinked Trips (million)
Miami-Ft Lauderdale	1990 Tri-Rail	2.5
Los Angeles	1992 Metrolink	7.9
Washington	1992 VRE	2.7
San Diego	1995 Coaster	1.2
Stockton-San Jose	1998 ACE	0.8
Dallas-Fort Worth	1996 TRE	2.1
Seattle-Tacoma	2000 Sounder	0.8
Nashville	2006 Music City Star	Not available
Albuquerque	2006 Rail Runner	Not available

Sources: American Public Transportation Association 2004 Public Transportation Fact Book, RLBA research.

The four peer cities chosen for the peer city review are Metrolink (Los Angeles), Trinity Railway Express (Dallas-Fort Worth), Tri-Rail (Miami-Fort Lauderdale) and Virginia Railway Express (northern Virginia).

Implementation Environment

Metrolink

Metrolink began operating in October 1992 with 24 trains over three routes. The Ventura County Line (Los Angeles-Moorpark) had three daily round trips, arriving in Los Angeles at 6:30, 7:30 and 8:25 in the morning, and departing Los Angeles at 4:10, 5:30 and 6:20 in the afternoon. The Santa Clarita Line (Los Angeles-Santa Clarita) had morning arrivals at Los Angeles at 6:25, 7:15, 7:55 and 8:35, and afternoon departures from Los Angeles at 4:20, 5:00, 5:40 and 6:30. The San Bernardino Line (Los Angeles-Pomona) trains arrived at Los Angeles in the morning at 6:20, 7:00, 7:40, 8:20 and 8:50, and departed Los Angeles in the afternoon at 3:45, 4:35, 5:15, 5:45 and 6:25. There were 1500 boardings on opening day; this rose to 34,000 in 2001.[8] Start-up costs exclusive of purchase of rail lines were $291 million for the initial three routes.[9] Farebox recovery ratio (also farebox ratio) for first full year of operation was 25.9 percent; current farebox ratio is 44.8 percent.[10]

Metrolink acquired some of its right of way from freight railroads, and some Metrolink service is over railroad right of way still owned by freight railroads. Both Metrolink and the freight railroads operate in a shared use mode over the other's right of way. This is a very important advantage which Metrolink has, because the two parties – passenger and freight rail owners – are obliged to treat each other fairly with regard to access fees, maintenance fees, etc.

[8] G. Mac Sebree, "The marvel that is L.A.'s Metrolink", *TRAINS*, September 2001, page 24.
[9] "Full Speed Ahead" Metrolink brochure, 1996-97.
[10] Farebox recovery ratio (also farebox ratio) is the proportion of operating expenses covered by passenger fares.

Metrolink is the fastest-growing commuter rail operation in the nation.

The principal factors in Metrolink's success are need, political will and reliable service. The need arises from Los Angeles' dubious distinction has having the worst highway traffic congestion in the nation (associated with a large regional population), significant air quality issues, and a demand for improved mobility. Political will allowed and encouraged the five counties to work together in implementing Metrolink, and in forming a joint powers authority to manage the commuter rail system. Political will also results in local sales taxes in four of the five Metrolink counties, thus providing dedicated funding. Reliable service results from the initial arrangements made regarding ownership of the various rail lines comprising the Metrolink system. BNSF and Union Pacific Railroad own some segments of the lines, the public jurisdictions own others. Because of this, each party (privately-owned railroad, public jurisdiction) tends to treat the other with mutual respect in matters of dispatching as well as in matters of negotiated trackage use charges.

In summary, Metrolink's phenomenal success may be attributed to that region's very bad traffic congestion, cooperation among the jurisdictions in which the commuter rail service operates, a right of way ownership situation which obliges the two parties – privately-owned freight railroads and public transit – to cooperate and be fair with one another, and dedicated public funding.

With regard to both Los Angeles (above) and Dallas-Fort Worth (below), it has been said that people in both locations are very automobile-oriented and that they would never give up their cars and ride transit.

Trinity Railway Express

Trinity Railway Express (TRE) operations began on December 30, 1996 on an initial 10-mile segment between Dallas and Irving. Total cost of the ten-mile first phase was about $70 million. What helped make TRE possible was the 1983 purchase of the former Chicago, Rock Island and Pacific Railroad Company (Rock Island) right of way linking Dallas and Fort Worth by those two cities, which formed a joint administrative agency, Railtran, which upgraded the route and acquired rolling stock. Represented within Railtran were Dallas Area Rapid Transit (DART) and the Fort Worth Transit Authority (the T).[11] Ten months after operations began on the initial ten-mile segment, weekday average ridership was 1,250.[12] Self-propelled Budd Rail Diesel Cars were rehabilitated for use in the startup operation. The initial service included 20- to 25-minute headways during rush hours. As of year 2002, TRE extends all the way to Fort Worth. This resulted in a ridership improvement; currently there are 9.5 thousand trips per day on TRE.

[11] Frank Malone, "Dallas on track to join commuter rail roster", *Progressive Railroading*, December 1996, page 48.
[12] "Fast-paced growth continues", *Railway Age*, November 1997.

Ownership of the right of way has been a boon to Trinity; BNSF and Union Pacific Railroad pay Trinity to operate over the publicly-owned tracks.

Limiting the potential for greater ridership have been several factors: parking constraints at stations, the walking distance to existing parking, ticket vending machines which are not user-friendly, the 50-year-old self-propelled diesel railcars (no rest rooms, difficult to board compared with the bilevels, no accommodation for bicycles). Non-payment of fares has also been an issue.

It is also indicated that despite the cooperation between the two cities which made TRE possible, there are jurisdictional issues arising from the two-city ownership and management of the commuter rail service, the two cities having divergent interests and there being somewhat of a historic rivalry. It is believed that there has been improvement in this area, and that there is a much more cooperative attitude between DART and the T.

Tri-Rail

Tri-Rail service was initiated in 1989, with 18 weekday trains (nine in each direction), and an average weekday ridership of 3,000.[13]

The State of Florida purchased the right of way. Unfortunately, purchase of the right of way did not mean permission to operate commuter trains freely. Indeed, most control of train operations was left in the hands of the freight railroad, and this resulted in important constraints on Tri-Rail operations. CSX sold the railroad corridor but retained the freight easement as well as dispatching and maintenance of way.

Commuter rail service was not reliable or convenient to prospective users for several reasons including: CSX control of dispatching, antiquated track, an unreliable signal system, stations not ideally located, inadequate parking at the stations, inadequate feeder bus service (at the beginning), and no mid-day service. Absence of dedicated funding also was cited as an issue. It is understood that Tri-Rail is working itself out of these problems.

Currently Tri-Rail operates on 20 to 30 minute headways during peak periods, plus mid-day service, a total of 25 weekday round trips. There is also weekend service.

Although Tri-Rail ridership has been rising over the years, it does so despite continuing reliability and other problems. A recent newspaper article[14] reports an average 11 late or cancelled trains per month owing to mechanical defects with regard to the “aging fleet” of locomotives and coaches, over the first six months of 2007. The number of

[13] “Tri-Rail Reports Daily Ridership Exceeding 5000 in February”, *Passenger Transport*, April 16, 1990, page 8.

[14] Michael Turnbell, “Tri-Rail’s troubles increase under new contractors: More trains late or canceled; riders complain about odors, bugs”, *South Florida Sun-Sentinel*, September 10, 2007.

trains late and canceled was reported as 32 in July, and 82 in August. Tri-Rail's on-time performance so far this year is 61 percent.[15]

Current farebox recovery ratio is 25 percent.[16]

Virginia Railway Express

Virginia Railway Express (VRE) initiated service in June 1992 with four round trips a day on each of two lines, connecting Washington, DC, with Fredericksburg and Manassas. Startup costs were $131 million.[17] At start of service, total weekday ridership on both lines was approximately 2,500 trips per day.

Farebox ratio has varied over the years. Recent farebox recovery ratio is 49 percent.

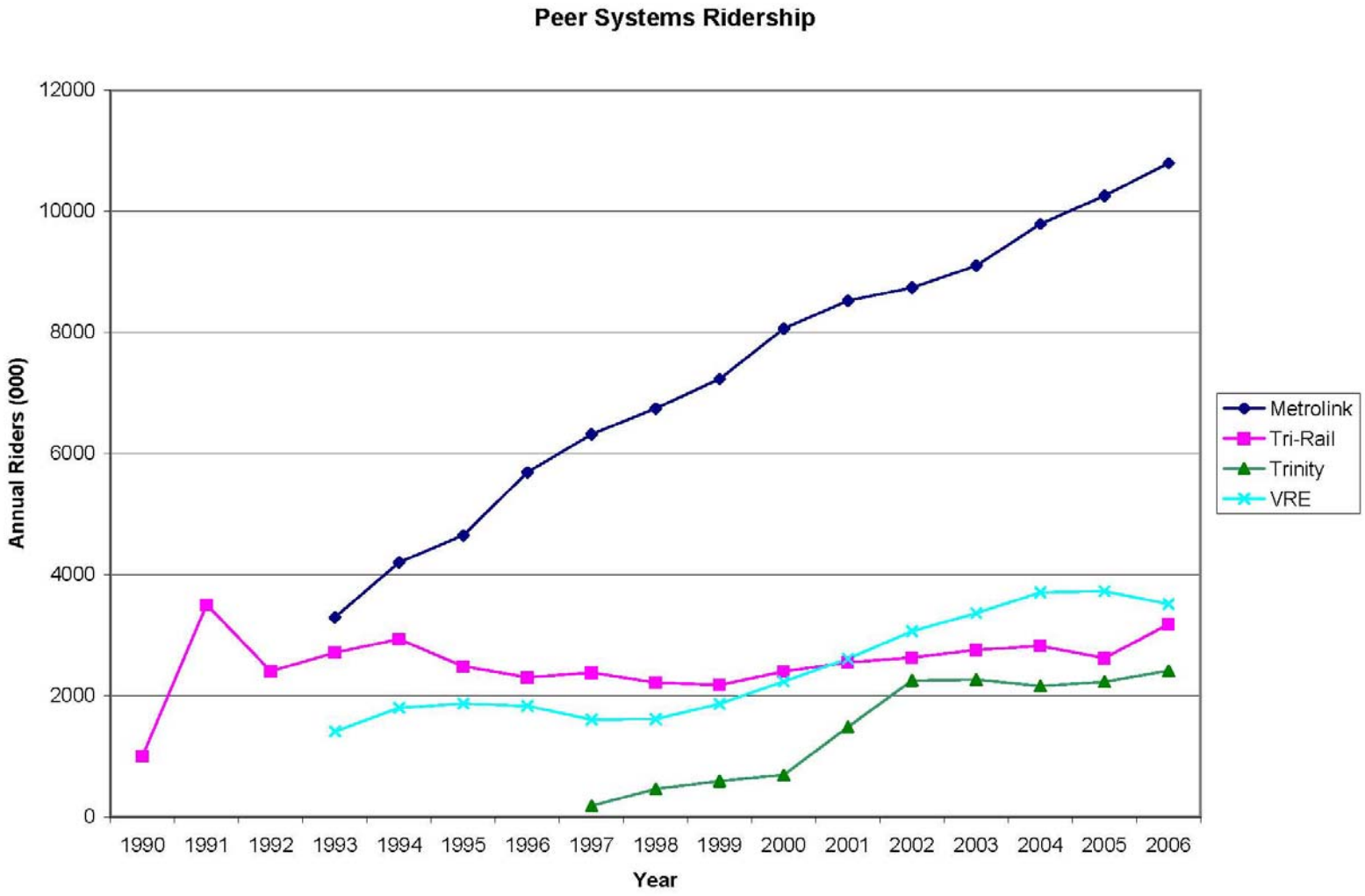
Today, VRE would have more customers if it had more railcars and more parking. Reliability problems which plagued VRE service half a dozen years ago are no longer a big issue.

Ridership Growth Trends

The following graph depicts ridership trends on these four commuter railroads, from first full year of service to the present.

[15] *Ibid*.
[16] http://ntl.bts.gov/lib/7000/7600/7625/chapters/FtLaudTriR1.html

[17] "Longtime Symbols of Decay and Delay, Commuter Railroads Undergo a Revival", *Wall Street Journal*, October 1, 1991, page B1.



Sources: APTA, Trinity Railway Express, VRE and Metrolink

Economic Development, Real Estate Value and Development Changes

Economic development at rail stations can take different forms. One is commercial development, e.g. restaurants, movie theatres, and office buildings. The other is higher density residential development. And there can be a mix of both near a station. These concepts all fall within a general definition of Transit Oriented Development (TOD), referring to the creation of compact, walkable communities centered around high quality train systems. TOD is also known as joint development.

Appearing below are descriptions of economic development activity occurring at four existing commuter rail systems.

Metrolink

For the most part, Metrolink stations are owned by the cities in which they are located. The cities then are responsible for the development of the stations. The exception is within Riverside County, where the Riverside County Transportation Commission (RCTC) owns the stations. RCTC owns five stations: Riverside Downtown, Riverside-La Sierra, Pedley, West Corona and North Main Corona. Recent transit related economic development activity at three RCTC stations is cited below.

Riverside Downtown Station

A major success story in terms of economic development at a station is the Riverside Downtown station. This station serves Metrolink riders using the Riverside Line, the 91 Line, and the Inland Empire Orange County (IEOC) Line.

As a result of the station and growing Metrolink service, several restaurants, a trade college, and office buildings (converted from old railroad buildings) were established. Vine Street, which parallels the track, has been renovated in the vicinity of the station. According to RCTC, up until now the primary focus has been development west of the tracks, which will soon include a transit center and potentially a TOD joint development on the station property. In addition, the east side of the tracks is now getting attention with a 450-unit apartment building being planned.

RCTC stated that none of this would have happened without Metrolink service at the station. Prior to the station, nothing was really happening in the area. The City of Riverside Redevelopment Agency supported the development of properties adjacent to the station, and worked with the developers to realize the projects. RCTC was not directly involved with the initial development because it was not on RCTC property.

Riverside-La Sierra Station

This station is a stop on the Metrolink 91 and IEOC Lines. There are current negotiations with a developer for a TOD joint development at the station within two years. In addition, new housing projects are being constructed surrounding the station.

North Main Corona Station

This station also is a stop on the 91 and IEOC Lines. The City of Corona has been talking about TOD near the station, and RCTC is getting ready to issue an RFP for joint development at the station.

Trinity Railway Express

There has not been a significant effort on the part of DART to spur economic development at TRE stations, and there has been little noticeable economic development around TRE stations.

One exception is the American Airlines Center, which is served by both DART light rail trains and TRE special event service. The center, which is just outside of the Dallas Central Business Direct, is a major sporting event and entertainment complex. There are plans on the books for high-end residential development there. However, the transit connections to the center have been contributory rather than fundamental to the center's success. DART said that the economic development would have occurred without the transit access.

Tri-Rail

Tri-Rail reported that joint development projects are either planned or are underway at about half of its 18 stations. This activity is relative recent. Driving the interest in joint development are three factors:

1. Increasing service levels which have drawn more riders to stations; trains have increased almost 70 percent in two years.
2. Maturation: TOD is the natural next step for development at stations with high service levels.
3. Establishment of land-use policies in station areas which support infill development.

Tri-Rail predicts that full implementation of these projects, which should spur economic development around stations, is still several years away. There have been challenges, however. Among these is the fact that Tri-Rail operates on track located just to the west of I-95, and there has not been a lot of land to develop to the east between the stations and the Interstate. When land is in short supply, parking concepts tend to be structured parking concepts, which are more expensive and thus work against the financial justification of the projects.

Virginia Railway Express

VRE began operations in 1992. Even before the first commuter trains began operating, "43% of suburban home sales were affected by their access to a planned regional rail station. This has led to continuing strength in residential development along VRE lines, with planned developments for well over a thousand homes presently under way around two stations on the Fredericksburg line along."[18]

VRE identified three success stories regarding economic development around stations. All three were built around VRE service, and its ability to attract riders. VRE service was fundamental for the success of the developments, and for escalating real estate values around the stations. The three stations are on the Fredericksburg Line. VRE also identified a new station development planned for the future westward extension of the Manassas Line.

The land on which the three stations sit was or is in the hands of private developers. One positive outcome of working with private developers on station projects is that their investments in stations count toward the local match for federal and state funds.

Rippon Station

This station is on the Fredericksburg Line. Since the station was first built, developers have changed. The original developer built 144 single family homes and 170 townhouses along a bluff near the station. The new developer is building on this start, with plans for three 10 to 12-story high rises on top of the station itself.

Cherry Hill Station

This planned station also is on the Fredericksburg Line. The station is being built to serve a conference center, including a golf course and 1,500 high-end homes.

Lorton Station

This station also is on the Fredericksburg Line. The original developer of this station built 259 high end housing units above commercial space at the station site. The station was subsequently surrounded by new single family homes.

Prince William Station

This station is planned for Gainesville on the future westward extension of the Manassas Line to Haymarket. Here the station developer has conceptualized the station as the hub of a town center, comprised of five or six office buildings surrounded by upwards of 1,000 new homes.

[18] William D. Middleton, "Smart growth and rail transit", *Railway Age*, November 1999, page G2.

Another challenge has been forging a successful working relationship between private developers and the Board of the South Florida Regional Transportation Authority, the public agency operating of the Tri-Rail commuter rail service. Essentially, while the agency approaches projects with a deliberate but often lengthy approval process, the developers are entrepreneurs, who are under financial pressures to get projects built quickly. These two approaches do not mix.

Circumstances that Lead to Successful Commuter Rail Implementation

There are three general conditions considered essential for implementation of new commuter rail service:

- Demand
- Available Railroad Corridor(s)
- Funding

"Demand" means that people want to use it. This is the essential starting requirement. There must be sufficient demand so that the public entity is willing to fund it. The word "available" in "Available railroad corridor(s)" is to suggest two things. First, that the rail corridor is in existence, and second, that a willing corridor owner and a public entity are able to reach an agreement regarding its use for commuter rail. Inasmuch as the corridor owner will want compensation for use of his property, funding is required.

Decision-Making Framework

In addition to success factors from other systems, the decision-making framework described below includes evaluation and prioritization factors currently under consideration by TPB in its development of prioritized regional plan of projects.

Success Factors

Success factors from other system are described above under "Peer City Review" and are summarized as follows.

- Metrolink. Highway congestion, therefore demand. After some effort, got five counties working together. Likewise, obtained funding commitment.
- Trinity. Ownership of right of way. Overcoming of jurisdictional difficulties.
- Tri-Rail. There were a number of constraints. Many were overcome, and demand prevailed.
- VRE. The political will was assembled. Some constraints remain still.

The fastest-growing commuter rail system, Metrolink, implemented in 1992, illustrates the importance of the three general conditions considered essential for implementation of new commuter rail service – demand, available railroad rights of way, and funding. For years, Los Angeles has been known for traffic congestion. Commuters in that region wanted an alternative to automobile travel. The many rail corridors were in

existence, built long ago to serve the ports of Los Angeles and Long Beach. At the time of corridor acquisition and access agreements, the freight railroad owners were "cash starved" and willing to make a deal. In what turned out to be a master stroke, the "deal" included acquisition by the public agencies of certain rail corridors, and track access agreements with regard to other rail corridors. In this arrangement, each party (the private freight railroad, and the public entity) utilizes its own and the other party's rights of way, a sharing which results in the felicitous outcome that agreement on access, dispatching, and maintenance charges remains forever and necessarily in an environment of fair treatment and cooperation. The five counties of the region worked together to implement commuter rail service, and there is dedicated funding.

The population of the Dallas-Fort Worth region provided a level of demand, Trinity Railway Express (TRE) began on the Dallas side, and later the new commuter rail service was extended to Fort Worth. Most fortuitously, the cities of Dallas and Fort Worth purchased of the former Chicago, Rock Island and Pacific Railroad Company (Rock Island) right of way linking those two cities in 1983, and this provided the basis for implementation of the commuter rail service.

Tri-Rail likewise found demand in a growing population, in this case, in the Miami-Fort Lauderdale region. A railroad right of way became available as the result of a negotiated agreement between the State of Florida and CSX.

The Washington D.C. metropolitan area "enjoys" the traffic congestion problems typical in an expanding urban and suburban region with a growing population and constraints on addition of highway capacity. This environment assisted in creating the "political will" which enabled the counties of Northern Virginia – as represented by the Northern Virginia Transportation Commission and the Potomac and Rappahannock Transportation Commission – to work together in the implementation of Virginia Railway Express (VRE). Negotiation with four railroads (National Railroad Passenger Corporation (Amtrak); Conrail; the Richmond, Fredericksburg and Potomac Railroad Company (RF&P); and Southern Railway Company) resulted in two commuter rail routes: one connecting Fredericksburg, Virginia, with Washington, DC, and the other connecting Manassas, Virginia with the nation's capital. An $83 million bond issue provided the capital needed to implement the commuter rail service.

Evaluation and Prioritization Factors

RLBA reviewed information provided by TPB on the subject of the TPB development of a regional transit network or vision, and development of evaluation factors. An important requirement of this study is to provide updated data which is useful in the TPB evaluation process.

RLBA believes that the scope of work of this study yields data which will be important in the TPB process, in that the data produced in this study update ridership and cost data pertaining to seven prospective commuter rail lines, and the data are such that various

measures of cost effectiveness and performance effectiveness may be readily calculated.

The following are examples of cost and service effectiveness calculations which may be made with the data produced in this study:

- Cost per passenger trip
- Total project cost
- Operating costs
- Cost effectiveness in terms such as cost per passenger-mile, etc.
- Trip time comparisons, commuter rail and highway

Some specific evaluation factors which have been used in the past, with regard to public transportation systems, include:

- Operating expense per passenger trip
- Operating expense per vehicle mile
- Operation expense per passenger mile
- Farebox recovery ratio
- Subsidy per passenger trip
- Revenue per vehicle mile
- Revenue per passenger trip
- Revenue per passenger mile

Additionally, the data produced in this study may be utilized in a further study of benefits and costs of commuter rail service.

A Decision-Making Framework

RLBA recommends the following decision-making framework.

- Determine priority commuter rail lines which should be implemented.
- Plan organizational means for managing and operating commuter rail service.
- Obtain funding.
- Prepare strategy for negotiation of track access.
- Negotiate track access.
- Construct facilities and procure equipment.
- Public information and education campaign (marketing).
- Implement commuter rail service.

Determination of priority commuter rail lines which should be implemented presumably will be done through cost and service effectiveness calculations, and evaluation and prioritization factors, listed above.

Preferred Operating Profiles for Use in Task 2 and Task 3

Based upon evaluation of peer city systems, when those peer cities implemented new commuter rail service, the preferred operating profile is:

- At least three inbound morning peak trains
- At least three outbound afternoon peak trains
- More trains, if the demand is indicated
- Mid-day service
- Free and ample parking, and
- Feeder bus service as needed.

It is understand that profiles may change over time as ridership changes.

Task 2: Market Analysis

Requirement

2.1 Demographics. Determine and define potential market for commuter rail service within 80 miles of downtown Atlanta by analyzing data such as population, employment, existing transit usage, and experience of other regions, relying largely on existing data. Develop transit propensity characteristics and map the potential for ridership along the corridors.

2.2 Inventory Currently-Identified Rail Corridors. Use key existing data to support ridership forecasting, station locations, impacts to existing transportation systems and modes, and potentially community and environmental constraints. Consider and recommend links necessary to support significant trip generators without access to existing or proposed rail lines. Following is a sample of data to be inventoried:

- *Existing rail lines active/inactive*
- *Railroad owners and contacts*
- *Current and forecast freight rail movements*
- *Current and forecast freight rail investment plans*
- *Current and forecast freight rail investment needs*
- *Existing rail right of way*
- *Track conditions*
- *Speed limits*
- *Adjacent land uses, population and employment densities*

Potential sources include Georgia Rail Passenger Authority, Georgia Department of Transportation Office of Intermodal Programs, Norfolk Southern, CSX Transportation, City of Macon and Atlanta Regional Commission.

Discussion

2.1: Demographics

Socio Economic Forecast Assumptions

One of the main assumptions in any ridership forecast is the socio economic forecast for the area surrounding the proposed commuter rail stations. The 1995 study ridership forecast was based on socio economic data available at the time. Since this study, the 2000 Census has become available with actual population data and new forecasts have been prepared by Atlanta Regional Commission (ARC) and others.

A comparison between the following socio-economic forecasts was made:

1. The 1995 Commuter Rail Study includes 1990 and 2010 estimates of population and employment. For comparison purposes, 2000 population and employment were calculated by interpolation.
2. Woods and Poole (W&P) County forecast Version 2006. This data base provides past and future estimates of various socio economic variables, including population and employment, for all counties within the USA. Previous version of W&P data were used in the 2001 study of the Macon-Atlanta Corridor and the 2003 study of the Athens-Atlanta Corridor for counties outside the ARC region.
3. Governor's Office of Planning and Budget (OPB) Version December 2004. This data base includes population estimates for 2000 and 2015 but no employment data.
4. ARC socio economic data from the current travel demand model. This data base includes population and employment by 5 year increments from 2005 to 2030.

Because the region includes more than 40 counties, all socio-economic data were summarized using the same districts as were used in the 1995 Study, as shown on Figure 2. In addition, comparison was made with the 20-county ARC region. A comparison of population forecast is shown in Table 1 and a comparison of employment forecast is shown in Table 2.

The following comments can be made concerning the population forecasts:

- For 1990, the 1995 Study and the W&P data match closely, as they are both based on the 1990 Census.
- For 2000:
    - W&P and Census data are very close because W&P is based on the 2000 Census.
    - The 1995 Study has a lower estimate than the Census or W&P for all districts under study. One must remember that the 2000 Census was not available at the time of the 1995 Study.
    - Although one would assume that the 2000 OPB data is also based on the Census, there are discrepancies at the district level. However, the total for the 20 counties ARC region match exactly with the Census. It is possible that OPB data were not summarized properly from the census tract data to the county data.

- For 2010:
    - Both ARC and W&P have a higher forecast for the 20 counties ARC region than the 1995 Study.
    - ARC has a lower forecast than both the 1995 Study and the W&P for the 9 counties ARC District.
- For 2015 and 2030:
    - ARC and W&P have a similar forecast for the 20 counties ARC region.
    - The lower ARC forecast is more pronounced for the 9 counties ARC district.

Figure 2

1995 Study Districts

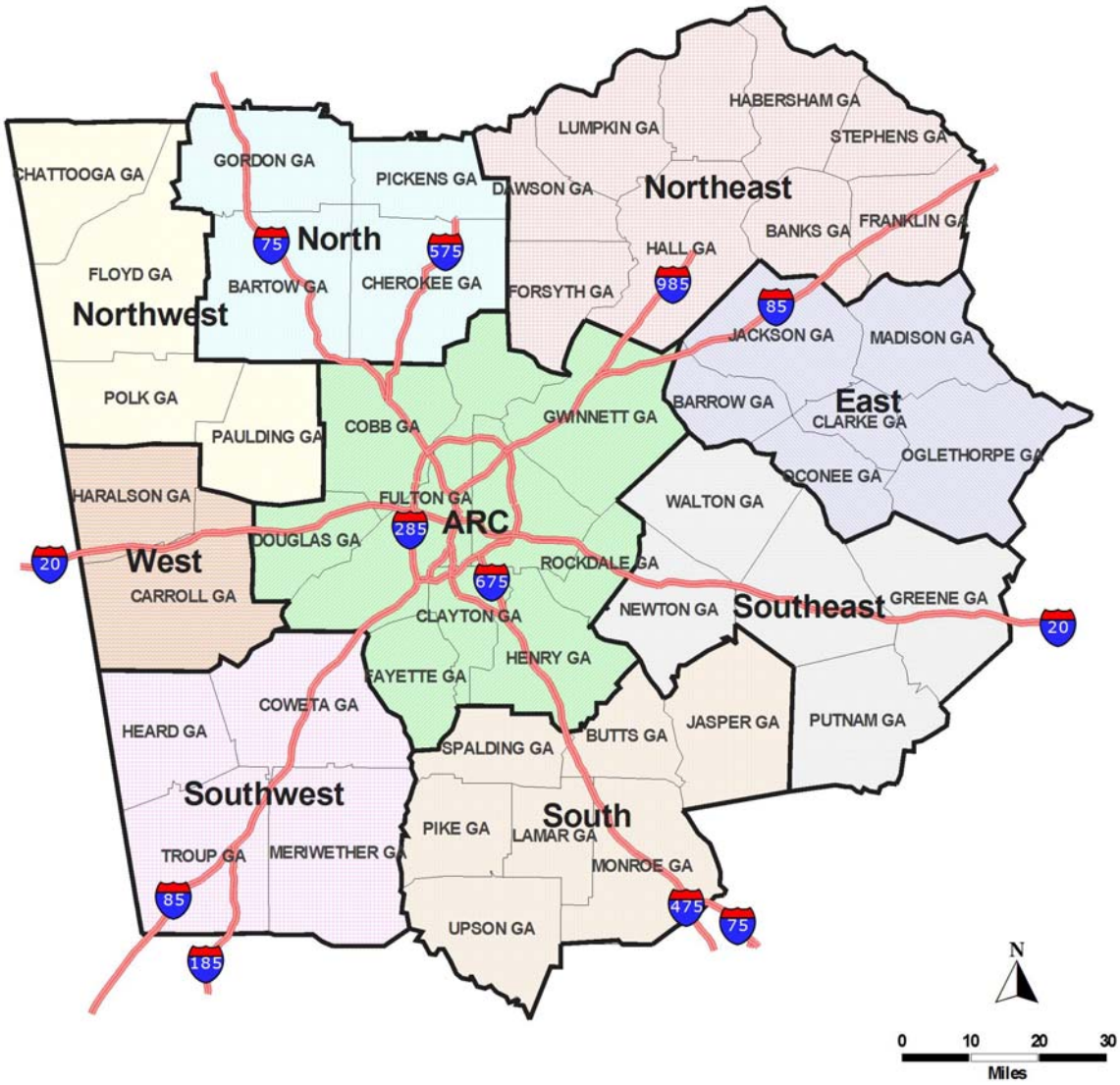


Table 1: Population Forecasts (Thousand)

1995 Study Districts	1990		2000						
	95 Study Population	W&P (1) Population	95 Study (3) Population	W&P (1) Population	W&P (1) Difference	OPB (2) Population	OPB (2) Difference	Census Population	Census Difference
ARC (9 Counties)	2,424	2,440	3,089	3,310	7.1%	2,683	-13.1%	3,287	6.4%
East	196	197	213	255	19.6%	254	19.0%	254	19.0%
North	196	197	240	288	20.1%	285	18.8%	285	18.8%
NorthEast	254	257	282	396	40.1%	391	38.4%	391	38.4%
NorthWest	179	180	190	238	25.2%	236	24.3%	236	24.3%
South	145	146	153	169	10.4%	168	10.0%	168	10.0%
SouthEast	119	120	135	173	28.4%	171	26.9%	171	26.9%
SouthWest	140	141	155	183	17.9%	182	17.1%	182	17.1%
West	93	94	100	114	13.4%	113	12.5%	113	12.5%
Total	3,746	3,772	4,558	5,125	12.4%	4,483	-1.7%	5,087	11.6%
ARC (20 Counties)	3,041	3,063	3,802	4,262	12.1%	4,228	11.2%	4,228	11.2%

1995 Study Districts	2010							2015			2030	
	95 Study Population	W&P (1) Population	W&P (1) Difference	OPB (2) Population	OPB (2) Difference	ARC Population	ARC Difference	W&P (1) Population	OPB (2) Population	ARC Population	W&P (1) Population	ARC Population
ARC (9 Counties)	3,937	4,022	2.1%	3,276	-16.8%	3,756	-4.6%	4,318	3,603	3,993	5,267	4,778
East	233	308	32.4%	319	37.1%	na		328	357	na	394	na
North	294	398	35.2%	422	43.3%	na		444	501	na	587	na
NorthEast	313	524	67.2%	572	82.6%	na		571	676	na	721	na
NorthWest	201	300	49.3%	315	56.6%	na		327	360	na	412	na
South	162	187	15.9%	204	26.0%	na		195	223	na	222	na
SouthEast	153	226	47.6%	258	68.3%	na		236	308	na	271	na
SouthWest	171	222	29.9%	229	33.5%	na		239	256	na	291	na
West	108	140	29.8%	157	45.0%	na		147	179	na	168	na
Total	5,573	6,328	13.6%	5,750	3.2%	na		6,806	6,463	na	8,333	na
ARC (20 Counties)	4,753	5,339	12.3%	5,448	14.6%	4,999	5.2%	5,761	6,137	5,394	7,107	6,817

Notes:
(1) Woods & Poole County Data - Version 2006
(2) Governor's Office of Planning and Budget - Version December 2004
(3) 2000 values for 95 Study are interpolated between 1990 and 2010 data

Table 2: Total Employment Forecast (Thousand)

1995 Study Districts	1990			2000		
	95 Study Employment	W&P (1) Employment	Difference	95 Study (3) Employment	W&P (1) Employment	Difference
ARC (9 Counties)	1,423	1,695	19.1%	1,864	2,392	28.4%
East	98	100	1.9%	106	134	26.4%
North	78	80	2.1%	92	127	38.9%
NorthEast	125	130	3.5%	139	201	45.1%
NorthWest	75	76	0.7%	80	98	22.6%
South	60	58	-2.7%	62	68	9.4%
SouthEast	48	49	1.4%	53	65	24.0%
SouthWest	67	68	1.6%	73	95	30.2%
West	44	45	1.0%	47	51	7.9%
Total	2,019	2,300	13.9%	2,515	3,232	28.5%
ARC (20 Counties)	1,678	1,955	16.5%	2,152	2,801	30.1%

1995 Study Districts	2010					2015		2030	
	95 Study Employment	W&P (1) Employment	Difference	ARC Employment	Difference	W&P (1) Employment	ARC Employment	W&P (1) Employment	ARC Employment
ARC (9 Counties)	2,440	2,709	11.0%	2,115	-13.3%	2,953	2,308	3,687	2,965
East	115	153	33.8%	na		164	na	196	na
North	108	165	52.9%	na		184	na	242	na
NorthEast	154	245	58.8%	na		269	na	341	na
NorthWest	85	119	40.9%	na		129	na	159	na
South	65	75	14.4%	na		79	na	92	na
SouthEast	58	75	30.8%	na		80	na	94	na
SouthWest	79	105	33.2%	na		116	na	148	na
West	51	56	10.0%	na		59	na	68	na
Total	3,154	3,702	17.4%	na		4,034	na	5,029	na
ARC (20 Counties)	2,761	3,223	16.8%	2,565	-7.1%	3,522	2,847	4,419	3,849

Notes: (1) Woods & Poole County Data - Version 2006

(3) 2000 values for 95 Study are interpolated between 1990 and 2010 data

The following comments can be made concerning the employment forecast:

- There are a lot more discrepancies between the various forecasts because unlike population, there is no census of employment.
- The W&P forecast is significantly higher than the 1995 Study employment forecast.
- The W&P forecast is also significantly higher than the ARC forecast where available.
- The ARC forecast for 2010 is lower than the 1995 Study employment forecast.

The study team used the following sources for socio-economic forecasting for the ridership update:

1. ARC socio-economic data for the 20-counties region.
2. W&P socio-economic data for the counties outside the ARC 20-counties region.

2.2: Inventory of Currently-Identified Rail Corridors

This subtask focuses upon compiling existing available data regarding each of the seven prospective Atlanta commuter rail corridors (primarily over the freight railroad lines indicated):

Athens (CSX)
Macon (NS)
Gainesville (NS)
Madison (CSX)
Bremen (NS)
Senoia (CSX)
Canton (CSX and GNRR)

The Multi-Modal Passenger Terminal (MMPT) is proposed to be constructed adjacent to the MARTA Five Points station, and it to be accessed by utilizing CSX tracks near Circle Connection as well as NS tracks near Spring ("Circle Connection" and "Spring" are railroad locations.) As stated earlier, this study is a corridor by corridor study; this study does not assume development of all seven commuter rail corridors simultaneously. Therefore, this study does not include the cost of building a MMPT including track access to handle seven commuter rail lines. Rather, this capital cost estimate includes, for each corridor, with regard to the Atlanta end of the commuter rail service line, an estimate for (1) track access to a platform at the site of the proposed MMPT, and (2) layover and minimum maintenance facility at the Atlanta end of the commuter rail line.

Where railroads furnished specific data in timetables and/or track charts, information is broken out by milepost (MP), type of existing signal system (if any), maximum track speed, number of sidings (as well as length) and other pertinent data. Following are narrative summaries of each corridor.

Although this inventory was to include “current and forecast freight investment plans” and “current and forecast freight rail investment needs”, such information is not available from the freight railroads. RLBA has, however, generally alluded to freight rail investment plans and needs in its discussion – considered a key component of this study – of “Commuter Rail Capacity Improvements”, which appears under Task 3 Feasibility Analysis of this report. Suffice it to observe at this point that Atlanta is an important rail hub, that freight railroad traffic is growing significantly, and that there are problematic capacity constraints today.

Athens-Atlanta

This corridor connects Athens with Atlanta via the CSX Abbeville Subdivision. At approximately MP 505.5 a NS branch line provides access to the proposed Athens station. At MP SG 561 the CSX Abbeville Subdivision becomes the CSX Atlanta Terminal Subdivision. Here the proposed commuter rail service continues toward Atlanta until reaching a planned (non-existing) connection track near Mina (MP SG 572.0). This planned track would approach the NS right of way (ROW) near Masons (MP 631.7) on the NS track and serve the proposed Atlantic Station. The commuter rail corridor would continue along NS ROW to Howell (MP 635.2) where it would then divert to CSX alignment, along the W&A line for approximately 2.9 miles to the MMPT (WA 0.0). Total distance from Athens would be approximately 74.0 route miles. Operations on this line are currently governed by Automatic Block Signal (ABS) rules, and a maximum freight track speed of up to 50 miles per hour (mph) is authorized on the CSX portion of the corridor, and up to 40 mph on the NS portion of the corridor.

This corridor is composed almost entirely of single main track with controlled passing sidings of sufficient length (at least greater than one mile) to accommodate the passage of full length trains. These sidings are located as follows:

Siding Location	MP (SG)	Length (feet)
Fowler	507.8	9,815
Harper	521.6	10,018
Auburn	532.0	9,968
Dacula	538.5	8,880
Lawrenceville	542.5	9,726
Gloster	549.0	7,975
Tucker	562.0	10,192
	Total	66,574

Between the location where the proposed commuter rail route diverges to NS near Masons, and the MMPT, the existing NS and CSX tracks are double main.

CSX furnished the following train counts (trains per day) on the Abbeville Subdivision and Atlanta Terminal Subdivision for this corridor:

East Switch-Belt Jct.	15

Belt Junction-Lawrenceville	19
Lawrenceville-Dacula	21

Train counts increase as one moves toward Athens from Atlanta by almost 30 percent which appears to be the reverse of what one would expect. This is probably due to local switching operations. CSX did not furnish future traffic projections; however, the current Association of American Railroads (AAR) projection is that freight traffic will increase by 70 percent by 2020. Based upon that projection, it is estimated that this corridor could see up to 36 trains per day by 2020.

Right-of-way (ROW) width, determined by inspecting valuation (val) maps, is 100 feet between Athens and Armour Yard in Atlanta. Between Armour Yard and Howell (railroad location near the intersection of Howell Mill Road and West Marietta Street), a distance of approximately three miles, the NS ROW width is 100 feet except between MP 632.4 and MP 632.9, where ROW is 80 feet wide. Between Howell and the MMPT, ROW width is 66 feet. A ROW width of 66 feet limits the number of parallel tracks to three. This may pose a constraint on the addition of rail service, freight or passenger.

Based upon CSX-furnished track charts, the track structure between Athens and Atlanta may be characterized as follows.

- Continuous welded rail (CWR) weighing 115, 132, 136 and 141 pounds per yard, throughout the corridor;
- 45 curves of two degrees or less, 55 curves greater than two degrees and up to six degrees, and one curve greater than six degrees;
- A maximum grade of 1.3 percent;
- 60 public, at-grade, highway-rail crossings (combined active and passive protection) and 11 private crossings utilizing passive protection;
- 40 bridges totaling about 5,090 feet in addition to 38 overhead bridges;
- Indication that the vast majority of the corridor between Athens and Mina has received a timbering and surfacing (T&S) cycle in either 2004 or 2005;
- Indication that the NS portion of the corridor received a T&S cycle in either 2005 or 2007; and
- CSX track closer to the MMPT shows an older T&S cycle of 2001.

The track charts indicate that this corridor is a well-maintained Class 1 primary rail corridor.

Speeds throughout the corridor between Athens and Mina range between 35 and 50 mph. Maximum speeds are lower in downtown Atlanta and would likely be very slow near Howell where the prospective connection would be made so that commuter trains may revert to CSX trackage to access the MMPT.

Adjacent Land Use. The proposed service between Athens and Atlanta travels through a mix of urban and suburban areas through portions of Fulton, DeKalb, Gwinnett, Barrow, Oconee and Clarke counties. The route generally parallels US 29 between

Athens and Atlanta. The portion of the route closest to Athens has suburban to semi rural land use. That portion of the corridor closest to Atlanta is suburban, transitioning to urban as the route nears its termination in downtown Atlanta. This route passes the University of Georgia, Emory University, Gwinnett County Airport and North Lake Mall.

Macon – Atlanta

This corridor travels on the Norfolk Southern (NS) Griffin District between Edgewood (railroad location near Macon, approximate MP S 192.1) and Spring (railroad location in Atlanta, MP S 294.4) which is near the MMPT. The connection between Spring and the MMPT may be accomplished by utilizing the "Circle Track" which connects NS with CSX immediately south of the proposed MMPT site. The total prospective commuter rail corridor amounts to 102.3 route miles. This line is governed by Track Warrant Control (TWC) rules between Edgewood (MP S 192.1) and MP S 248.0 where line control changes to "yard limit" rules (within yard limits there are switching activities, trains move at restricted speeds, and all users are to remain mindful of other users). The yard limit territory extends to Experiment (railroad location at MP S 253.0) where train control returns to TWC rules until reaching Lee (railroad location at MP S 280.1). Between Lee and Spring (MP S 294.4), the territory is governed by ABS rules. Track speeds reach a maximum of 25 mph between Edgewood and East Point (MP S 288.2) where maximum speed increases to 30 mph between East Point and Spring.

This corridor is a combination of single and double track segments. Single track extends between Edgewood (Macon) and Hapeville (MP S 286.4); between Hapeville and Spring there is double track. Passing sidings of sufficient length for the meeting of full length trains (at least greater than one mile) exist at the following railroad locations. Milepost location and siding length are also listed.

Siding Location	MP (S)	Length
Smarr	212.0	5,730
Collier	223.0	6,600
Griffin	251.0	21,078
	Total	33,408

NS provided the following train counts (trains per day) on this corridor.

Macon-Griffin	6
Griffin-Forest Park	2
Forest Park-East Point	13
East Point-Spring	29

The 29 trains per day between East Point and Spring includes a daily average of 21 CSX trains.

NS did not furnish future projections. Nationwide projections suggest that the number of daily trains between East Point and Spring could reach 50 by year 2020.

ROW width on this corridor, determined by reviewing val maps, is generally 100 feet. However, there are approximately 14 locations where there are short-distance constrictions (less than a mile) where ROW widths are 85, 70, 60, 50 and 35 feet. The width of 35 is especially problematic, as this width would allow a maximum of two tracks. On the other hand, Norfolk Southern and the State of Georgia have reached at least a tentative agreement which would allow commuter rail service on this rail corridor.

Based upon NS-furnished track charts, the track structure between Macon and Atlanta may be characterized as follows:

- CWR weighing 90, 115, 131 and 132 pounds, and jointed rail weighing 112 and 115 pounds, are scattered throughout the corridor with the primary rail weight being 112 pounds;
- 61 curves of two degrees or less, 76 curves greater than two degrees and up to six degrees, and two curves greater than six degrees;
- a maximum grade of 0.81 percent;
- 138 public at-grade highway-rail crossings (combined active and passive protection) and 17 private crossings utilizing passive protection;
- 22 bridges totaling about 3,435 feet, plus 34 overhead bridges;
- the vast majority of the corridor has received a T&S cycle in 2004 (MP 192.1-280.0) with the remainder receiving a T&S cycle in 1998.

It appears that this line is a well-maintained Class 1 secondary rail corridor.

Maximum track speeds are fairly uniform throughout the corridor ranging between 20 and 30 mph with most speeds between 25 and 30 mph. Slower track speeds are in Macon and Atlanta.

Adjacent Land Use. The proposed service between Macon and Atlanta travels through a mix of urban, suburban and rural areas in portions of Fulton, Clayton, Henry, Spalding, Lamar, Monroe and Bibb counties. The route generally parallels US 41 between Macon and Atlanta. The quarter of the route nearest Macon is characterized by suburban and urban land use. The portion of the route nearest Atlanta likewise is characterized by suburban and urban use. Intervening mileage is rural. Some points of interest that the route passes are Hartsfield International Airport and the Atlanta Motor Speedway.

Gainesville-Atlanta

Another NS corridor connects Gainesville and Atlanta. This corridor is in Norfolk Southern's Piedmont Division, and is in the NS Greenville District between Gainesville (MP 584.6) and Foremost (railroad location at MP 630.9), and the Georgia Division between Foremost and Atlanta. Previous planning routes Atlanta-bound commuter trains to Armour (Atlanta railroad location at MP 632.5, at the point where the Decatur Belt Line connects to the Norfolk Southern line to Gainesville), where commuter trains

would then travel over the Decatur Belt Line, continuing south approximately four miles on the Decatur Belt Line until reaching a new (presently non-existing) connection to CSX track near the east end of West Hulsey Yard (approximate MP YYG 169.4). From this point, commuter trains would travel westward to the MMPT (MP YYG 170.8).

It should be stated that RLBA received informal information to the effect that the Decatur Belt Line has not been formally abandoned, but that it is owned by a developer who plans to use it for purposes other than commuter rail. RLBA did not pursue this subject further as it is not within the scope of work of this study.

Total length of the commuter rail corridor between Gainesville and Atlanta would be 53.3 route miles.

This line, governed by ABS rules, allows a maximum track speed of 50 mph (freight) and 79 mph (passenger) between Gainesville and Armour.

This corridor is composed of combinations of single main track with controlled passing sidings and areas of double track. Passing sidings of sufficient length to allow "meets" of full-length trains exist at the following locations.

Siding Location	MP	Length (feet)
Flowery Branch	593.0	12,750
Duluth	613.0	11,950
	Total	24,700

Between Gainesville (MP 584.6) and Chicopee (railroad location at MP 588.0) there are 3.4 miles of double track. Another 5.4 miles of double track exists between Walters (railroad location at MP 599.8) and Shadow Brook (railroad location at MP 605.2). Double track begins again at Norcross (MP 619.0) and continues for 13.5 miles to Armour (MP 632.5), bringing the total double track to about 22.3 miles on the NS portion of the 53.3 mile corridor.

NS furnished train counts (trains per day) for this corridor as follows:

Gainesville-Chamblee	25
Chamblee-Armour	32

The above train count includes two Amtrak trains. Train counts increase closer to Atlanta as one would expect. Although NS did not provide future projections, RLBA utilizes the Association of American Railroads projection to estimate that this corridor could see as many as 55 trains per day by year 2020.

ROW width in this corridor, determined by inspecting val maps, is generally between 100 and 150 feet. There is a 90-foot width section of ROW between MP 619.7 and MP 619.9, and a single-track tunnel under I-85 near MP 632 on the Decatur Belt Line near Armour.

Track charts furnished by NS indicate the following characteristics of this railroad corridor.

- CWR weighing 132 pounds throughout the corridor between Gainesville and Armour;
- 115-pound rail on the CSX portion of the corridor;
- 31 curves measuring two degrees or less, 23 curves greater than two degrees and up to six degrees, and no curves measuring greater than six degrees on the NS portion, between Gainesville and Armour;
- based upon the 1995 study, that the Decatur Belt Line has curves ranging between two and somewhat over four degrees;
- on the CSX portion of the corridor, there are three curves less than or equal to two degrees, and two curves somewhat over two degrees;
- maximum grade of 1.46 percent;
- 36 public, at-grade, highway-rail crossings (combined active and passive protection) and one private crossing utilizing passive protection on the NS portion of the corridor between Gainesville and Armour;
- the CSX portion has no at-grade, highway-rail crossings;
- 22 bridges totaling about 2,743 feet plus 19 overhead bridges on the NS portion;
- no information was available with regard to Decatur Belt Line bridge structures;
- CSX has three railroad bridges over roads, and three overhead bridges on its 1.4 mile portion of the corridor;
- the entire corridor has received a T&S cycle since 2002 with the except of the Flowery Branch siding area which received a T&S cycle in 2001.

With the exception of the Decatur Belt Line, this is a well-maintained Class 1 primary rail corridor.

Maximum speeds are generally uniform throughout the corridor ranging between 35 and 50 mph (freight) with most of the corridor being 50 mph. Passenger speeds are 79 mph in some places, but reduced over certain curves. It is understood that the Decatur Belt Line is operated at 15 mph. Maximum speed on the CSX portion of the corridor ranges between 25 and 10 mph.

Adjacent Land Use. The proposed commuter rail service would operate through Hall, Gwinnett, DeKalb and Fulton Counties. The route generally parallels I-85 between Gainesville and Atlanta. In Gainesville the route is characterized by urban land use, which transitions to suburban and rural as one moves toward Atlanta, then to suburban and urban as one approaches downtown Atlanta. This route passes Gainesville College, and in Atlanta, Lennox Square Mall.

Madison-Atlanta

A CSX rail corridor connects Madison with Atlanta, utilizing the Georgia Subdivision and the Atlanta Terminal Subdivision of that railroad. This prospective commuter train would

begin in Madison on the Georgia Subdivision at approximately MP YYG 101.3 and travel toward Atlanta, and enter CSX Atlanta Terminal Subdivision at Lithonia (MP YYG 149.0). The train would continue over the Atlanta Terminal Subdivision until reaching Circle Connection at MP YYG 170.8. Total distance between Madison and the MMPT would be approximately 69.5 route miles. This railroad line is governed by TWC rules on the entire portion of the Georgia Subdivision, and the segment of the Atlanta Terminal Subdivision between Lithonia and Scottsdale (approximate MP YYG 162.4) where ABS territory begins and continues to the Circle Connection. Maximum authorized track speed is 50 mph.

This corridor is composed of a combination of single main track with spring switch passing sidings, and signaled double track (in Atlanta). Spring switch passing sidings, of sufficient length (at least greater than one mile) to accommodate full length trains "meets", exist at the following locations.

Siding Location	MP (YYG)	Length (feet)
Social Circle	119.4	9,560
Lithonia	147.8	8,670
	Total	18,230

Near Kirkwood (railroad location beside the East Lake MARTA station, at railroad MP YYG 165.9), the signaled south end double track begins and continues to Circle Connection.

CSX furnished train counts (trains per day) as follows:

Circle Track-Kirkwood	9
Kirkwood-Madison	7

CSX did not furnish future train count projections. Utilizing the Association of American Railroad nationwide projects, RLBA estimates that year 2020 train counts could be 16 trains per day.

ROW width on the Madison corridor, determined by examination of val maps, is 198 feet, except for three segments. Two short segments, at MP 103.5 and MP 110, are 66 feet wide, and at MP 171 there appears to be a constriction, but the width isn't indicated.

CSX track charts provide the following corridor characteristics.

- CWR weights of 112, 115 and 141 pounds throughout the corridor, with the great majority being 115 pound CWR;
- 32 curves measuring two degrees or less, and 36 curves between greater than two degrees and six degrees, including some long compound curves;
- maximum grade of 1.00 percent;

- 77 public, at-grade, highway-rail crossings (combined active and passive protection) and 12 private crossings protected by passive signs;
- 20 bridges totaling about 2,991 feet, plus nine overhead bridges;
- almost all of the corridor between Madison and Conyers (MP 142) was subject of T&S cycles in 2003 and 2005, while track between MP 142 and Circle Connection had its last T&S cycle in 1999.

This appears to be a well-maintained Class 1 secondary rail corridor.

Speeds are generally uniform throughout the corridor, ranging between 35 and 50 mph with the only FRA Class 2 speeds (25 mph) located just south of the South End Double Track near Kirkwood (MP YYG 165.6) and continuing to Circle Connection.

Adjacent Land Use. The proposed service between Madison and Atlanta travels through a mix of urban, suburban and rural areas through portions of Fulton, DeKalb, Rockdale, Walton and Morgan counties. The route generally parallels I-20 between Madison and Atlanta. The half of the route nearer Madison is devoted to rural land use. The half nearer to Atlanta is suburban changing to urban as one moves closer to downtown Atlanta.

Bremen-Atlanta

The railroad corridor between Bremen with Atlanta is partly on the NS Alabama Division (between Bremen, at approximately MP 685.1, and Austell, at MP 650.0, and partly on the NS Georgia Division, between Austell (MP 134.7 H) and a point in Atlanta south of Howell at approximately MP 152 H (near Jones Street) where commuter trains would traverse a new (non-existing) crossover to CSX track and continue to the MMPT. The total distance between Bremen and the MMPT us approximately 52.8 route miles. On the NS Alabama and Georgia Division portions of the corridor, the line is governed by ABS rules (utilizing traffic control signals) and has a maximum allowable track speed of 50 mph for freight and 79 for passenger trains. The CSX portion of the corridor would likely be less than a mile; therefore speed would not be a factor.

This corridor is composed almost entirely of single main track. Controlled passing sidings of sufficient length (at least greater than one mile) to allow full length train "meets" exist at the following Alabama Division locations.

Siding Location	MP	Length (feet)
Sewell	683.0	11,040
Taylor	676.0	9,306
Baggett	669.0	7,540
Winston	665.0	9,865
	Total	37,751

There is double track main on the Georgia Division between Austell and Howell, where triple main track begins. It is assumed that commuter trains would cross over to CSX at

a point south of Howell at approximately MP 152 H near Jones Street, and proceed over dedicated track to the MMPT.

NS furnished the following train counts (trains per day) on this corridor:

Bremen-Austell	25
Austell-Atlanta	72

These train counts include two Amtrak trains. Utilizing Association of American Railroad projections, year 2020 trains counts could be as high as 120 trains per day.

ROW width, determined by inspection of val maps, is between 100 and 200 feet between Bremen and Austell. Between Austell and Howell ROW width is 200 feet except for a segment of 150-foot ROW near MP 130H and a segment of 100-foot ROW near MP 150H. On the CSX line between Howell and MMPT, ROW width is only 66 feet.

NS track charts provide the following track structure characteristics.

- CWR weighing 132 and 136 pounds scattered throughout the corridor;
- 25 curves measuring two degrees or less, 64 curves between greater than two degrees and six degrees, and twelve curves measuring greater than six degrees (all curves over six degrees were located on the Alabama Division);
- a maximum grade of 1.61 percent;
- 58 public, at-grade, highway-rail crossings (combined active and passive protection) and 4 private crossings utilizing passive protection;
- 17 bridges totaling about 2,975 feet, plus 24 overhead bridges;
- the entire corridor (NS portion) has received a T&S since 2003.

This line is a well-maintained Class 1 primary rail corridor.

Speeds on the Alabama Division vary over the corridor, ranging between 35 and 50 mph due to the high number of speed-restricted curves. On the Georgia Division portion of the corridor, speed is fairly constant between Austell and Bolton, at 50 mph, and from that point into Atlanta, speed is restricted to 25 mph on all NS main tracks. It is expected that any connection track between NS and CSX near Jones Street would likely have speeds less than 25 mph, and that this would continue as the maximum allowable speed between this point and the MMPT.

Adjacent Land Use. The proposed commuter rail service between Bremen and Atlanta traverses Haralson, Carroll, Douglas, Cobb and Fulton Counties. The route generally parallels I-20 along the entire corridor. The route is rural at the Bremen end of the line, becoming suburban and urban one nears downtown Atlanta.

Senoia-Atlanta

The prospective commuter rail service connecting Senoia and Atlanta would utilize primarily CSX main tracks on that railroad's Manchester Subdivision and Atlanta Terminal Subdivision. Within Atlanta the commuter rail service would utilize a portion of the NS Atlanta South District. This commuter rail corridor would begin at Senoia at MP ANB 822.2 of the Manchester Subdivision. At Peachtree City (MP ANB 826.9) the corridor becomes the Atlanta Terminal Subdivision and continues toward Atlanta until reaching Stonewall (MP ANB 844.0 and MP XXB 16.4), where commuter rail trains would diverts to the CSX A&WP Subdivision via the Union City Connection. The corridor continues on the A&WP Subdivision toward East Point (CSX MP XXB 6.4 and NS MP S288.2) where it crosses to and utilizes NS-owned tracks between that point and Spring (NS MP S294.3). Total commuter rail corridor length is approximately 37.9 route miles.

This corridor is governed by ABS rules on CSX, and has a maximum allowable track speed of 55 mph. That portion of the corridor governed by NS rules is Traffic Controlled territory and has a maximum speed of 30 mph.

The Senoia-Atlanta rail corridor is composed of a combination of single main track with controlled passing sidings, on the CSX portion, and double track over the NS portion, between East Point and Spring (near the MMPT).

The controlled passing sidings are of sufficient length (at least greater than one mile) to allow the meeting of full length trains, and are at the following locations.

Siding Location	MP	Length (feet)
Peachtree City	ANB 827.5	5,900
Red Oak	XXB 13.4	10,000
College Park	XXB 10.0	6,160
	Total	22,060

CSX train counts on the Manchester Subdivision and Atlanta Terminal Subdivision in this corridor between Atlanta and Manchester are 17 trains per day. Using the Association of American Railroad nationwide projection, this corridor could see 29 trains per day by year 2020.

ROW width, determined by inspection of val maps, is 100 feet between Senoia and Stonewall Connection (railroad location at MP ANB844), a distance of approximately 22 miles from Senoia, except for one short segment at MP ANB843.9 where ROW width is 75 feet. Between Stonewall Connection and East Point, a distance of approximately 10 miles, no val maps were made available. Between East Point and Oakland Junction (railroad location at MP S291.5), a distance of approximately three miles, the ROW width is 100 feet except for three short segments on which widths are 60, 50 and 35 feet. Between Oakland Junction and Atlanta MMPT no val maps were made available to the study team.

Track charts furnished by the railroads provide the following corridor characterization.

- CWR weighing 112, 115, 131, 132 and 141 pounds, scattered throughout the corridor;
- 31 curves measuring two degrees or less, 43 curves between greater than two degrees and six degrees, and eight curves measuring greater than six degrees;
- maximum grade of 1.17 percent;
- 35 public (three on NS), at-grade, highway-rail crossings (combined active and passive protection) and 15 private crossings utilizing passive protection;
- 14 bridges totaling about 21,796 (652 on CSX) feet plus 27 overhead bridges (10 on NS);
- a great majority of the CSX portion of the corridor received a T&S cycle in 2003 or 2004 (NS portion received T&S in 1998).

The lines that form this corridor are well-maintained Class 1 primary rail corridors.

Speeds are fairly uniform throughout the corridor ranging between 30 and 55 mph.

Adjacent Land Use. The proposed commuter service between Senoia and Atlanta would traverse Coweta, Fayette, Douglas and Fulton Counties. The route generally parallels US 29 between Senoia and Atlanta. The route is suburban and semi-rural near Senoia, and changes to urban as one approaches downtown Atlanta. The route passes by Hartsfield International Airport.

Canton-Atlanta

The Canton corridor would utilize two different-sized rail carriers -- a Class 1 railroad and a short line railroad -- to connect Canton with Atlanta. The Georgia Northeastern Railroad (GNRR) connects Canton to CSX at Elizabeth (north of Marietta), a distance of approximately 22.3 route miles on GNRR, and the CSX W&A line (Atlanta Terminal Subdivision) connects Elizabeth with the Atlanta MMPT, another 21.3 route miles, for an overall total of 43.6 route miles between Canton and the MMPT.

The CSX portion of this prospective commuter rail corridor is the most heavily-trafficked portion of CSX's Atlanta network.

The CSX line, governed by ABS rules, allows a maximum track speed of 35 mph.

The CSX portion of the corridor is composed of double track between Elizabeth and Smyrna (MP WA 13.1). The track becomes a single main crossing over the Chattahoochee River (MP WA 7.5), and then becomes double track at Gilstrap (railroad location at MP WA 7.4). At Tilford (MP WA 4.9), CSX has three tracks until reaching a location known as "Top of Slide" (railroad location at MP WA 3.8) where it again becomes double track. From that location, the corridor remains double tracked the remainder of the way to Circle Connection. There are no passing sidings in the 5.7 miles of single track main.

GNRR corridor track is all single main track with a single passing siding located near Toonigh (MP 462.0), the length of which is only about 900 feet.

CSX train count on the Atlanta Terminal Subdivision between Elizabeth and Bolton (MP WA 6.6) is 35 trains per day. GNRR furnished train counts for its territory of three or four trains per day (including a 70 car unit train that GNRR breaks in half at Marietta, taking each half to Pilgrim's Pride in Canton separately).

Utilization of the Association of American Railroads nationwide projection results in traffic of about 60 trains per day by 2020 on the CSX portion of this prospective commuter rail corridor.

Inspection of val maps indicates that ROW width on the GNRR between Canton and Elizabeth is 100 feet, with the exception of short 50-foot constrictions at MP 474.1 and 475.5, a 0.9-mile-long 50-foot constriction near MP 475, and a 35-foot width of ROW between MP 454.1 and 456.1. On CSX territory, width of ROW between Elizabeth and Atlanta is 66 feet.

Track charts provide the following characterization of the CSX portion of this corridor.

- CWR weighing 115, 132, 136 and 141 pounds scattered throughout the corridor with the great majority weighing either 136 or 141;
- 16 curves measuring two degrees or less, 44 curves between two degrees and six degrees, and four curves greater than six degrees;
- maximum grade of 1.07 percent;
- 12 public at-grade highway-rail crossings (combined active and passive protection) and no private crossings;
- five bridges totaling about 1,017 feet plus 16 overhead bridges;
- the corridor has varying dates regarding T&S cycles, some segments dating as far back as 1993.

Telephone interviews provided information on the physical aspects of the GNRR. Rail is a mix of 90, 100, 132 and 136 pound, jointed. When retired, 90 pound rail is replaced with 100, 132 or 136 pound jointed rail. The GNRR portion of this prospective commuter rail corridor includes at least one curve exceeding 15 degrees, many 8 and 10 degree curves, and some steep grades, exceeding two percent. According to the GNRR timetable and other sources[19], the corridor encompasses 39 public at-grade, highway-rail crossings with either passive or active protection and twelve private crossings. Three overhead bridges exist on the GNRR portion of the corridor.

It appears from the CSX track chart that the CSX portion of this corridor is a well-maintained Class 1 primary rail corridor, with the possible exception of some locations needing a T&S cycle.

[19] Canton - Elizabeth/Marietta - Atlanta Commuter Rail - Express Bus Feasibility Study, October 2004, p. Appendix B

Speeds are generally uniform north of Howell Tower (MP WA 3.0) on the CSX portion of the corridor, ranging between 30 and 35 mph with only a few exceptions. Closer to Circle Connection, track speeds decrease to 10 mph. The entire GNRR portion of the corridor is restricted to 10 mph.

Adjacent Land Use. The proposed commuter rail service between Canton and Atlanta would traverse Cherokee, Cobb and Fulton Counties. The route generally parallels I-575/I-75. The route is largely rural along the GNRR ROW, and becomes more suburban and urban as on approaches Atlanta. This route passes Dobbins Air Force Base and Columbia Mall.

Inactive Rail Lines

It is possible that inactive rail lines may be restored to service in order to assist in mitigating capacity problems. Maps showing three such lines – A&WP Belt, Decatur Belt and L&N Belt -- are displayed on the Georgia Department of Transportation website, and copies of those maps are included in Appendix A.

Station Locations

This inventory found no operational impediment to station locations planned in earlier studies. Other station location findings may be found at the beginning of the Task 3 portion of this report.

Task 3: Feasibility Analysis

Requirement

3.1 Station Locations. Make a high level review of current station locations for the commuter rail lines and make necessary recommendations to slightly shift locations based on current development and land use patterns.

3.2 Interface with Other Modes. Address connections to other transportation systems, possible multi-modal station locations, integration with current bus systems, other transit modes, and interconnectivity and interface with ongoing regional transit planning.

3.3 Ridership/Travel Demand Forecast. Update GDOT's existing ridership forecasts and operating plans in a way that is consistent with the TPB prioritization process.

3.4 Capital and Operating and Maintenance Cost Estimates. Review and assess existing capital and operating and maintenance (O&M) costs. Develop updated order-of-magnitude capital, gross operating and maintenance costs for each commuter rail route given current best practices. Make use of recent commuter rail cost information available from recently initiated services as well as historic cost information from commuter rail systems that have been operating in the last 10-15 years. Use updated forecast ridership to determine operational plans (at least two operational scenarios) necessary to meet investment objectives. Use this information to determine where additional track is needed, either as full new lines (double or triple tracked) or as sidings, and preliminary identification of potential maintenance facility locations or train storage areas. Clearly identify track infrastructure requirements, particularly right of way requirements.

U.S. Department of Transportation anticipates national rail freight traffic will nearly double by 2030. Provide sufficient rail operations analysis expertise to quickly estimate for each line the approximate number of main tracks required in 2030 so that commuter rail capacity enhancements can be complementary to the anticipated build-out and not preclude that build-out.

3.5 Feasibility Assessment. Identify benefits and costs of improving the corridors to support commuter rail service. Ridership potential will be compared to other U.S. systems as a gauge of measuring potential success of the Atlanta region commuter rail system, both at startup and at a future time.

Submit an analysis of known limitations and issues. Identify concerns as coming from the community, political leadership, railroad companies, or all three.

Identify the most promising commuter rail corridors in the Atlanta region.

Discussion

3.1: Station Locations

Following are the station locations planned in previous studies.

Athens-Atlanta

Athens Multi-Modal Transportation Center
Bogart
Winder
Cedars Road/SR 316
Lawrenceville
Reagan Parkway
Lilburn
Tucker
Emory
Atlantic Station
Atlanta Multi-Modal Passenger Terminal (MMPT)/Five Points

Macon-Atlanta

Macon (existing terminal station)
Bolingbroke
Forsyth
Barnesville
Griffin
Hampton
Lovejoy
Jonesboro
Morrow
Forest Park
Aviation Boulevard/Southern Crescent
East Point
Atlanta MMPT

Gainesville-Atlanta

Gainesville
Oakwood (downtown-Main Street)
Sugar Hill
Suwanee
Duluth (Pleasant Hill Road/Buford Highway)
Norcross (Jimmy Carter Boulevard/South Peachtree)
Lenox
Atlanta MMPT

Madison-Atlanta

Madison
Social Circle
Covington (downtown-Emory Street)
Conyers (SR 138)
Lithonia (Turner Hill Road)
Stone Mountain (downtown-Old Depot)
Avondale
Atlanta MMPT

Bremen-Atlanta

Bremen
Temple
Villa Rica
Douglasville West
Austell (downtown at City Hall)
Mableton
Atlanta MMPT

Senoia-Atlanta

Senoia (Wells Street)
Peachtree City
Tyrone (Tyrone Road/SR 74)
Red Oak
East Point
Atlanta MMPT

Canton-Atlanta

Canton (SR 140 & I575)
Holly Springs
Sandy Plains
Marietta
Cumberland
Atlanta MMPT

The RLBA Team visited proposed station sites on all lines, in order to determine whether locations remain viable. Only three earlier-proposed stations may require relocation, two on the Macon-Atlanta line, and one on the Senoia line.

On the Macon-Atlanta corridor, the proposed Morrow site has been cleared, apparently in preparation for new development. The proposed Lovejoy site has been developed for

commercial purposes. It is possible that a station may be incorporated into the existing commercial development at Lovejoy. Later information, received at the end of this study, is that an alternative location has been identified.

On the Senoia-Atlanta corridor, there is considerable development at the proposed Peachtree City station at SR 54 and SR 74.

3.2: Interface with Other Modes

The ridership forecast included in this report assumes:

- Most riders drive their cars to their origin (home) train stations.
- There is ample parking at stations to accommodate all riders arriving by car.
- Riders will either walk, ride transit, utilize public or private shuttles, or other means, to egress their destination train stations.

According to the Metrolink *2002 On-Board Passenger Survey*, 83 percent of riders were either dropped off or drove to their home stations. Only two percent took transit. More people walked (3 percent) than took transit to their home station. Accordingly, transit is not seen as an important factor facilitating access to Metrolink home stations. Rather, parking is the most important.

Departing their destination stations excluding downtown Los Angeles, 16 percent of Metrolink riders either biked or walked, 13 percent rode public transit, and another 23 percent rode “other bus”, presumably some form of public transit shuttle service. Thus, connecting transit and shuttle services provided the means of continuing the trip for over a third of Metrolink riders in 2002. Interestingly, 22 percent of the riders departed destination stations by driving. It appears that these riders park cars at destinations stations overnight and use them during the day.

Departing Los Angeles Union Station in downtown Los Angeles, 7 percent rode a Metro bus (Metro is the LA County public transit agency), 50 percent rode the Metro Red Line (a subway), and 13 percent rode “other bus”, primarily a local publicly provided shuttle. This means that, collectively, 70 percent of egress for work trips from LA Union Station is served by public transit.

This study’s ridership forecast was based on the experience of Metrolink as derived from the 2002 rider survey. It assumes similar access and egress patterns evident from the surveys of Metrolink riders. This experience suggests that Atlanta should provide ample parking at home stations, so that parking is not a constraint on ridership, and it should provide convenient transit access at destination stations.

Metrolink offers a free transfer to the Metro heavy rail (Red Line subway), light rail, and bus systems serving the downtown Los Angeles Union Station, where most Metrolink trains terminate their inbound peak period runs.

The ridership forecast for the current study assumes free transfer to MARTA. All Atlanta commuter lines would terminate at the Five Points station, which is served by MARTA.

3.3: Ridership/Travel Demand Forecast

Forecasting Methodology

The methodology described below was pioneered in a similar commuter rail planning effort conducted by California Orange County Transportation Authority in 2003-2004. That study focused on improvements to Metrolink service from Orange County to Downtown Los Angeles. The forecasting process was developed based on various existing data but mostly on origin-destination information from Metrolink's 2002 On-board Passenger Survey. The methodology was adapted to the Atlanta commuter rail study and consists of several steps outlined below.

Determining Station Catchment Areas. The catchment areas represent the area around stations from which riders are most likely to be originating (home end) or terminating (work end) when using commuter rail. Any one station thus has two catchment areas; one for the home end of the trip and one for the work end of the trip. Typically, origin catchment areas are larger than the destination catchment areas as travelers can use their own car to access the station, and vary generally from about 3 to 5 miles around a station, but extending further outward for more distant stations.

For this study, the origin catchment areas were defined as 5 miles for closer-in stations and up to 10 miles for more distant stations -- those more than 35 miles from Downtown Atlanta (because of overlap between stations on the same line, the actual catchment area of a particular station is often smaller).

The destination catchment areas were defined as 3 miles around all stations. Because of the easy transfer to MARTA rail at the Atlanta MMPT station, a catchment area of 1/3 mile for each MARTA station outside the 3 miles was added for the Atlanta MMPT station but tailored to each commuter rail line to avoid back travel.

Identifying the Universe of Work Trips. With the station catchment areas defined, the study team identified the universe of work trips that could be attracted to the commuter rail lines between any pair of origin catchment area and destination catchment area. Two different procedures were used to do so depending on the location of the stations.

For stations included in the 20 counties ARC region, the home base work (HBW) trip tables developed as part of the ARC model were used. HBW trips made between the aggregation of traffic analysis zones (TAZs) at the origin station and the aggregation of TAZs at destinations were extracted from ARC trip tables for 2015. The 2030 universe of work trips between the stations was then estimated by "growing" the 2015 estimate based on the forecasted growth in population (origin) and employment (destination) as described in Task 2.

For stations outside the ARC region, Journey to Work (JTW) data from the 2000 Census was used. The JTW data is based on the long form of the Census which is administered to a controlled sample of census respondents and contains information about where people live and where they work. That information is summarized at the Census Block level. Because workers are not the same thing as work trips, workers had to be "translated" into work trips. This was done by comparing the total number of 2000 HBW trips from the ARC model to the corresponding JTW data for the region. The 2000 work trips were then expanded to future year work trips based on expected population growth at the origin as described in Section 2.

Determining the Commuter Rail Trips. In the Orange County Metrolink Study, a comparison of actual Metrolink peak period ridership between station catchment areas and the universe of work trips between those catchment areas provided an understanding of the commuter rail mode share, i.e. the percentage of all work trips that commuter rail could capture. If, for example, a commuter rail line carries 100 out of 1,000 eligible work trips between an origin station catchment area and a destination station catchment area, then the commuter rail line captures 10 percent of that work trip market.

The analysis of Metrolink data showed a relationship existed between the shares of work trips and both the distance traveled and the frequencies of trains. Commuter rail tend to capture more commute trips if the trips are longer and if offered higher service levels. Furthermore, trips heading for Downtown tended to have higher mode splits than to anywhere else (this fact appears a result of higher parking fees and good transit connections in Downtown). A table of capture rates varying with the distance to downtown and the frequency of train were developed for the Metrolink study.

The capture rates were then applied to the Atlanta projections of work trips between station areas.

Potential Adjustments. Applying capture rates by distance and train frequency from the Metrolink study to the Atlanta Commuter Rail study assumes implicitly that the other factors affecting ridership are similar between the Atlanta proposed commuter rail system and the Metrolink system at the time of the survey (2002). These assumptions were reviewed as described below and adjustments were developed when needed.

- Congestion - Los Angeles is well known as one of the worse city in the USA when it comes to congestion. Atlanta has seen its congestion level increasing significantly in the last decade. Based on the Texas Transportation Institute Annual Urban Congestion Report, the annual hours of delay per peak travelers averaged 99 hours from 2000 to 2003 in Los Angeles. Based on the 1995 to 2003 trend, the annual hours of delay for Atlanta in 2030 is estimated at 109 hours. Based on this data, it was assumed that the congestion level in Atlanta in 2030 would be similar to the congestion level in 2002 in Los Angeles, so no adjustments were deemed necessary.

- Gas price - Gas price is usually higher in California than in Georgia. However, the difference varies over time. For example at the beginning of September, 2007 the average gas price was $2.747 in LA versus $2.710 in Atlanta. A year earlier it was $3.005 versus $2.524. Recent year data on travel has also shown that relatively small difference in gas price does not affect travel patterns. As a result, it was assumed that no adjustment for gas price differential was necessary.
- Fares – Since the project team was instructed to use distance based "typical" commuter rail fares for this project, a linear regression of Metrolink monthly passes by station was estimated and applied to the Atlanta commuter rail system. The fares were estimated as a fixed cost of $2.25 plus a variable cost of $0.09 per mile. For examples, one way fare for Macon to Atlanta would cost $11.61, Lovejoy to Atlanta would cost $4.68 and Athens to Atlanta $8.91.
- Transfer Costs – Metrolink has a policy of free transfer to most local transit, so no adjustment was necessary to reflect free transfer for Atlanta.
- Parking availability and cost – Most of the Metrolink stations have free parking, so again no adjustment was necessary to reflect that policy in Atlanta
- Train speed – The average Metrolink train speed was estimated at 42 MPH, the same as for the proposed Atlanta system.
- Although the average train speed for the Atlanta system is similar to Metrolink, the Atlanta ratio of rail time to auto time varies from one line to another as some lines are more circuitous. Adjustments to the ridership were made on a line by line basis to take into account these variations.

Commuter Rail Lines Description and Assumptions

Forecasts were made for year 2030 for the 7 commuter rail lines, described earlier in this report, are summarized in Table 3.

The following describes other key assumptions used in forecasting ridership for the above alternatives:

- Three trains inbound in the morning peak period. The reverse pattern is assumed in the afternoon peak period. An additional mid-day service is assumed.
- The fare assumption is the one described above ($2.25 fixed cost plus $0.09 per mile for the one way average fare).
- Free transfer to MARTA rail and buses.
- Free and available parking at station outside downtown.
- Feeder bus service as needed.
- Ridership for each commuter rail line is estimated independently of the others.
- Potential for ridership from reverse commuters is not included.

Table 3: Commuter Rail Lines Description

Athens Line

Station Name	Milepoint	Time (MN)
MMPT/Five Points	0	-
Atlantic Station	3.4	8
Emory	9.5	10
Tucker	18.1	13
Lilburn	23.4	8
Reagan Parkway	26.7	6
Lawrenceville	30.7	7
Cedars Road	36.5	9
Winder	52.9	20
Bogart	62.9	11
Athens MMTC	73.6	13
Total Time		105

Bremen Line

Station Name	Milepoint	Time (MN)
MMPT/Five Points	0	-
Mableton	14	24
Austell B	18	4
Douglasville West	28	18
Villa Rica	36	13
Temple	45	14
Bremen	52	12
Total Time		85

Canton Line

Station Name	Milepoint	Time (MN)
MMPT/Five Points	0	-
Cumberland	11	23
Marietta	20	15
Sandy Plains	24	8
Holly Springs	38	20
Canton A	43	8
Total Time		74

Gainesville Line

Station Name	Milepoint	Time (MN)
MMPT/Five Points	0	-
Lenox	8	17
Norcross A	18	13
Duluth A	23	7
Suwanee	30	9
Sugar Hill	34	6
Oakwood A	47	16
Gainesville	53	9
Total Time		77

Macon Line

Station Name	Milepoint	Time (MN)
MMPT/Five Points	0.0	-
East Point	6.2	11
Aviation Blvd	10.3	7
Forest Park	13.6	6
Morrow	17.2	5
Jonesboro	19.9	7
Lovejoy	26.6	9
Hampton	32.8	9
Griffin	42.5	9
Barnesville	60.7	19
Forsyth	77.3	17
Bolingbroke	87.3	14
Macon	103.9	17
Total Time		130

Madison Line

Station Name	Milepoint	Time (MN)
MMPT/Five Points	0	-
Avondale	7	13
St. Mountain B	16	13
Lithonia B	25	11
Conyers C	32	9
Covington B	41	11
Social Circle	52	23
Madison	68	7
Total Time		87

Senoia Line

Station Name	Milepoint	Time (MN)
MMPT/Five Points	0	-
East Point	6	11
Red Oak	13	10
Tyrone A	24	13
Peactree City	30	10
Senoia B	38	10
Total Time		54

Results

2030 Base Forecast

A range of ridership forecasts for 2030 is summarized below in Table 4. More detailed results (with regard to three trains per peak period) are presented in Table 5 in productions to attractions format (a commuter trip from Macon to Atlanta MMPT and back is shown as two trips from Macon to Atlanta).

Table 4: 2030 Daily Ridership Summary

Line	Total Daily Boardings Three Trains per Peak Period	Total Daily Boardings Six Trains per Peak Period
Athens	3,000 - 3,700	6,100 - 7,500
Bremen	1,600 - 2,200	3,400 - 4,600
Canton	2,300 - 3,400	4,700 - 6,700
Gainesville	1,200 - 2,500	2,800 - 5,300
Macon	1,700 - 2,200	3,700 - 4,500
Madison	3,200 - 4,700	6,400 - 9,000
Senoia	1,200 - 1,700	2,600 - 3,600

Relative ridership estimates, in many cases, are reflective of the relative population levels within the individual commuter rail lines' "catchment" areas (the geographic area bounding the commuter rail lines likely to attract riders) with higher ridership in areas of higher population. There is not, however, a one-to-one relationship between population levels and ridership levels, because commuter rail ridership forecasts are based on:

- How many employees live within the commuter rail "catchment" area, defined as within 10 miles of a station outside of 35 miles from city center and within 5 miles of a station within 35 miles of the city center.

- How many of those employees' employment destinations are served by the commuter rail line (i.e. whether a person's job is near another commuter rail station, whether outlying or in the Midtown-Downtown activity center).

- The propensity of those employees to choose commuter rail as their travel mode.

Table 6 shows the total number of daily 2030 commuter trips from each commuter rail line's catchment area as well as the total number of daily commuter trips in that catchment area which have destinations served by the commuter rail line.

Table 5: 2030 Daily Ridership Forecast

Athens Line

	Productions*		Attractions*	
Station	**Low**	**High**	**Low**	**High**
Athens	10	10	0	0
Bogart	90	120	10	10
Winder	380	590	0	0
Cedars Road	1,110	1,350	30	30
Lawrenceville	0	0	130	190
Reagan Parkway	910	1,060	20	30
Lilburn	340	400	50	70
Tucker	170	180	70	90
Emory	0	0	360	460
Atlantic	0	0	230	280
Atlanta-MMPT	0	0	2,110	2,560
Total	3,010	3,710	3,010	3,710

Note: Ridership from Lawrenceville and Reagan Parkway are shown together as coming from Reagan.

Bremen Line

	Productions*		Attractions*	
Station	**Low**	**High**	**Low**	**High**
Bremen	100	120	0	0
Temple	290	360	0	0
Villa Rica	390	530	0	10
Douglasville	600	950	20	40
Austell	0	0	30	50
Mableton	200	240	30	30
Atlanta-MMPT	0	0	1,490	2,080
Total	1,580	2,200	1,580	2,200

Note: Ridership from Austell and Mableton are shown together as coming from Mableton.

Canton Line

	Productions*		Attractions*	
Station	**Low**	**High**	**Low**	**High**
Canton	290	440	0	0
Holly Springs	1,470	2,330	0	0
Sandy Plains	380	440	40	60
Marietta	100	110	90	130
Cumberland	80	90	520	770
Atlanta-MMPT	0	0	1,660	2,460
Total	2,320	3,410	2,320	3,410

* Productions to attractions format means that a commuter trip from Macon to Atlanta MMPT and back is shown as two trips from Macon to Atlanta

Gainesville Line

	Productions*		Attractions*	
Station	**Low**	**High**	**Low**	**High**
Gainesville	60	290	0	0
Oakwood	180	660	0	10
Sugar Hill	0	0	0	20
Suwanee	470	810	0	40
Duluth	0	0	0	220
Norcross	470	620	10	260
Lenox	60	70	0	380
Atlanta-MMPT	0	0	1,230	1,530
Total	1,240	2450	1,240	2,450

Notes: Ridership from Sugar Hill and Suwanee are shown together as coming from Suwanee. Ridership from Duluth and Norcross are shown together as coming from Norcross

Macon Line

	Productions*		Attractions*	
Station	**Low**	**High**	**Low**	**High**
Macon	70	70	0	0
Bolingbroke	50	60	0	0
Forsyth	70	90	10	10
Barnesville	110	140	0	0
Griffin	450	550	30	30
Hampton	250	400	0	10
Lovejoy	370	450	10	10
Jonesboro	250	270	60	60
Forest P/Morrow	120	120	70	90
Sou. Crescent	0	0	180	230
East Point	0	0	170	210
Atlanta-MMPT	0	0	1,210	1,500
Total	1,740	2,150	1,740	2,150

Madison Line

	Productions*		Attractions*	
Station	**Low**	**High**	**Low**	**High**
Madison	60	70	0	0
Social Circle	410	540	0	0
Covington	1,020	1,680	30	40
Conyers	850	1,370	60	60
Lithonia	640	740	30	40
Stone Mountain	180	200	40	50
Avondale	40	50	400	610
Atlanta-MMPT	0	0	2,640	3,850
Total	3,200	4,650	3,200	4,650

Senoia Line

	Productions*		Attractions*	
Station	**Low**	**High**	**Low**	**High**
Senoia	400	570	0	0
Peachtree City	470	690	10	10
Tyrone	190	270	10	10
Red Oak	110	130	30	40
East Point	20	20	220	310
Atlanta-MMPT	0	0	920	1,320
Total	1,190	1,680	1,190	1,680

Table 6: Daily Commuter Trips in Catchment Area

Line	Daily Work Trips From Catchement Areas	Daily Work Trips Served
Athens	926,550	135,756
Bremen	316,847	52,975
Canton	564,891	98,347
Gainesville	714,206	99,655
Macon	475,256	110,283
Madison	514,683	111,981
Senoia	241,917	62,304

Employees' destinations are as much a driver of ridership as the number of people who live near a commuter rail line.

Variation in ridership between rail lines also is due to the number and location of the stations. The highest capture rates for commuter rail are for longer distances and for downtown destinations. Table 7 shows this.

Table 7: 2030 Market and Ridership

Line	2030 Total Market	2030 Ridership (Boardings)	Rank	Market >15 Miles	CBD Market >15 Miles	CBD Mrkt as % Total
Madison	112,000	4,700	1	61,251	44,500	40%
Athens	136,000	3,700	2	56,950	32,851	24%
Canton	98,000	3,400	3	46,956	24,266	25%
Gainesville	100,000	2,500	4	36,399	22,347	22%
Macon	110,000	2,200	5	33,250	19,912	18%
Bremen	53,000	2,200	6	20,928	16,740	32%
Senoia	62,000	1,700	7	17,400	17,400	28%

For each line, the above table shows the estimated total potential market along the line, but also the potential market for trips greater than 15 miles in length and also the potential market for trips greater than 15 miles in length *and* with a downtown destination. As shown, the ranking of rail lines based on ridership matches very closely the ranking of "CBD Market > [greater than] 15 Miles" since the latter is the "best" market in terms of potential diversion to rail.

The corresponding daily revenues from ridership for 2030 are shown in Table 8. Revenues vary from $17,000 per day on the Madison line to $5,000 per day on the Senoia line on the low side and from $8,000 to $25,000 on the high side.

Table 8: 2030 Daily Revenues from Ridership ($ 2007)

Line	Total Daily Revenues Three Trains per Peak Period
Athens	$14,900 - $18,600
Bremen	$8,100 - $11,200
Canton	$11,700 - $17,500
Gainesville	$5,900 - $11,600
Macon	$9,300 - $11,600
Madison	$16,800 - $24,700
Senoia	$5,700 - $8,100

2015 Base Forecast

Similar results for year 2015 were prepared for the Macon and Athens lines. Service assumptions are the same as for 2030. Table 9 shows the expected daily ridership for three and six trains during peak period for these 2 lines. This table also shows the ridership on the Macon corridor for Lovejoy-Atlanta service, and on the Athens corridor for Tucker-Atlanta service.

Table 9: 2015 Ridership Forecast for Macon and Athens Lines

Line	Total Daily Boardings	
	Three Trains per Peak Period	**Six Trains per Peak Period**
Macon	1,700	3,700
Lovejoy	900	2,300
Athens	3,000	6,100
Tucker	300	900

Peer Cities Review

Recent average weekday boardings and number of weekday trains were obtained for 14 different commuter lines. The lines link suburban residential areas with urbanized work centers, just as a downtown Atlanta-oriented commuter rail service would. With one exception, all of the lines have been in service for five years or more, and thus as a group represent what an Atlanta commuter rail service might be able to achieve several years after start-up.

The commuter lines, the information from which was used in this analysis, are discussed briefly below. A summary of the services appears in Table 10.

Table 10: Commuter Rail Peer Group Service Summary

Service	Line	Miles	Stations	Average Weekday Boardings	Weekday Trains
VRE	Manassas Line	35	10	5,800	16
	Fredericksburg Line	55	12	6,800	13
Metrolink	Ventura County Line	71	12	4,200	20
	Antelope Valley Line	77	11	7,300	24
	San Bernardino Line	57	13	11,800	34
	Riverside Line	59	7	4,800	12
	Orange County Line	87	13	6,300	19
	IEOC Line	100	14	4,500	16
	91 Line	62	8	2,100	9
Sounder	Tacoma-Seattle Line	47	7	7,200	8
	Everett-Seattle Line	35	3	800	4
The Coaster	Oceanside-San Diego Line	41	8	6,000	22
Caltrain	Peninsula Corridor	77	32	35,000	96
ACE	Stockton-San Jose	86	10	2,800	8

Virginia Railway Express

The Virginia Railway Express (VRE) operates two lines between northern Virginia and Washington DC. These are the Manassas Line, between Manassas Junction and Union Station, and the Fredericksburg Line, between Fredericksburg and Union Station. These lines link residential communities in northern Virginia with work centers in the Washington DC metropolitan area.

Metrolink

The Metrolink commuter rail service operates seven lines serving the Los Angeles area. These are:

- The Ventura County Line, between Montalvo/Oxnard in Ventura County and Los Angeles Union Station (LAUS).
- The Antelope Valley Line, between Lancaster and LAUS.
- The San Bernardino Line, between San Bernardino and LAUS.
- The Riverside Line, between Riverside and LAUS, using the Union Pacific Railroad's Los Angeles Subdivision.
- The Orange County Line, between Oceanside in northern San Diego County and LAUS.
- The Inland Empire Orange County Line (IEOC), between San Bernardino and Oceanside. This is the only Metrolink line that does not serve LAUS.
- The 91 Line, between Riverside and LAUS, using the Burlington Northern Santa Fe Railway's San Bernardino Subdivision.

The Metrolink lines link residential community to work centers in Downtown Los Angeles and other work centers such as central Orange County.

Sounder

Sounder commuter trains operate on two lines serving Seattle and the central Puget Sound area. These lines link residential communities north and south of Seattle with downtown Seattle work centers. The majority of both service and ridership is on the southern line.

The Coaster

This service operates on one line along the Pacific Coast between Oceanside and downtown San Diego. The service links residential communities in northern San Diego County with San Diego metropolitan work centers.

Caltrain

Caltrain service operates on one line stretching from Gilroy in the south to San Francisco in the north. The line links residential communities in San Mateo and Santa Clara Counties with work centers in San Francisco and Silicon Valley (northern and central Santa Clara County). Of all peer group commuter operations, this is the oldest, with service on the line beginning in 1863. It also by far carries the most riders.

Of all the systems reviewed, Caltrain is somewhat unique in that it once was predominately oriented to San Francisco, with peak period, peak direction trains, but no more. The growth of jobs in Silicon Valley over the last 15-30 years has caused Caltrain to add reverse peak trains, and passenger flows on the system now are nearly equivalent in each direction. Caltrain also has more mid-day service than the typical commute line, with a train every half hour in each direction.

Altamont Commuter Express

Altamont Commuter Express (ACE) operates on one line stretching from Stockton in California's Central Valley, over Altamont Pass, to Pleasanton and ultimately San Jose. The line links residential communities in San Joaquin and Alameda Counties with work centers in Pleasanton and Silicon Valley.

Average weekday boardings for these 14 services were obtained for 2006 or 2007 and are summarized in Table 11.

Table 11: Average Boardings per Train of the Peer Group

Service	Line	Average Weekday Boardings	Weekday Trains	Average Riders per Train
VRE	Manassas Line	5,800	16	363
	Fredericksburg Line	6,800	13	523
Metrolink	Ventura County Line	4,200	20	210
	Antelope Valley Line	7,300	24	304
	San Bernardino Line	11,800	34	347
	Riverside Line	4,800	12	400
	Orange County Line	6,300	19	332
	IEOC Line	4,500	16	281
	91 Line	2,100	9	233
Sounder	Tacoma-Seattle Line	7,200	8	900
	Everett-Seattle Line	800	4	200
The Coaster	Oceanside-San Diego Line	6,000	22	273
Caltrain	Peninsula Corridor	35,000	96	365
ACE	Stockton-San Jose	2,800	8	350
Total		***105,400***	***301***	***350***

The peer group ridership experience shown above results in an average or arithmetic mean of 350 boardings per train. The standard deviation is 176. This high number is driven by the recent experience of Sounder trains operating on the Tacoma-Seattle service, which jumped by a third in the last year. Eliminating this line from the comparison, average boardings per train drop slightly to 335, but the standard deviation drops by half, narrowing to 87. Thus, an average of about 248 to 422 boardings per train is reasonably reflective of what commuter trains, serving similar land uses, could be expected to achieve. The average boardings per train for the Atlanta commuter rail lines, based on the 2030 forecast, are shown in Table 12.

Table 12: Atlanta Estimated Average Boardings per Train

Line	Estimated 2030 Daily Boardings			Weekday Trains	Average Riders/Train		
Athens	3,000	-	3,700	8	376	-	464
Bremen	1,600	-	2,200	8	198	-	275
Canton	2,300	-	3,400	8	290	-	426
Gainesville	1,200	-	2,500	8	155	-	306
Macon	1,700	-	2,200	8	218	-	269
Madison	3,200	-	4,700	8	400	-	581
Senoia	1,200	-	1,700	8	149	-	210
Average					***255***	-	***362***

The average boarding per train estimated for the Atlanta commuter rail lines are well within the expected range especially considering today low average population density of the Atlanta region compared to the regions included in the peer city group (Table 13).

Table 13: Average Population Density

Urban Area	2003 Population Density (Persons/Sq.Mile)
Atlanta	*1642*
Washington DC-VA-MD	3272
Los Angeles-Long Beach-Santa Ana CA	5495
Seattle WA	2320
San Diego CA	3727
San Francisco-Oakland CA	3261
San Jose CA	4295
Average	*3728*

Conclusions

This study estimates potential ridership for 7 commuter rail lines in the Atlanta region based on a review of peer cities with existing commuter rail as opposed to a forecast based on modeling only. The results show that all proposed Atlanta commuter rail lines could enjoy the same level of success as the peer cities, with some lines doing better than others.

3.4: Capital, Operating and Maintenance Cost Estimates

Basis for Cost Estimates

It is very important to understand that the cost of new commuter rail service cannot be known until a commuter rail access agreement is negotiated with the freight railroad.

Freight railroad policies are clearly articulated; agreements to host new commuter rail service will be based upon infrastructure improvements which result in no derogation of freight rail service.

For purposes of this study, RLBA (1) has carefully reviewed recent freight railroad policy statements, (2) has considered growing freight rail traffic volumes and the freight rail constraints already indicated in the Atlanta region, a freight rail hub, (3) has made a judgment regarding what capital improvements will be agreed to in a future negotiated settlement between the State and the railroad(s), and (4) has prepared a detailed estimate of the cost of those improvements.

Again, the capital cost estimates with regard to right of way infrastructure are based on judgment and knowledge of railroad policies and practices, but they must be considered as estimates which may change considerably in the actual instance of a future negotiated access agreement.

Commuter Rail Capacity Improvements

This initial section within Subtask 3.4 addresses the capacity-related improvements projected to be necessary to achieve agreements with host railroads to gain access to desired commuter rail corridors. Condition and speed improvements, stations and support facilities will be addressed in the later portions of this task.

Commuter rail has flourished over the past 25 years, with new-start services in Northern Virginia, Florida, Southern California and other locations. One advantage that helped spawn development of these new-start commuter rail services was "Capital costs can be modest in comparison with other rail modes because … right-of-way is assembled, way and structure costs can be shared with freight and intercity passenger services, and equipment is standard.[20]" Successful implementation of new-start services and interest in taking advantage of existing rail corridors sparked investigations into the feasibility of commuter rail in Atlanta and many other communities across the country.

But the freight railroad business has changed dramatically over those same 25 years. Revenue ton-miles on the Class1 (largest) railroads increased from 1.04 trillion in 1991 to 1.77 trillion in 2006. Freight traffic density, measured in millions of revenue ton-miles per owned mile of track, increased from 8.9 in 1991 to 17.0 in 2004.[21] This means that there is almost twice as much traffic per mile of track as in 1991 at the early edge of the commuter rail renaissance. Now the owners of that assembled right-or-way that once may have been available for sharing, as indicated in the paragraph above, find that many of their main lines are overcrowded with freight traffic.

Along with increased traffic, the railroads have achieved a degree of pricing power not enjoyed during the "… 27 years of declining prices in real dollars following partial deregulation under Staggers …"[22] With freight traffic booming and predicted to increase substantially over the next 20 years, and with railroad financial performance improving steadily, there is no incentive for management to grant access to commuter rail services in return for nominal operating fees and modest improvements. Quite the opposite, rail managements are better positioned than ever to demand extensive capital improvements that address present and expected capacity needs before admitting new users to their lines. Some lines may be deemed too strategic and sensitive for freight managements to admit new passenger services at any price. *On the other hand, none of this is to suggest that commuter rail access agreements cannot be successfully negotiated (i.e., to the satisfaction of both parties). The freight railroads are more than ever amenable to accepting public funding for right of way capacity improvements*.

[20] "North American Commuter Rail", by Walter E. Zullig and S. David Phraner, published on-line by the Transportation Research Board at http://onlinepubs.trb.org/onlinepubs/millennium/00080.pdf.
[21] "Railroad Facts, 2005 Edition" and http://www.aar.org/PubCommon/Documents/AboutTheIndustry/Statistics.pdf, both published by the Association of American Railroads.
[22] Railway Age, July 2007, page 19.

Capacity Improvements Context

Current consideration of commuter rail in the Atlanta region dates to at least 1994. While the public sector wrestled with questions of the desirability of and ability to fund commuter rail, CSX and NS experienced the changes described above. Earlier planning assumptions related to capacity improvements may no longer be valid in the current environment. Hence this study, which updates capital cost estimates (along with ridership projections).

The RFP calls for "capital cost estimates given real-world freight considerations" in the context of "current and future freight needs".

How do railroads really feel in the "real world" about shared passenger-freight operations? In an article about Nashville area commuter rail, Gary Sease, spokesman for CSX, based in Jacksonville, Florida was quoted as saying, "For about the past three years, freight demand has continued to increase at a virtually unprecedented rate. ... All things considered, we would prefer to focus exclusively on freight, but from a public policy standpoint, that's not completely possible." (emphasis added)[23]

Capacity Planning

Simulation is the best way to test potential additions of traffic and infrastructure to a complex operating situation. It is a lengthy and expensive process. In order for simulation to be meaningful, several preconditions should be in place:

- Host railroad(s) and other operators agree to participate in the simulation process, providing review and comments,
- Host railroad(s) and other operators agree to provide infrastructure and train operations information for relevant existing and future scenarios, and
- Ideally, host railroad(s) and other operators agree to recognize or be committed to simulation results.

Steps in the simulation process include inputting the physical characteristics of each railroad's track structure, representing existing train operations, running a base case that represents existing operation, calibrating the model to match actual behavior of the network, and then testing various future traffic levels and proposed improvements to determine what sets of improvements support operating various mixes and levels of future traffic. Construction costs then may be developed associated with selected packages of infrastructure improvements.

Given confidence in the simulation model and the modeling process, simulation develops a fact-based determination of necessary improvements. However, unless the parties have entered into an iron-clad agreement to be bound by the results of the simulation, it is likely that the final set of improvements deemed necessary will be determined by negotiation rather than being strictly fact-based. Since the railroads owning the corridors have the stronger position, except for some amount of negotiating

[23] From an Associated Press report by Travis Loller filed on Oct. 1, 2006, as quoted on the United Transportation Union website at http://www.utu.org/print_news.cfm?ArticleID=30829.

give-and-take, the railroads will determine what the infrastructure requirements will be. Again, this is not to say that it is all one-sided in favor of the freight railroads. Success in negotiating commuter rail access will depend upon balancing the railroad's interest in capacity improvements which will benefit the railroad also, and the public's interest in getting on an existing right of way thus providing a new public travel option.

The scope of this analysis does not contain a requirement for nor the time or resources to conduct simulation. Instead the focus will be upon identifying what the railroads may require, based upon:

- First, as a minimum, improvements that a neutral party (in this case, the consultant, RLBA) would determine necessary to support the overlay of commuter rail service upon the freight volumes assumed for the scenario.
- Second, improvements that the consultant believes the host railroad is likely to seek as a requirement of shared commuter-freight use of a given rail corridor.

Host Railroad Planning Perspective

The infrastructure that any railroad would require to support train operations on its track by another entity is more robust than were it to operate the same service itself. If a railroad were to decide to implement a fleet of short fast intermodal trains, similar in operating characteristics to commuter trains, it likely would make the minimum of infrastructure improvements and then implement the service and see how it performs. After an initial operating period, if the new service became permanent but needed further infrastructure improvements to support it, those could be made at that time.

The scenario does not play out the same way when the trains to be added are those of another party, especially those of a public agency. A railroad must anticipate all of the infrastructure improvements needed before the first public train is operated. The notion of testing the operation and then getting more public funding for additional improvements creates a financial risk that public agencies are unwilling to assume and one that may be precluded by the terms of federal funding assistance, if used. From the railroad's perspective, if capacity becomes tight it can scale back or cancel its own service, but it may not ever be able to evict a public-sponsored commuter service.

What does this mean in terms of capacity negotiations? Railroad planning staff must anticipate the greatest amount of infrastructure that could be required to support commuter rail service:

- At the level of commuter service prescribed in the contract, remembering that freight volumes on a given line are subject to change not only with growth in existing traffic in that business lane but as network flows shift and new lines of business (such as ethanol) are developed,
- Under the maximum level of freight service anticipated in the contract period,
- Potentially, under levels of freight service that might be reached after the initial contract given the questionable ability ever to displace the public commuter service, and
- Always, always with a sufficient margin of safety to protect the company's interests and the professional reputation of the planner/negotiator. Obviously the

stakes are highest and the safety margin highest on lines that are key components of the freight railroad's core system.

Finally, given how small the typical revenues associated with hosting commuter service are, compared with freight revenues, the host railroad may decide that in order to justify hosting commuter service it needs to obtain infrastructure improvements in excess of those planned in accordance with the above.

Public Planning Perspective

Moving now from the perspective of a railroad negotiator to that of a public planner, this means that anticipating railroad requirements requires the blending of two approaches. First, specific improvements necessary to host near-term service must be developed using experience, simulation or both. Second, the railroad's vision for the route and its future traffic potential as well as its long term anticipations with respect to overall prospects of the rail industry must be estimated. The two must be combined, taking into consideration whether the railroad is perceived as receptive or hostile to the proposed project. The results of this process, no matter how expertly developed, are necessarily subjective and uncertain in nature.

Railroad Policy

CSX and NS representatives have spoken frequently about their company policies concerning commuter rail.

In response to an inquiry on behalf of the Columbia, SC, area, CSX Resident Vice President Dan Green advised RLBA in March 2000 that CSX would "…require, at a minimum, for passenger services:

- A separate dedicated rail corridor – no mixing of freight and passenger services;
- 100 % separation of all at-grade road crossings;
- All pedestrian crossings must be separated – no at-grade pedestrian crossings will be permitted."

CSX AVP-Operations Planning John Gibson, in October 2001 stated, "Passenger operations must be transparent to the freight operations at peak passenger head-ways (*emphasis added*). If you want to consume the cheap capacity for passenger operations, then you will have to build enough capacity for freight growth well into the future, not just enough to address current conditions or to cover just the next few years."

The underlined portion of Mr. Gibson's remarks is crucial. He points out that passenger-related improvement projects that maintain average freight performance over a 24-hour period are inadequate. RLBA understands him to mean that CSX freight trains should be able to operate through the commuter territory at peak commuter period with no more delay than experienced prior to commuter service implementation.

Mr. Gibson's second sentence also is important, in that it offers (in RLBA's thinking) some hope of implementing passenger in the near term with improvements appropriate to current conditions as long as the passenger operator commits to funding capacity

improvements in the future as traffic grows. While this sort of open-ended commitment may not be desirable to public agencies, RLBA believes that on busy CSX (or other) freight lines, the only choice will be to construct a virtually separate passenger system on the edge (not the heart) of the right-of-way at the time of implementation or to pledge to fund whatever is needed in the future.

In January, 2004, CXS Director of Operations Planning Rosanne Kohler wrote, "Passenger rail projects that diminish existing and future *(emphasis added)* rail capacity can be inconsistent with the true objectives of transportation planners, which is to reduce pollution and congestion on the roadways."

NS policy issued by Bill Schafer, Director Corporate Affairs, in June 2003, strikes a note similar to that of CSX with respect to transparency of passenger operations: "Passenger train operation must be 'transparent' to our freight operations. We define transparency as the provision of sufficient infrastructure for passenger trains and freight trains to operate without delay to either, and to allow for the growth of both."

The NS policy goes on to say "Delay to freight trains by passenger trains, however minimal, is unacceptable. Sufficient infrastructure must be furnished so that each type of train can operate without getting in the other's way."

Implications upon Atlanta Commuter Rail

Why go to the trouble to repeat here the CSX and NS policy statements that by now are well known to planners? RLBA believes that while policies like these may have been somewhat negotiable in the past, and may still have some room for compromise in some specific locations, they provide an accurate indication of the requirements that CSX and NS will impose upon new commuter rail service in metropolitan Atlanta.

In developing proposed infrastructure requirements, RLBA first turned to recent work done with respect to two prime candidate corridors. Athens line improvements were studied in 2003. Recommendations of that study were the starting point for this analysis. Macon line improvements were presented in a year 2001 study and were the subject of agreements between NS and GDOT and others. These projects were adopted in this analysis and cost estimates were updated

RLBA has recognized the principle expressed by both railroads of attempting to avoid commuter rail-caused interference with freight operations. In doing so, several guidelines were established:

- All lines should have a CTC signal system over the entire length
- Lines with freight traffic exceeding 20 trains per day were considered candidates for installation of full double track, because (1) traffic is expected to grow, (2) host railroads have set forth non-interference standards, and (3) there may be places in the downtown area where there is not room to add trackage, which makes it even more important to beef up the capacity of adjacent line segments.

Services which traverse the downtown "core", loosely defined as the area between Spring or the Circle Connection on the south/east and Howell Interlocking on the north/west, may require capacity improvements the identification of which is beyond the means devoted to this analysis. The concurrent "Atlanta Terminal Study" may provide further insights when completed. Despite this caveat, it is worthwhile to consider that downtown core issue on a line by line basis.

- Athens service is proposed to traverse the core on a new line diverging from CSX at Mina, thus avoiding all freight interference between there and the MMPT. On the other hand, construction of this proposed new line within the NS corridor between Mina and Howell, and through the core, would consume right-of-way through two relatively narrow corridor segments. It is understood that this may be a problem.
- Macon service would not traverse the core, but rather diverges from the NS main line at Spring and enters MMPT by way of the Circle Track.
- Gainesville service would not traverse the core.
- Madison service would not traverse the core.
- Bremen service would traverse the core.
- Senoia service would not traverse the core (as defined above, for purpose of this discussion), but would enter downtown and the MMPT along the same route used by Macon service.
- Canton service would traverse the core.

While it cannot be said that Atlanta capacity issues are restricted to just the core area, it may be seen from the above that the downtown core problem applies most directly to prospective Bremen and Canton services (and the Athens service, if the proposed separate passenger track through the core is not adopted).

It must be emphasized at this point that the foregoing analysis of the "core" and other downtown Atlanta rail corridors is not rigorous and is not based upon a comprehensive evaluation. This analysis is performed without field examination or consultation with the railroads regarding detailed capacity issues. It must also be emphasized that solution to downtown Atlanta rail network capacity issues is a very important step on the process, following this study, of implementing any commuter rail service, with the exception of Lovejoy-Atlanta service, since it is understood that the State and Norfolk Southern have already come to terms.

Recommended Atlanta Region Capacity Improvements

RLBA's recommendation with respect to each service corridor is presented below.

Athens Service

CSX Abbeville Subdivision
CSX Atlanta Terminal Subdivision

Capacity Improvements:

- Athens-Mina: install second main track wherever possible, connecting existing sidings.

- Mina-MMPT: Construct new track with associated interlocked connection and signal system diverging from CSX at Mina and passing under the NS Norcross District tracks, then paralleling NS to the vicinity of Howell and there turning to parallel the CSX tracks between Howell and the MMPT. It is understood that there will be a crossover requirement resulting in potential passenger/freight interference. This track segment potentially could be used by Canton service and in part by Bremen service. It is understood that there may be insufficient space to add a track within the NS corridor between Mina and Howell. Resolution of this issue is deemed beyond the scope of this study.

Macon Service

NS Griffin District, Georgia Division

Capacity Improvements:

- Absent good reason, not evident at this time, RLBA recommends sticking with the improvements already agreed to by NS and public bodies.
- RLBA understands that the agreement calls for CTC signal system installation, lengthening of sidings as well as condition and speed-related improvements.

Gainesville Service

NS Greenville District

Capacity Improvements:

- Gainesville-Norcross: install second main track wherever possible.
- Norcross-Armour: No changes; currently double track and CTC.
- Armour-CSX Connection via Decatur Street Belt Line: This segment should be rebuilt as necessary to support comfortable and reliable passenger service. It is projected to need tie and surface work as well as probable rail replacement. In addition, a CTC signal system should be installed and connections at both end of the Belt Line should be interlocked and upgraded. Once signal work and necessary condition improvements are made, no other capacity improvements are needed on this line that presently handles no through trains. (One observer states that although the Decatur Belt Line has not been formally abandoned, it is owned by a developer and that light rail transit is planned on it.)
- CSX/Decatur Belt Line Connection-MMPT (via CSX): This segment is double track, but only one track is equipped with a signal system. The other track, currently operated under yard limit rules, should be equipped with a CTC signal system. This segment also would be used by Madison Service.

Madison

CSX Georgia Subdivision

Capacity Improvements:

- Madison-Kirkwood: Install CTC signal system. In addition, the 1995 study (page 25) called for a generous set of improvements in terms of siding construction and extension and a short segment of double track. All of those same improvements

are recommended. Current train volume is modest at seven per day north of Kirkwood.

- Kirkwood-MMPT: This segment is double track, but only one track is equipped with a signal system. The other track, Track 1, currently operated under yard limit rules, should be equipped with a CTC signal system. A portion of this segment would be shared with Gainesville service.

Bremen

NS East End District, Alabama Division
NS Atlanta North and Atlanta South Districts, Georgia Division
Improvements:

- Bremen-Austell: Install second main track wherever possible, connecting existing sidings.
- Austell-Atlanta: This segment is heavily used. RLBA proposes no specific improvements to segment which currently consists of two or three main tracks equipped with a CTC signal system. However, RLBA further notes that improvements over this segment may be specified by the ongoing Atlanta Terminal Study.

Senoia

CSX Manchester Subdivision
CSX Stonewall Connection
CSX Atlanta Terminal Subdivision
NS Griffin District
NS Atlanta South District
Improvements:

- Senoia-Stonewall: Install CTC signal system, extend and improve two sidings (Peachtree City and Tyrone).[24]
- Stonewall-East Point: Install CTC signal system, construct new siding.
- East Point-MMPT: Improvements installed for Macon service apply also to this segment.

Canton

Georgia Northeastern Railroad
CSX W&A Subdivision
Improvements:

- Canton-Elizabeth: Upgrade tie and rail conditions to sustain passenger train speeds and ride quality. Install CTC signal system.
- Elizabeth-MMPT: Upgrade all single track segments to double track, including a new bridge crossing the Chattahoochee River.
- Considerable speed and condition improvements also will be necessary on the Georgia Northeastern Railroad. These improvements also will increase line capacity. The 2004 Canton report is relevant in this regard.

[24] RLBA was informed that Peachtree City siding was extended last year by CSX.

Infrastructure Capital Costs

This section addresses capital costs associated with track, bridge and other infrastructure improvements deemed necessary to implement commuter rail service.

Methods Used

Physical improvements to the respective corridors are based upon assumptions regarding what will be required to obtain railroad access agreements. Cost updates were performed with regard to five corridors from the 1995 study, and with regard to the two corridors which were studied more recently. Following is a list of the seven corridors and the year dollar of their cost estimates.

Athens (2002)
Macon (2000)
Gainesville (1994)
Madison (1994)
Bremen (1994)
Senoia (1994)
Canton (1994)

Cost estimates also are provided for the two “sub-corridor” commuter rail prospects added to this study: Tucker-Atlanta on the Athens corridor, and Lovejoy-Atlanta on the Macon corridor.

Previous studies applied unit costs to quantities required for specified improvements, and this method is used in the current cost updates. Capital cost estimates in the current study are based upon an independent assessment of infrastructure and equipment requirements and updated unit costs, which were discussed with a Class I railroad to assure reasonableness.

Some physical improvements specified in the previous study have in fact been accomplished. Those improvements are “zeroed out” in the cost estimate breakdown and are shown in red lettering in the cost estimate tables. Comparison of railroad-furnished track charts and requirements stated in previous studies also indicates the need to add certain infrastructure items no included in the previous studies.

Items of most concern are signaling and overhead bridges (OHB). Requirements for both are quite site specific, and can vary significantly owing to local conditions. Escalated from the 1995 study, unit cost per mile for CTC (centralized traffic control) appears to be $ 138,000. This unit cost is less than similar estimates in the 2001 Macon study, $125,000 per mile before adding a fifteen percent contingency. Escalating $125,000 per mile to 2007 dollars amounts to $168,000 before applying a contingency. In the current study, RLBA utilizes a figure of $170,000 per mile for CTC signaling on main track, and 75 percent of that cost, or $127,500 per mile, for signaling side tracks.

OHB costs vary widely based on site conditions such as clear width of ROW between support columns, and the possible need to widen or reconstruct the bridge. Where a new OHB is shown on the current track chart, it is assumed that sufficient width is present to install a second main track. A lump sum of $250,000 is utilized for each new OHB to account for minor construction related items such as realignment of track, building crash walls (if not presently there), engineering and other factors.

Capital costs are estimated for track access to the Atlanta MMPT on each corridor by indexing estimates in the Macon and Athens studies.

Athens-Atlanta Corridor

Track and signal capital costs for this corridor are estimated to be $389 million. Line items from the 2003 study were checked against current, CSX-furnished track charts along with the specified improvements set forth earlier in this section to include:

- extend double track from Mina to Athens
- signal improvements as required
- bridge replacement as necessary
- install new #20 crossovers
- install new #20 turnouts as required to access connection tracks
- remove all old materials
- install new stations
- crossing upgrades and replacements as necessary
- include provisions for overnight storage of rail equipment

Where the current track chart shows variances from estimates made in the 2003 study, those line items were highlighted in red, and if no cost allowance had previously been made, an estimate is provided. Those variances for this corridor included:

- allowances for two HB-DE detectors on new track at Winder and Gloster
- nine OHB allowances for modifications
- install 93 feet of ballast bridges
- install #10 and #20 turnouts as required
- make allowances for a track shift at Winder
- add double track between the sidings

Infrastructure capital costs are estimated at $427 million. A complete breakdown of estimated costs for the Athens-Atlanta corridor is at Table 14 in Appendix C, which contains all infrastructure cost estimates.

In this and in other corridors, the freight railroad must approve the extents of infrastructure improvements required for commuter rail access, which is subject to negotiation.

Tucker-Atlanta

Tucker-Atlanta is a "sub-corridor" of the Athens-Atlanta corridor. Estimated infrastructure cost, $151 million, is a sub-set of the Athens-Atlanta corridor. A breakdown of these costs may be found in Table 15 in Appendix C.

Macon-Atlanta Corridor

Updated track and signal capital costs are estimated at $328. It should be noted that the 2000 unit costs used in the 2001 study contained a fifteen (15) percent contingency for all items along with a five (5) percent environmental contingency for new construction. The same escalation factor was applied to all unit costs after contingencies to arrive at current (2007) unit costs. Line items from the 2001 study were checked against current, NS-furnished track charts along with the specified improvements set forth earlier in this section to include the following:

- install CTC signaling over the entire corridor, Edgewood-Spring (102.3 miles)
- upgrade/install 160 at-grade, highway-rail crossings on newly constructed or upgraded track
- rehabilitate entire line track structure
- capacity improvements to existing infrastructure include building two entirely new sidings of two miles long each
- build a four mile long thoroughfare at Griffin
- build 5.4 miles of new main track connecting Hapeville-Forrest Park-Morrow
- improve 7.2 miles of track between Hapeville and Spring
- construct one mile of new storage tracks
- restore the Edgewood wye
- install new #20 turnouts on each end of passing sidings, ends of double tracks and double crossovers
- remove all old materials
- install new stations along with land, parking and other capital costs
- add provisions for overnight storage of rail equipment

Please refer to Table 16 in Appendix C for a breakdown of this corridor's infrastructure cost estimate.

Lovejoy-Atlanta

Information provided by Georgia Department of Transportation (GDOT) describes three agreements, one among Norfolk Southern, GDOT, and the Georgia Rail Passenger Authority (GRPA), and the other two between GDOT and GRPA and between GDOT and Clayton County. The first agreement mentioned would permit rail passenger service between Atlanta and Lovejoy, with the possibility of expansion of service to Hampton and Griffin, and addition of the Southern Crescent station (Aviation Boulevard, near Atlanta International Airport). The term of the agreement is 25 years and initially would include construction of six stations: Lovejoy, Jonesboro, Morrow, Forest Park,

East Point and MMPT. Norfolk Southern will be responsible for operation of the passenger service. GDOT and GRPA would be responsible for obtaining $500 million per occurrence liability insurance. Construction of track and station improvements and train control signals between Lovejoy and MMPT would total $54 million, and this work would permit 79 mph operations on signalized portions of the track. Operating and maintenance costs are estimated at $3.69 million for the first year, $6.42 million for the second, $7.4 million for the third, $8.37 million the fourth, $9.08 million the fifth, and $9.41 million the sixth year. Annual fees for use of Norfolk Southern track are $831,749 per year, including dispatching. The $54 million figure does not include locomotives and passenger coaches, but does not include stations.

Gainesville-Atlanta Corridor

Track and signal capital costs for this corridor are estimated at $113. Line items from the 1995 study were checked against current, NS and CSX-furnished track charts along with the specified improvements set forth earlier in this section to include the following:

- construct double track (Chicopee-Grif) 4.5 miles
- CTC Decatur Belt Line – four miles
- install new #20 turnouts on ends of double tracks
- install new #10 turnouts as required
- remove all old materials
- install five at-grade, highway-rail crossings on newly constructed track
- install new stations
- add provisions for overnight storage of rail equipment

Where current track charts show variances from the 1995 study, those line items are highlighted in red, and if no cost allowance had previously been made, an estimate is provided. Those variances in this corridor included:

- construct 16.7 miles of new double track between Allen and Walters, Shadow Brook and Duluth, and Carolina and Norcross
- CTC all newly-constructed double track
- CTC Chicopee-Grif (4.5 miles)
- CTC one CSX main track (1.4 miles) between West Hulsey Yard and MMPT
- upgrade existing Belt Line track (four miles)
- install eight #20 turnouts at ends of double track
- install four #10 turnouts as required
- remove old materials
- construct 478 feet of new bridge (MP 609.1 and 610.5)
- extending two box culverts
- add allowances for three new SAD detectors at Oakwood, Walters and Duluth
- add six OHB allowances
- provide for ten new public at-grade highway-rail crossings
- provide for one new private at-grade highway-rail crossing

Please refer to Table 17 in Appendix C for a breakdown associated with this corridor.

Madison-Atlanta Corridor

Track and signal capital costs are estimated at $99 million. Line items from the 1995 study were checked against current CSX-furnished track charts along with the specified improvements set forth earlier in this section to include the following:

- install CTC signaling over entire corridor (69.6 miles)
- extend double track three miles
- extend and upgrade five sidings
- build one entirely new siding
- install new #20 turnouts on each end of passing sidings and ends of double tracks
- install at-grade highway-rail crossings on newly constructed track
- remove all old materials
- install new stations
- add provisions for overnight storage of rail equipment

Where the current track chart shows variances from the original 1995 study, those line items were highlighted in red and if no cost allowance had previously been made, an estimate is provided. Those variances for this corridor included:

- extending one arch culvert
- allowances for a HB-DE detector on the new track at Stone Mountain
- three OHB allowances
- three new public at-grade highway-rail crossings
- three new private at-grade highway-rail crossings

Please see Table 18 in Appendix C for a cost breakdown.

Bremen-Atlanta Corridor

Track and signal capital costs are estimated at $119 million. Line items from the 1995 study were checked against current, NS and CSX-furnished track charts along with the specified improvements described earlier in this section to include the following:

- install two new crossovers at Howell Junction
- extend double track 1.8 miles (Carroll-Baggett)
- upgrade existing Douglasville siding (1.3 miles)
- install four new #20 turnouts on ends of double tracks
- remove all old materials
- install eight at-grade highway-rail crossings on newly constructed track
- install new stations

- add provisions for overnight storage of rail equipment

Where the current track chart showed variances from the 1995 study, those line items are highlighted in red lettering, and if no cost allowance had previously been made, an estimate is provided. Those variances for this corridor included:

- construct 24.1 miles of double track between Austell and Douglasville, Douglasville and Winston, Villa Rica and Taylor, and Temple and Sewell
- add CTC on all new constructed main track
- construct 391 feet of new bridge (MP 671.5, 672.9, 673.2 and 675.3)
- install eight #20 turnouts at ends of double track
- install seven #10 turnouts as required
- remove all old materials
- add allowances for four HBD-DED detectors on the newly constructed track at Lithia Springs, Winston, Villa Rica and Morgan
- add four OHB allowances
- provide for thirty one new public at-grade highway-rail crossings
- provide for three new private at-grade highway-rail crossings

Please refer to Table 19 in Appendix C for a breakdown.

Senoia-Atlanta Corridor

Track and signal capital costs are estimated at $75 million. Line items from the 1995 study were checked against current CSX-furnished track charts, and specified improvements described earlier are added. The improvements include the following:

- install CTC signaling over the A&WP Subdivision (10.0 miles)
- extend Tyrone siding 2.2 miles
- upgrade two existing sidings (Tyrone and Peachtree)
- upgrade Stonewall connection track
- construct new two mile long siding (MP XXB 14.3 to 16.3)
- install new #20 turnouts on each end of passing sidings and connection tracks
- install at-grade highway-rail crossings on newly constructed track
- remove all old materials
- install new stations
- provisions for overnight storage of rail equipment

Where the current track chart showed variances from the original 1995 study, those line items are highlighted in red, and if no cost allowance had previously been made, an estimate is provided. Those variances in this corridor include:

- add CTC signaling to Manchester Subdivision (MP ANB 822.2-844.0, or approximately 21.8 miles)

- add CTC signaling to Tyrone and Peachtree sidings (2.9 and 1.3 miles, respectively)
- add CTC to Stonewall connection track (1.2 miles)
- install four new public at-grade highway-rail crossings
- install/remove one #10 industrial turnout

Please refer to Table 20 in Appendix C for a breakdown.

This corridor relies on significant improvements between East Point and the MMPT on NS which are discussed under the Macon Corridor and that portion following the same route is assumed to be identical.

Canton-Atlanta Corridor

Line items from the 1995 study were checked against current, CSX-furnished track charts along with the specified improvements described earlier in this section to include the following:

- install new double main track between Gilstrap and South Smyrna (5.6 miles)
- install new #20 turnouts on each end of new double track main and at the GNRR connection at Elizabeth
- install at-grade highway-rail crossings on newly constructed track
- remove all old materials
- install new stations
- add provisions for overnight storage of rail equipment

According to the CSX-furnished track chart, certain line items had already been accomplished and therefore were zeroed out including the following:

- 4.3 miles of proposed double main track (MP WA 15.2-17.5 and MP WA 19.2-21.2)
- two bridges over Mill Creek (MP WA 5.8 and 6.5)
- three corresponding #20 turnouts
- eleven at-grade highway-rail grade crossings
- four installation/removal of industrial turnouts

Where the current CSX track chart shows variances from the original 1995 study, those line items are highlighted in red, and if no cost allowance had previously been made, an estimate is provided. Those variances for this corridor included the following:

- install CTC signaling over the same new double track main (5.6 miles)
- one bridge, GA Power slough at MP WA 7.6 (84 feet)
- two installation/removal of industrial turnouts

This corridor encompasses some of the most heavily-trafficked CSX tracks in the Atlanta region, and capacity improvements have been made since the 1995 study.

Line items from the 1995 study were checked against information gained from the current GNRR-furnished timetable (no track charts were available) along with the specified improvements described earlier in this section to include the following:

- upgrade main track between Elizabeth and Canton (22.3 miles)
- add CTC to main track (22.3 miles)
- upgrade and extend (0.5 mile) Toonigh siding
- upgrade 37 public at-grade highway-rail crossings
- install new stations
- add provisions for overnight storage of rail equipment

Where current information differs from the original 1995 study, those line items are highlighted in red, and if no cost allowance had previously been made, an estimate is provided. Those variances for the GNRR portion of this corridor include the following:

- CTC Toonigh siding
- install two #20 turnouts on each end of Toonigh siding
- install three industrial turnouts (100, 200 and 300 leads)
- fourteen private, at-grade, highway-rail crossings
- remove all old materials
- zero out line items of three public, at-grade, highway-rail crossings

Please refer to Table 21 in Appendix C for a breakdown associated with this corridor.

Track and signal capital costs for the GNRR and CSX corridor between Canton and Atlanta are estimated at $106 million.

Equipment Costs

Equipment costs are based upon ridership estimates and operating plans for each of the seven corridors. In addition, equipment costs are calculated for prospective commuter rail service between Lovejoy and Atlanta on the Macon corridor, and between Tucker and Atlanta on the Athens corridor, again, based on the number of trains.

GDOT planning with regard to the proposed Lovejoy-Atlanta commuter rail service was not provided to RLBA[25] until specific questions were asked, late in the study, and then, complete information was not provided. Thus the assumptions of this study apparently do not represent current GDOT planning. RLBA learned at the time of comments on its study report (late September 2007) that GDOT plans four peak period commuter trains for Lovejoy service. It is now understood, following distribution of the RLBA study report

[25] RLBA requested this information at the study's kickoff meeting on July 9, 2007.

in September, that GDOT plans four peak Lovejoy trains, and use of second hand equipment, rather than new equipment.

The following RLBA equipment requirements are based upon this study's scope of work. Costs are for new equipment.

	Three peak period trains				Six peak period trains			
Corridor	**Loco-motives**	**Cab cars**	**Coaches**	**Cost (2007 $million)**	**Loco-motives**	**Cab cars**	**Coaches**	**Cost (2007 $million)**
Athens	4	5	9	$44.4	7	8	26	$99.4
Tucker	4	5	0	$23.7	7	8	0	$39.6
Macon	4	5	6	$37.5	7	8	12	$67.2
Lovejoy	4	5	0	$23.7	7	8	6	$53.4
Bremen	4	5	6	$37.5	7	8	12	$67.2
Canton	4	5	6	$37.5	7	8	19	$83.3
Gainesville	4	5	3	$30.6	7	8	6	$53.4
Madison	4	5	12	$51.3	7	8	26	$99.4
Senoia	4	5	3	$30.6	7	8	6	$53.4

Total Capital Costs

Total capital costs are as shown:

		Three peak trains		Six peak trains	
Corridor	**Infrastructure Cost (millions)**	**Equipment Cost (2007 $million)**	**Total Capital Cost ($million)**	**Equipment Cost (2007 $million)**	**Total Capital Cost ($million)**
Athens	$427	$44.4	$471	$99.4	$526
Tucker	$152	$23.7	$176	$39.6	$192
Macon	$328	$37.5	$366	$67.2	$395
Lovejoy	$54	$23.7	$78	$53.4	$107
Bremen	$119	$37.5	$157	$67.2	$186
Canton	$106	$37.5	$144	$83.3	$189
Gainesville	$113	$30.6	$144	$53.4	$166
Madison	$99	$51.3	$150	$99.4	$198
Senoia	$75	$30.6	$106	$53.4	$128

Infrastructure cost includes track and other right of way improvements as well as signaling and stations. Equipment cost includes locomotives and passenger coaches.

Operating and Maintenance Costs

Operating and maintenance costs include labor, fuel, equipment maintenance, railroad access fees, maintenance of way, station maintenance and operations, contractor management and fees, general administrative and marketing, insurance and contingency.

Corridor	Operating and Maintenance Cost, Three Peak Trains (2007 $million)	Operating and Maintenance Cost, Six Peak Trains (2007 $million)
Athens	$15.0	$21.9
Tucker	$7.2	$9.8
Macon	$17.2	$26.1
Lovejoy	$8.6	$12.3
Bremen	$11.7	$17.4
Canton	$10.6	$16.0
Gainesville	$11.7	$17.2
Madison	$13.9	$20.1
Senoia	$9.2	$13.8

It is noted that the Norfolk Southern-GDOT agreement regarding prospective Lovejoy-Atlanta service includes lower operating and maintenance costs than are indicated in the above table, which is based, in the case of Lovejoy, on six trains at peak service.

Furthermore it is understood that GDOT's agreement with Norfolk Southern indicates a $3.69 million operating cost for the first year, and that GDOT planning foresees four peak Lovejoy trains and use of second hand equipment, which would result in a reduced equipment cost.

Estimated Macon-Atlanta commuter rail line operating and maintenance costs are relatively high because, at 102 route-miles, this is by far the longest of the seven prospective commuter rail corridors. The next longest corridor is Athens-Atlanta, at 74 route-miles, and the shortest corridor is Senoia-Atlanta at 38 route-miles. The principal components of operating and maintenance costs include locomotive fuel, equipment maintenance, railroad access fees and maintenance of way, insurance, and contractor management and fees. The estimated cost of all of these components increases with increasing length of rail corridor. Also station maintenance and operations costs are higher on the Macon-Atlanta line because there are more proposed stations on it.

3.5: Feasibility Assessment

This feasibility assessment identifies benefits and costs of commuter rail service, compares ridership potential to that of other commuter rail systems in the United States, analyzes limitations and issues, and identifies the most promising commuter rail corridors in the Atlanta region.

Benefits of Commuter Rail Service

Benefits of commuter rail have been evaluated many times, and in some studies benefits have been quantified and compared with the costs. Following are the principal benefits most often attributed to commuter rail:

- Reduced congestion costs
- Improved quality of life (by providing alternative means of transportation)
- Reduced road/highway maintenance costs
- Improved air quality
- Improved commute time for commuter rail passengers
- Reliable travel time
- Avoided cost of automobile operations
- Economic development, including potential for economic development around the stations
- More efficient use of nonrenewable resources (conserves fuel use)
- Enhancement of safety (train travel is safer than highway travel)
- Stimulation of more efficient and economic land use by concentrating development along corridors

Ridership Potential

Following is an alphabetical order listing of the daily ridership estimates (total daily boardings) by corridor, for two operating scenarios: three trains per day at each peak period (morning and afternoon), and for six trains at each peak period. Each operating scenario also will have mid-day service. The total daily boardings are shown as ranges, rounded to the nearest hundred, and based on a year 2030 forecast.

Line	Daily Work Trips From Catchment Areas	Daily Work Trips Served by the Corridor	Total Daily Boardings Three Trains per Peak Period	Total Daily Boardings Six Trains per Peak Period
Athens	926,550	135,756	3,000-3,700	6,100-7,500
Bremen	316,847	52,975	1,600-2,200	3,400-4,600
Canton	564,891	98,347	2,300-3,400	4,700-6,700
Gainesville	714,206	99,655	1,200-2,500	2,800-5,300
Macon	475,256	110,283	1,700-2,200	3,700-4,500
Madison	514,683	111,981	3,200-4,700	6,400-9,000
Senoia	241,917	62,304	1,200-1,700	2,600-3,600

The ridership estimates are shown as ranges because demand forecasting is not an exact science. It is a most useful and necessary tool in the investigation of commuter rail feasibility. However, ridership forecasts made before the beginning of service are but estimates, and actual post-start-of-service ridership figures are most often different.

In August, Metro Atlanta Chamber of Commerce asked that the consultant team include ridership and cost estimations for commuter rail service on segments of the Athens and

Macon corridors, respectively, between Tucker and Atlanta on the Athens corridor, and between Lovejoy and Atlanta on the Macon corridor, for 2015. Following are the estimates for those "sub-corridors".

Line	Ridership - Three Trains per Peak Period	Ridership - Six Trains per Peak Period
Lovejoy	900	2,300
Tucker	300	900

The RLBA Team does not attempt to explain the differences between another consultant's work and RLBA Team forecasts, except to say that different methodologies were used. Compared with actual starting ridership figures in peer city commuter rail implementations, all estimated riderships are roughly comparable, with the exception of Tucker-Atlanta. Thus peer city comparisons indicate that Atlanta commuter rail is feasible on all seven corridors. It is believed that the Tucker-Atlanta estimate is low because of the relatively short distance of that prospective commuter rail service.

Known Limitations and Issues

The most prominent limitation and issues is the rail network in and immediately surrounding Atlanta. This network is in many places at or over capacity. The width of right of way in several important segments of the Atlanta network may be insufficient for expansion. In order to allow commuter rail access, the freight railroads will insist that commuter trains not interfere with their freight operations. This means, where width of right of way allows, addition of track and sidings.

Most Promising Corridors

As stated above, commuter rail is deemed feasible, based upon estimated ridership, on all seven prospective commuter rail corridors evaluated in this study. The relation of costs and benefits is also a consideration. Perhaps the best way to determine this would be to develop a detailed examination of benefits and comparison with costs, which is beyond the scope of this study.

As an alternative, following is a comparison of the prospective corridors showing indices of capital cost per rider and operating cost per rider, using the six-trains-per-peak-period operating scenario. Capital costs will be the most significant investment costs associated with implementation of new service in the Atlanta region.

	Daily Riders (Boardings)	Capital cost per rider ($2007)	Operating cost per rider ($2007)
Athens	6,100-7,500	10.2	0.43
Bremen	3,400-4,600	6.2	0.58
Canton	4,700-6,700	4.4	0.37
Gainesville	2,800-5,300	5.4	0.56
Macon	3,700-4,500	12.8	0.84
Madison	6,400-9,000	3.4	0.35
Senoia	2,600-3,600	5.5	0.59
Lovejoy	2,300	6.2	0.71
Tucker	900	28.3	1.45

The figures in the "Capital cost per rider" column are the result of dividing capital cost in millions of dollars by 30 years of boardings.[26] The figures in the "Operating cost per rider column result from dividing annual operating cost in millions of dollars by 30 years of boardings. The numbers shown in the two columns on the right hand side are merely indices, providing relative costs per rider.

Interpretation of Study Results

It is very important to understand the significance of the ridership and cost estimates resulting from this study, and that the results of this study differ from the results of previous studies.

Differences from previous studies

Ridership estimates are different because different prediction methodologies are used and because of demographic changes which have occurred in the Atlanta region over time. RLBA recommends the attachment of no great sense of precision to these (or any other) commuter rail ridership estimates. Ridership forecasts are estimates, and not precise predictions. What the demand estimates of this study (and those of previous studies) indicate is that commuter rail in the Atlanta region is feasible on most or all of the seven corridors investigated. The ridership estimates of this study (and previous Atlanta commuter rail studies) are comparable with actual first-year-of-operation ridership results on peer city systems.

For other reasons, cost estimates may not be taken as precise or final. No one knows what it will cost to obtain commuter train access to freight railroad rights of way until an agreement is negotiated with the freight railroad. Atlanta is an important freight rail hub, and one which is capacity-constrained. RLBA has considered the robust growth trend in freight rail volumes, has estimated what

[26] This very simplified calculation is made merely to arrive at simple indices which may be compared.

track and signal and other infrastructure improvements will be required in a future negotiated agreement, and has calculated costs accordingly.

Last, it warrants calling out here that this study did not include any cost estimate for construction of a multi-modal passenger terminal (MMPT). This work has already been completed in previous studies, so the only line-item cost associated with the MMPT is the track necessary to connect commuter rail lines to it.

Corridor vs. system analysis

There is yet another dimension of this study which must be understood. Estimates – ridership and cost – are made on a corridor by corridor basis; this was understood at the study's kickoff meeting. The estimates do not necessarily represent a fully-built system of seven operating commuter rail corridors. It is possible – perhaps likely – that railroad right of way infrastructure costs will rise considerably in a fully-built seven-corridor commuter rail system, because the presence of many commuter trains on multiple corridors at the Atlanta hub during peak commuter travel periods will cause considerable interference with freight traffic. RLBA understands that a Capacity Analysis of the Atlanta Terminal, sponsored by Georgia Department of Transportation, is under way and will be completed next year.

Future ridership estimates in the absence of land development changes

This study used the 2030 Atlanta Regional Commission's and U.S. Census Bureau's employment and socio-economic forecasts, not a projection of potential land development pattern changes associated with the commuter rail investment. This decision was made because:

- Projecting ridership based on existing socio-economic forecasts is standard for all transit projects, following Federal Transit Administration (FTA) guidelines about future development patterns; it provides a conservative estimate of ridership;
- It provides a uniform baseline for comparing all transit projects equally. Each transit mode currently being evaluated by the TPB used the same 2030 socio-economic data; and
- It removes subjectivity. It is the role and responsibility of the local Metropolitan Planning Organization to forecast future land development patterns. Altering those projections would introduce even more variables into an already-complex analysis and invite unnecessary scrutiny.

That said, national experience actually shows that development patterns would change in response to the infrastructure investment in a way that boosts ridership. The results, therefore, are assumed to be conservative given appropriate commuter rail service levels.

Corridor ridership estimates vs. populations/density levels

Relative ridership estimates, in many cases, are reflective of the relative population levels within the individual commuter rail lines' "catchment" areas (the geographic area bounding the commuter rail lines likely to attract riders); higher ridership in areas of higher population. There is not, however, a one-to-one relationship between population levels and ridership levels, because commuter rail ridership forecasts are based on:

1. How many employees live within the commuter rail "catchment" area, defined as within 10 miles of a station outside of 35 miles from city center and within 5 miles of a station within 35 miles of the city center.
2. How many of those employees' employment destinations are served by the commuter rail line (i.e. a person's job is near an outlying station or in the Midtown-Downtown activity center).
3. The propensity for those employees to choose commuter rail as their travel mode.

Below is tabulated the total number of employees within each commuter rail line's catchment area as well as the total number of employees in that catchment area whose destinations are served by that line.

Corridor	Daily Work Trips From Catchment Areas	Daily Work Trips Served by the Corridor
Athens	926,550	135,756
Bremen	316,847	52,975
Canton	564,891	98,347
Gainesville	714,206	99,655
Macon	475,256	110,283
Madison	514,683	111,981
Senoia	241,917	62,304

One can see, therefore, that an employee's destination is as much a driver of ridership as the number of people who live near a commuter rail line.

Summary of Feasibility Assessment

In summary, commuter rail is feasible on all seven corridors, based upon ridership comparisons with other new start commuter rail systems over the past two decades.

Task 4: Institutional and Jurisdictional Issues

Requirement

Identify and analyze any institutional and jurisdictional issues associated with the identified service and improvements. Include shared use, right of way, ownership control and insurance and indemnification issues related to operation of commuter passenger rail service within rail freight rights of way.

Discussion

This task relates to one of the key features of this study, namely, recognition of the important issues associated with gaining commuter rail access to freight railroad rights of way.

Association of American Railroads Position

The Association of American Railroads (AAR) position on this subject, taken from the AAR website and shown at Appendix B, is summarized as follows:

- Freight railroads should be fully compensated for passenger train access: capital, operating and other costs.
- Safety is paramount. Freight railroads insist on adequate liability protection.
- Where there are capacity constraints, new capacity must be added.

RLBA went directly to those in CSX and Norfolk Southern who are cooperating in this study, in order to determine the positions of those two freight railroads.

CSX Position

CSX stated that its template for consideration of passenger operations is based on "Four Pillars", stated as follows:

Safety

There can be no compromise in safety.

Capacity

Passenger operations must be transparent to the freight operations at peak passenger head-ways.

Cheap capacity consumed for passenger operations must be replaced with sufficient capacity for freight growth well into the future, not just enough to address current conditions or to cover just the next few years.

Compensation

CSX must be compensated for right-of- way and capacity consumed by the long term occupancy of passenger service.

CSX will not subsidize passenger operations through access payments, maintenance costs, dispatching, etc.

Liability

There can be no risk or liability in carrying passengers.

Norfolk Southern Principles

Norfolk Southern affirmed an earlier statement (June 1, 2003) of principals, articulated in a paper addressed "To Planners of Passenger Train Projects". Following is a summary of that paper.

- Until serious money is available, studies are hypothetical exercises.
- Additional capacity studies are to be paid for by the public agency.
- Fair compensation must be made for passenger train access.
- Passenger train operations must be transparent to freight operations; sufficient infrastructure must be provided, and it should allow for growth.
- Delay to freight trains is unacceptable.
- New passenger trains will pay higher usage fees than Amtrak.
- Liability is a major issue. NS must have adequate liability protection.
- Cab signals must be installed above 79 mph.
- Dispatching will remain with NS.

There is some additional discussion of the subject of passenger access to freight railroad rights of way in the "Commuter Rail Capacity Improvements" discussion under Subtask 3.4.

The corridors considered in this study are owned by the freight railroads, with the exception of the CSX corridor proposed for use in prospective Canton-Atlanta commuter rail service. The Georgia Department of Transportation (GDOT) owns the railroad corridor between Atlanta and the Tennessee border, and leases that corridor to CSX.

Conclusions

RLBA concludes that CSX and Norfolk Southern will permit commuter rail access where an agreement can be negotiated which:

- Compensates the freight railroad for use of its property,

- Provides sufficient capacity (track and other infrastructure improvements) so that passenger operations do not interfere with freight operations, when operations begin, and in the future, and
- Adds no safety issues, or risk or liability to the freight railroad.