

Western North Carolina Rail Passenger Study

Intrastate Rail Plan



Summary Report

January 1997



North Carolina Department of Transportation
Rail Division

**Western North Carolina
Rail Passenger Study**

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Executive Summary

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Executive Summary

In May 1994 the North Carolina Secretary of Transportation directed the Rail Division to determine the feasibility of extending rail passenger service to Asheville, N.C. The *Western North Carolina Rail Passenger Demand Study* identified five alternatives for providing Asheville with such a service.

Based on an evaluation of each alternative's projected ridership, revenue production and costs, service between Raleigh and Asheville via Salisbury is the preferred alternative for implementation. This service would follow the route of the existing *Piedmont* and *Carolinian* between Raleigh and Salisbury. Each day, one train would travel from Asheville to Raleigh and another train from Raleigh to Asheville. The estimated one-time capital improvement costs for stations, support facilities, and track structures for the preferred alternative total \$3,103,985.

This study assumed that the North Carolina Department of Transportation would have adequate locomotives and passenger cars to initiate service to Asheville. While some of the equipment presently used for the *Piedmont* could be shared with a newly established Asheville service, the state must acquire additional locomotives and passenger cars to maintain a long-term commitment to western North Carolina. The purchase of at least two locomotives, three passenger coaches and a food service car is projected to cost approximately \$10 million for new equipment, while the cost of refurbished equipment would be approximately \$6 million. The Department of Transportation has not yet selected a preferred set of operating equipment. A decision will be made when the service characteristics of an approved route are more fully investigated.

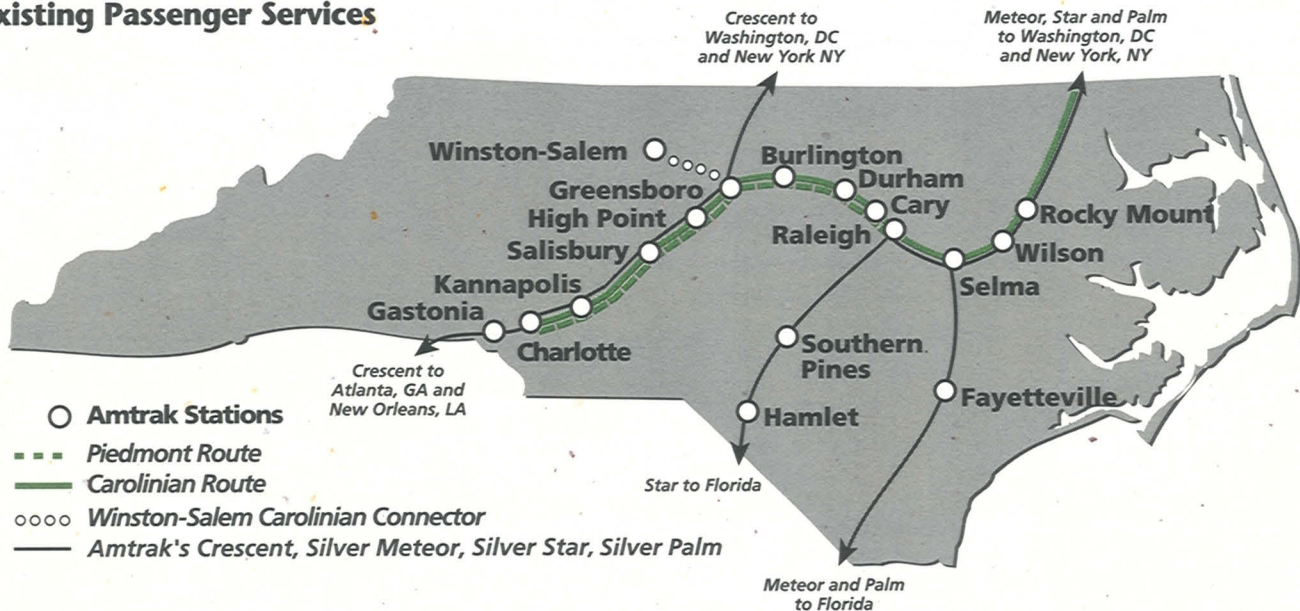
Based on the findings of this study and plans already in progress within the North Carolina Department of Transportation (NCDOT), the following recommendations are offered for consideration:

- ▲ *The state should pursue implementation of rail passenger service between Raleigh and Asheville via Salisbury.*
- ▲ *Service between Salisbury and Asheville with a connection to existing passenger services at Salisbury should be investigated only as an interim step to establishing through service between Raleigh and Asheville.*
- ▲ *Private interest groups, such as local chambers of commerce and travel/tourism organizations, should adopt the lead role in building support for service to western North Carolina.*
- ▲ *The state should continue its incremental approach to developing a statewide rail transportation system by producing a State Rail Passenger Plan, improving track and facilities along existing rights-of-way, preparing for high-speed rail in North Carolina, and planning for future rail passenger service to Asheville.*
- ▲ *The Rail Division should continue to aggressively market rail passenger service through advertising and other public information campaigns.*

Introduction

Responding to growing public interest in rail transportation and a request from members of the North Carolina General Assembly, in May 1994 the North Carolina Secretary of Transportation directed the Rail Division to determine the feasibility of extending rail passenger service to western North Carolina. A field study team from the Babcock Graduate School of Management at Wake Forest University conducted a passenger demand study and presented a final technical report to the North Carolina Rail Council and Secretary for approval in early 1995. This summary highlights the major findings of that report and offers recommendations for future action.

Existing Passenger Services



Population Projections for Counties Along Western Route: Salisbury-Asheville

Population to be served by the year 2000:

Rowan	123,601
Iredell	109,043
Catawba	132,033
Burke	83,257
McDowell	37,314
Buncombe	197,024
Total	682,272

Source: NC Office of State Planning, 1995

Rail passenger service best serves trip lengths of 400 miles or less. Passenger trains often use existing rights-of-way owned and operated by freight railroads. Amtrak currently operates six passenger trains in North Carolina: the *Carolinian*, *Crescent*, *Silver Star*, *Silver Meteor*, *Silver Palm* and the newly established *Piedmont*. At the inauguration of the *Piedmont* in May 1995, Governor James B. Hunt, Jr. proposed two-hour rail passenger service between Raleigh and Charlotte by the year 2001. In anticipation of future high-speed rail development in the United States, the Federal Railroad Administration has designated five emerging high-speed rail corridors. One of the five corridors extends from Washington, D.C. through Richmond, VA, Raleigh, Greensboro, to Charlotte with a projected future extension to Atlanta, GA.

Increased support for rail passenger service has sparked renewed interest in reestablishing service to Asheville to enhance economic development and improve the state's transportation infrastructure. According to Amtrak, Asheville is the most inquired about destination in the country not currently served with rail passenger service. The city's numerous tourist attractions as well as its prime location in the Blue Ridge Mountains draw millions of visitors every year. Many of these travelers originate from cities along the East Coast served by existing Amtrak service.

Methodology¹

The *Western North Carolina Rail Passenger Demand Study* identified five alternatives for providing Asheville with rail passenger service. Several methods were utilized to estimate ridership, revenue generation and operating costs in each scenario for 1995 (base year) and the year 2000. Personal interviews conducted at the Catawba County Rest Area along Interstate 40 and mail-back surveys were used to develop ridership and revenue estimates.² Projected operating costs are based on existing data for the *Carolinian* and *Piedmont*. The capital costs for station improvements were estimated by conducting on-site visits to each potential station, while the costs for track improvements, support facilities, locomotives and passenger cars were extrapolated from existing data.

Ridership, revenue and cost projections were calculated based on the following assumptions:

Adequate and safe stations are available

Safe and adequate station facilities with ample free parking is a primary concern among potential riders that can dramatically affect ridership levels. Most stations along Amtrak's routes are located in downtown areas. Unfortunately, the general public perceives some of these areas as being unsafe. This study assumed that the decisions of rail patrons to use the train were not negatively influenced by station-related concerns. Ridership projections also assume that means of access and egress are readily available at each station along the route.

Awareness and understanding of rail passenger service exists

Many North Carolinians are unaware of rail passenger services in the state. Those who are informed may not understand the scheduling, routing, ticket practices and stops served by passenger trains. This study assumed that people in the state are knowledgeable about rail passenger service as a transportation alternative.

The state can adequately equip service to Western North Carolina

This study assumed that the NCDOT would have adequate locomotives, passenger cars and other facilities to initiate and support service to Asheville.

Access to freight railroad can be negotiated

Any passenger service to western North Carolina would operate over tracks owned by Norfolk Southern Corporation. This study assumed that such access could be negotiated. The Department of Transportation and Amtrak would have to coordinate with the host railroad in the planning and design of any passenger service to Western North Carolina.

Costs of travel will remain constant

Any increase in the cost of air or automobile travel should positively affect rail passenger ridership estimations, while any increase in the cost of rail travel should affect ridership projections negatively. This study assumed that the cost of rail travel relative to other modes would remain constant.

General economic conditions will remain the same

A downturn in the general economic conditions of the state or nation could negatively impact cost and revenue projections to the detriment of rail passenger service. This study assumed that general economic conditions will remain the same.

¹For a complete explanation of the estimation techniques and models used in this study, see *Western North Carolina Rail Passenger Demand Study Technical Report, Volume II*.

²A total of 1,733 surveys were conducted. Projections are based on a 95% level of confidence.

Alternatives Considered

The following is a brief description and general evaluation of each of the five alternatives considered in this study:

Through service would operate between Raleigh and Asheville via Salisbury, following the route of the *Piedmont* and *Carolinian* between Raleigh and Salisbury. This alternative would involve one daily train frequency (one daily train to and from Asheville) between Raleigh and Asheville.

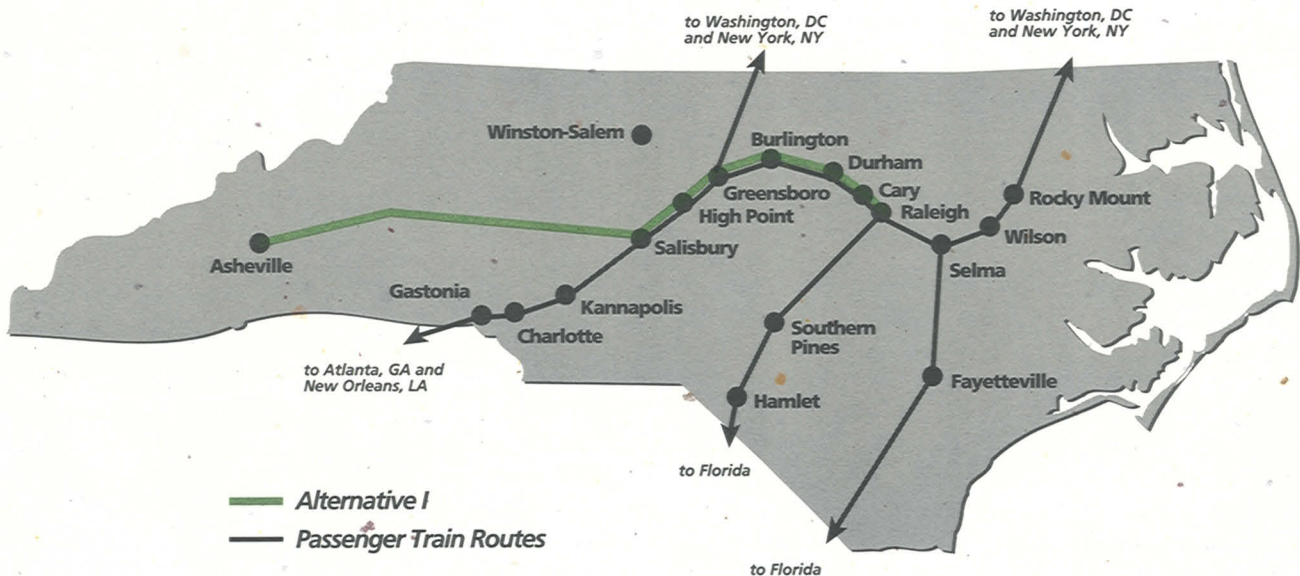
Alternative I: Through Service, Raleigh to Asheville via Salisbury

Strengths:

- Passengers from central North Carolina could reach Asheville without changing trains.
- This service could be extended to provide continuous through service from the coast to the mountains of North Carolina.

Weaknesses:

- The cost of operating a through train from Raleigh to Asheville is higher than operating a connecting train from either Salisbury or Greensboro to Asheville (see Alternatives IV and V).



The state owns two locomotives, two dining cars and five coaches for use on the *Piedmont* which provides daily round-trip service between Raleigh and Charlotte.



Alternative II: Through Service, Raleigh to Asheville via Greensboro & Winston-Salem

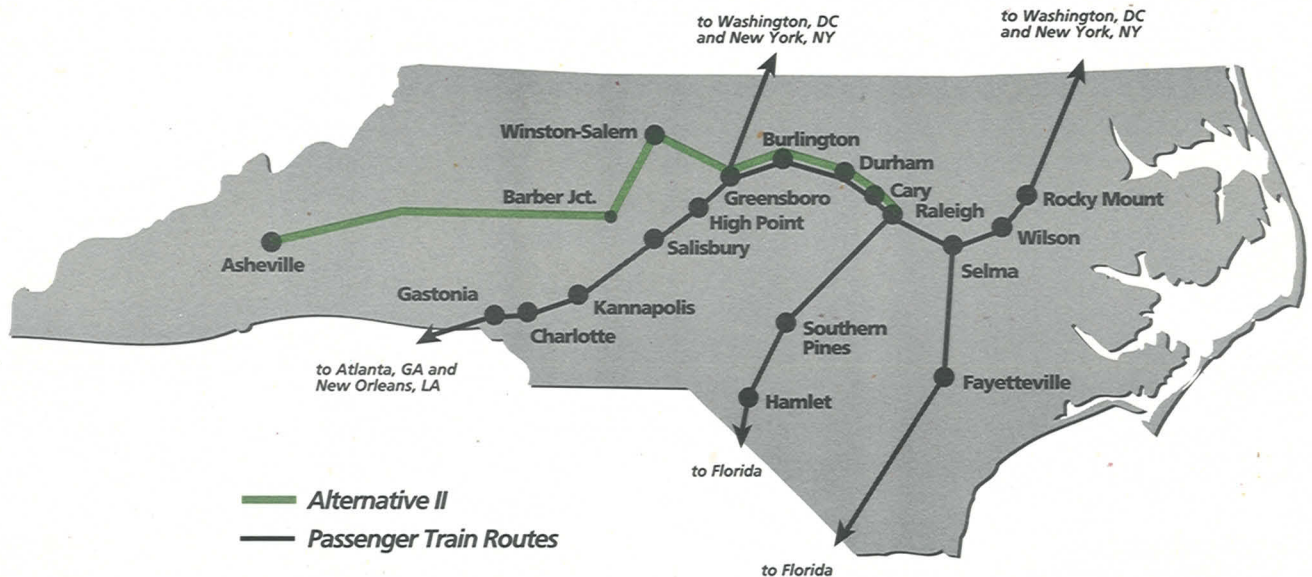
Strengths:

- Passengers from central North Carolina could reach Asheville without changing trains.
- This service could be extended to provide continuous through service from the coast to the mountains of North Carolina.
- This alternative would provide passenger service to Winston-Salem, the largest city in North Carolina not directly served by Amtrak.

Weaknesses:

- Poor track conditions between Winston-Salem and Barber Junction would require either significantly slower travel times or substantial expenditures on track improvements.
- The cost of operating a through train from Raleigh to Asheville is higher than operating a connecting train from either Salisbury or Greensboro to Asheville (see Alternatives IV and V).

Through service would operate between Raleigh and Asheville via Greensboro and Winston-Salem, following the route of the *Piedmont* and *Carolinian* between Raleigh and Greensboro. At Greensboro the train would proceed to Winston-Salem and then to Barber Junction. At Barber Junction the train would follow the same route to Asheville as in Alternative I. Alternative II would involve one daily train frequency between Raleigh and Asheville.



Running daily between Charlotte and New York City, the state-sponsored *Carolinian* operates with Amtrak locomotives and passenger cars.

Through service would operate between Charlotte and Asheville via Salisbury, following the route of the *Piedmont* and *Carolinian* between Charlotte and Salisbury. Alternative III would involve one daily train frequency between Charlotte and Asheville.

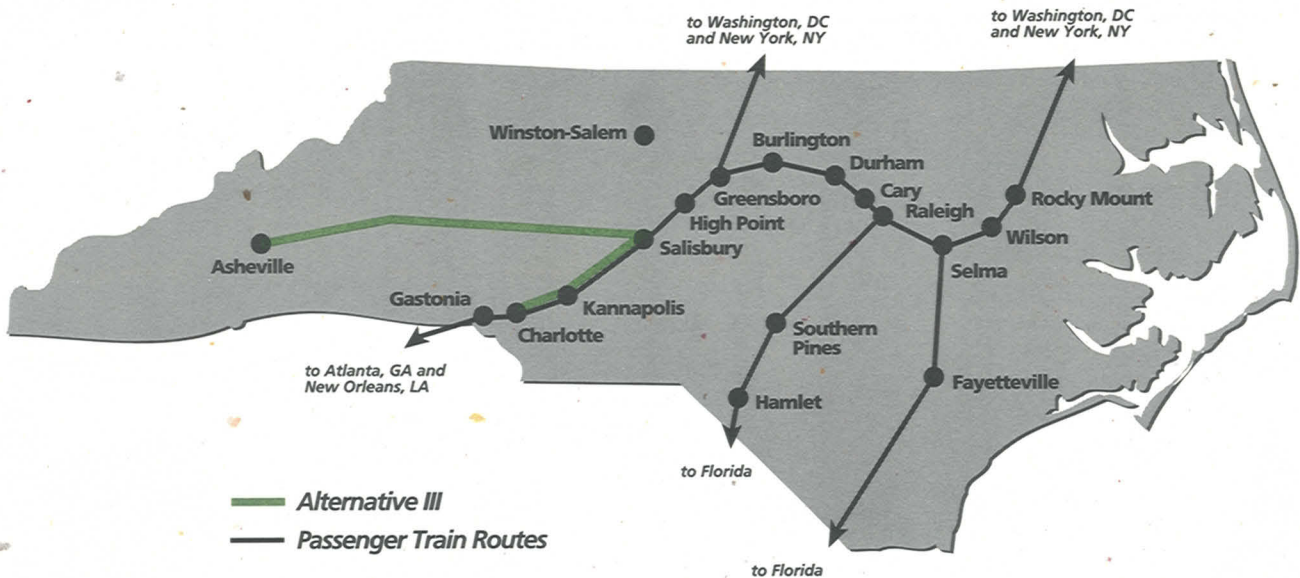
Alternative III: Through Service, Charlotte to Asheville via Salisbury

Strengths:

- Passengers from Charlotte could reach Asheville without changing trains.
- This service could eventually be extended to Greenville and Spartanburg, S.C. and Atlanta, Ga. as demand required. All three of these cities contribute greatly to western North Carolina's tourism.

Weaknesses:

- The cost of operating a through train from Charlotte to Asheville is higher than operating a connecting train from Salisbury to Asheville.
- The relatively short distance and direct route between Charlotte and Asheville by highway would limit the ability of rail passenger service to compete for travelers to western North Carolina.
- This alternative would not serve the Triad (Greensboro-High Point) and the Triangle (Raleigh-Durham) markets effectively.
- This service could not be extended to provide continuous through service from the mountains to the coast of North Carolina.



Nippon Sharyo's self-propelled diesel rail car seats 87 passengers and is designed for inter-city travel in the U.S.



Alternative IV: Salisbury to Asheville, Connection at Salisbury

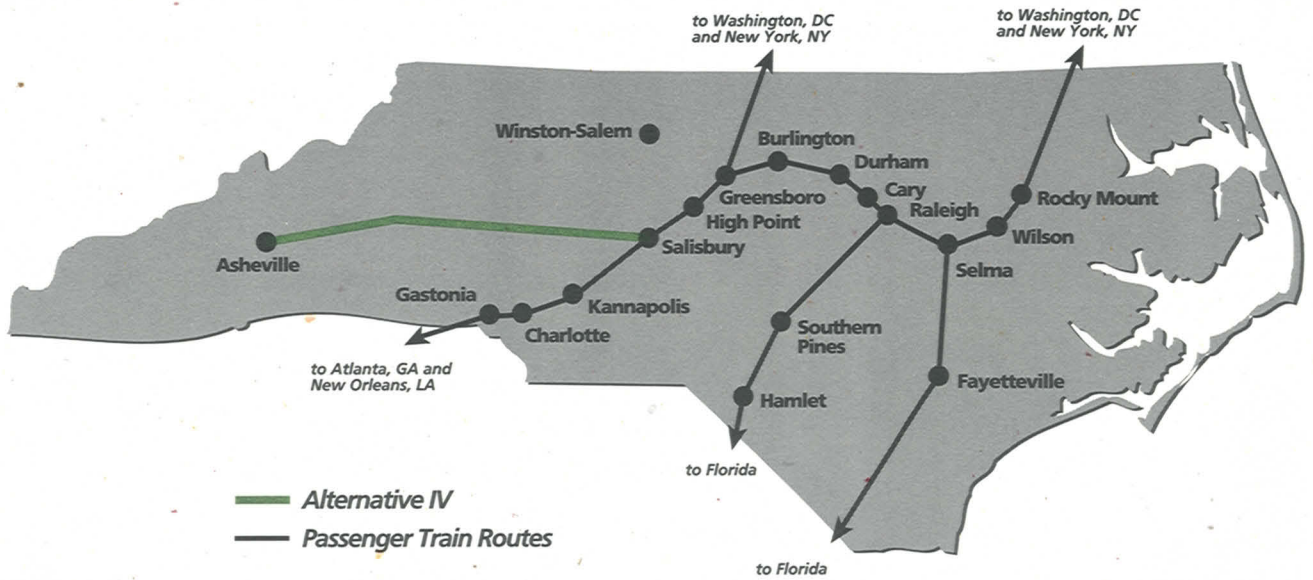
Strengths:

- The cost of operating a connection at Salisbury would be less than offering through service from either Raleigh or Charlotte to Asheville.

Weaknesses:

- Having to make connections is a significant deterrent to potential rail patrons due to the increase in travel time and the inconvenience associated with changing trains.
- The large markets in the Triad, Triangle, and points east could be better served by either Alternative I or II.

Service would operate between Salisbury and Asheville. Connections with other Amtrak trains would be made at Salisbury to serve passengers from points north, south, and east of Salisbury.



This German Light-Weight Diesel Multiple Unit is produced by Siemens-Duewag and represents one of the systems being considered for use by the Triangle Transit Authority.

Service would operate between Greensboro and Asheville via Winston-Salem, following the route in Alternative II. Connections with other Amtrak trains would be made at Greensboro to serve passengers from points north, south, and east of Greensboro.

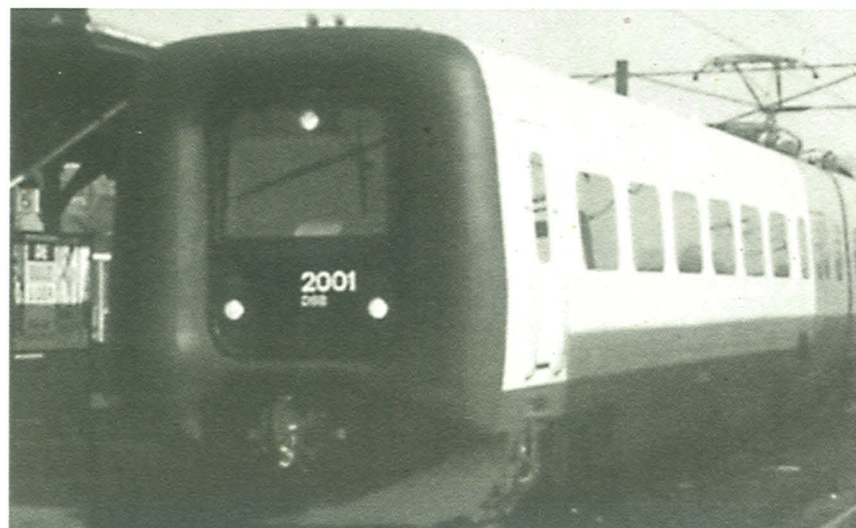
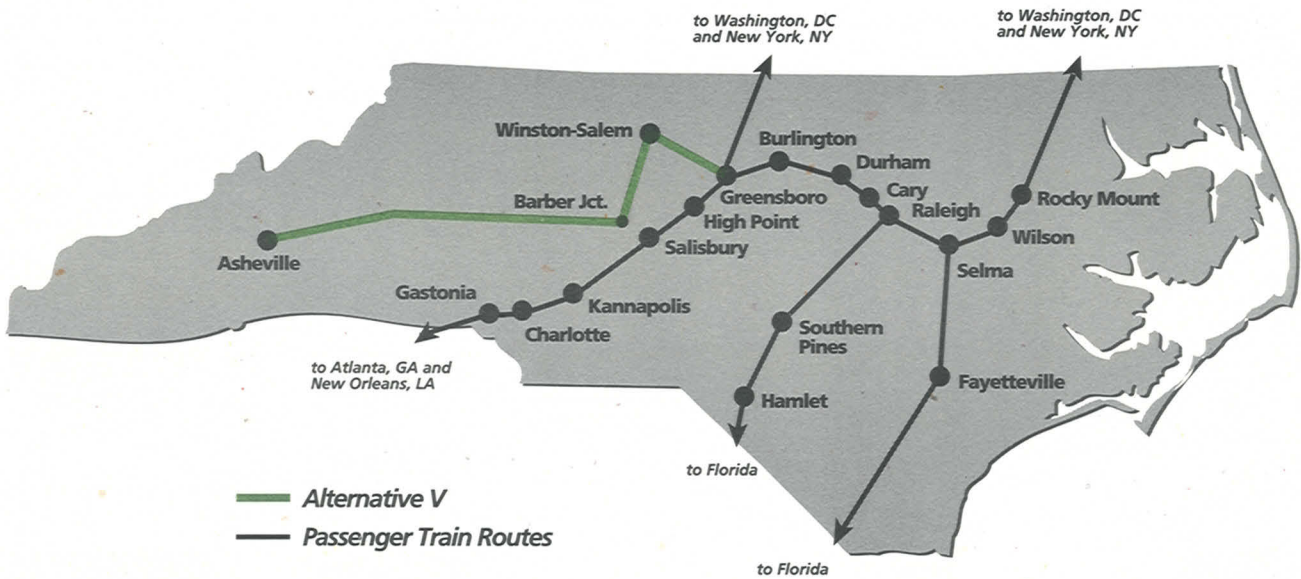
Alternative V: Greensboro to Asheville via Winston-Salem, Connection at Greensboro

Strengths:

- The cost of operating a connection at Greensboro would be less than offering through service from either Raleigh or Charlotte to Asheville.
- This alternative would provide passenger service directly to Winston-Salem.

Weaknesses:

- Poor track conditions between Winston-Salem and Barber Junction would require either significantly slower travel times or substantial expenditures on track improvements.
- Having to make connections is a significant deterrent to potential riders due to the increase in travel time and the inconvenience associated with changing trains.
- The market in the Triangle and points east could be better served in either Alternative I or II.



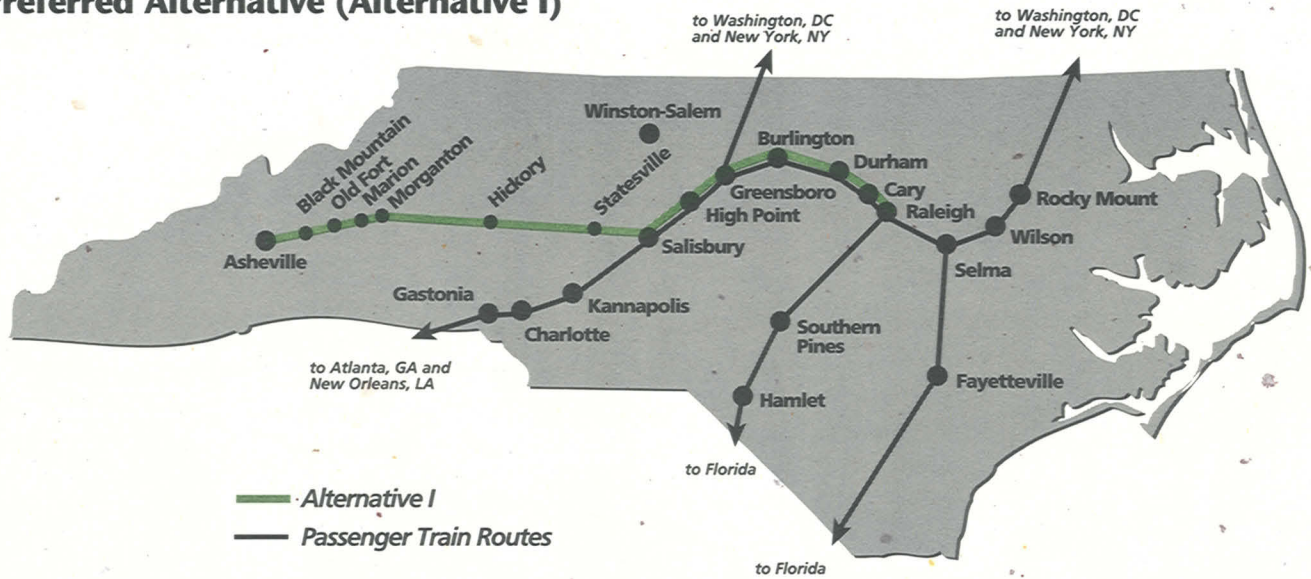
The IC3/DSB is manufactured by ABB Scandia of Sweden. The IC3 has many on-board design features that enhance passenger safety and convenience.

Findings and Preferred Alternative

Preferred Alternative

Based on a general evaluation of each alternative, through service between Raleigh and Asheville via Salisbury is the preferred alternative. The following charts provide a comparison of the five alternatives based on estimated ridership, revenue, operating costs and fare-box return ratios for 1995 (base year) and 2000. The fare-box return ratio represents the percentage of operating costs covered by the revenue generated through ticket sales.

Preferred Alternative (Alternative I)



1995 Projections (Base Year)

	I Ral-Ash via Sal	II Ral-Ash via Gboro	III Char-Ash via Sal	IV Sal-Ash connect at Sal	V Gboro-Ash connect at Gboro
Ridership	58,348	57,483	41,235	39,826	46,561
Revenue (ticket sales)	\$1,140,003	\$994,535	\$497,350	\$852,982	\$798,429
Operating Costs	\$3,169,103	\$3,305,324	\$2,582,223	\$2,109,614	\$2,689,691
Fare-Box Return Ratio	36%	30%	19%	40%	30%
Total One-time Capital Costs	\$3,103,985	>\$20,000,000	\$3,103,985	\$3,103,985	>\$20,000,000

2000 Projections

	I Ral-Ash via Sal	II Ral-Ash via Gboro	III Char-Ash via Sal	IV Sal-Ash connect at Sal	V Gboro-Ash connect at Gboro
Ridership	71,770	69,880	48,934	47,543	56,083
Revenue	\$1,661,977	\$1,381,584	\$745,422	\$1,208,732	\$1,114,539
Operating Costs	\$3,673,859	\$3,831,776	\$2,993,504	\$2,445,621	\$3,118,089
Fare-Box Return Ratio	45%	36%	25%	49%	36%

Proposed Schedule for Preferred Alternative – Raleigh to Asheville

<i>Westbound</i>	
Raleigh	departs noon
Asheville	arrives early evening
<i>Eastbound</i>	
Asheville	departs mid-morning
Raleigh	arrives late afternoon

Proposed Schedule for Alternative IV – Salisbury to Asheville

<i>Westbound</i> <i>(Piedmont connection at Salisbury)</i>	
Salisbury	departs midmorning
Asheville	arrives early afternoon
<i>Eastbound</i> <i>(Piedmont connection at Salisbury)</i>	
Asheville	departs early afternoon
Salisbury	arrives late afternoon

³This ratio was mandated prior to the recent cut in federal aid to rail passenger systems.

The capital cost estimate for service to Asheville via Winston-Salem in either Alternative II or V greatly exceeds the estimated capital cost for any of the other alternatives, due primarily to the extensive track and bridge improvements necessary south of Winston-Salem. These excessive capital costs outweigh the benefits of establishing service at Winston-Salem until an investment can be made in rebuilding 39 miles of track and bridges between Winston-Salem and Barber Junction.

Through service between Raleigh and Asheville via Salisbury would serve the largest number of riders without the need for connections to reach Asheville. Although the fare-box return ratio for Alternative I is slightly lower than the estimated ratio for Alternative IV, the potential for future ridership growth and system utilization is greater for Alternative I.

No transportation system is completely self-sustaining, and the estimated fare-box return ratio for Alternative I is typical of similar passenger rail systems in North Carolina and other parts of the country. For example, the average fare-box return ratio for urban fixed-route transit systems in the state is 30.9%. In Florida the state legislature has mandated a 40% fare-box return objective for the Florida Tri-Rail system.³

Implementation of Alternative IV, service between Salisbury and Asheville with a connection at Salisbury, could represent an intermediate step to establishing through service to Raleigh at a later date. However, Alternative IV should not be implemented *in lieu of* through service between Raleigh and Asheville.

Capital Costs: Stations, Support Facilities and Track Improvements

The breakdown of projected capital costs for each station, support facilities and track improvements under either Alternative I or IV is listed in the Appendix. The total estimated capital cost for these items is \$3,103,985. Funding for station construction and improvements should include significant local public and private participation. The state should pay the full cost of building track platforms, upgrading track and developing support facilities. Support facilities include signage, utilities, maintenance equipment and service buildings along the Salisbury-Asheville route. Engineering fees (12%) and contingency fees (10%) are included in each total.

Projected Station & Support Facility Costs

Asheville	\$533,750	A newly constructed station and train servicing facility would be located in the vicinity of Biltmore Village.
Black Mountain	\$147,315	The existing station structure would be used with improvements primarily to the structure, platform and parking areas.
Old Fort	\$168,970	The existing station structure would be used with improvements to the structure, platform and parking areas.
Marion	\$222,650	The existing station structure in Marion is located in a deteriorated section of the central business district with no space for parking. A new station would have to be built. This estimate does not include the cost of new land acquisition.
Morganton (station)	\$172,020	The station structure is currently occupied by a business. The state would pay to move the business to a freight-house structure nearby to free the station for use by passengers. Various improvements would have to be made to both structures and sites.
(freight house)	\$20,740	
Hickory	\$255,590	A new station structure would be located in or near the Central Business District.
Statesville	\$171,410	The existing station structure, recently relocated and restored by a local preservation society, would be used with construction of a new platform and parking area.
Salisbury	\$195,200	The Salisbury station is currently in operation serving the <i>Carolinian</i> , <i>Piedmont</i> and <i>Crescent</i> . Modifications to the existing <i>Piedmont</i> corridor platform and construction of an "Asheville" platform and equipment layover facilities are anticipated.
Total Station & Support Facilities Cost	\$1,887,645	
Track improvements	\$1,216,340	Including platform, track, signals, relocations, other route improvements, architecture and engineering fees @ 12% and contingency @ 10%.
Total Capital Costs	\$3,103,985.	

Capital Costs: Locomotives and Passenger Cars

This study assumed that the North Carolina Department of Transportation would have adequate locomotives and passenger cars to initiate service to Asheville. While some of the equipment presently used for the *Piedmont* could be shared with a newly established Asheville service, the state must purchase additional locomotives and passenger cars to maintain a long-term commitment to western North Carolina.

Preliminary capital outlays for conventional equipment anticipate the purchase of at least two locomotives, three passenger coaches and a food service car. The cost of this new equipment would be approximately \$10 million. The cost of refurbished equipment would be approximately \$6 million.

The Rail Division also explored the possibility of using self-propelled passenger vehicles for service to western North Carolina. Although the United States pioneered the use of self-propelled Rail Diesel Cars (RDC's) in the 1920s and 1930s, no American manufacturers of this type of equipment remain. The resurgent use of RDC's in Europe and Japan has recently stimulated the production of modern and cost-efficient variants of the American predecessor abroad. Manufacturers include ABB Scandia (Sweden), Duewag (Germany), Nippon Sharyo (Japan) and Bombardier (Canada).

Designated as Diesel Multiple Units (DMU's) today, modern self-propelled train sets are typically produced in two to three car variants costing up to \$3 million per set. Compared to traditional passenger trains headed by conventional locomotives, DMU's are more flexible. The Rail Division has agreed to participate with Amtrak in the demonstration of an ABB Scandia DMU in mid to late 1997, possibly in conjunction with a Salisbury to Asheville test run to evaluate its operating potential for western North Carolina service.

The Department of Transportation has not yet selected a preferred set of equipment. This decision will be made when the operating and service characteristics of an approved route are more fully investigated. The department will include a funding request for locomotives and passenger cars or DMU's as part of any proposed budget package for Asheville service.

Other Findings

Besides identifying estimated costs and ridership figures, this study also found:

Significant interest in rail passenger service exists

Nearly 35% of the mail-back surveys distributed during the study were returned. The high response rate and favorable comments made by interviewees indicate the presence of an untapped, latent demand for rail passenger service among the citizens of North Carolina.

Primary markets are Triad and Triangle regions

Surveys and travel time estimations revealed that the Triad and the Triangle regions represented the best potential markets for rail passenger service to western North Carolina.

Origins, destinations, and trip purposes identified

For the first time, origins, destinations and trip purposes were identified for travelers between central and western North Carolina.

Recommendations

Based on the findings of this study and plans already in progress within the North Carolina Department of Transportation, the following recommendations are offered for consideration:

- ▲ *The state should pursue implementation of rail passenger service between Raleigh and Asheville via Salisbury.*
- ▲ *Service between Salisbury and Asheville with a connection to existing passenger services at Salisbury should be investigated only as an interim step to establishing through service between Raleigh and Asheville.*
- ▲ *Private interest groups, such as local chambers of commerce and travel/tourism organizations, should adopt the lead role in building support for service to western North Carolina.*
- ▲ *The state should continue its incremental approach to developing a statewide rail transportation system by producing a State Rail Passenger Plan, improving track and facilities along existing rights-of-way, preparing for high-speed rail in North Carolina, and planning for future rail passenger service to Asheville.*
- ▲ *The Rail Division should continue to aggressively market rail passenger service through advertising and other public information campaigns.*

**Western North Carolina Passenger Service Study
Projected Capital Costs
Stations, Support Facilities and Track**

	Asheville	Black Mountain	Old Fort	Marion (Est w/o land Cost)	Station	Morganton Freighthouse	Hickory	Statesville	Salisbury	Total
STATION FACILITIES										
Platform**	\$70,000	\$60,000	\$60,000	\$70,000	\$65,000	\$3,000	\$7,000	\$70,000	\$10,000	
Station Building, new construction	*\$75,000			*\$35,000						
Intermodal Center, climate controlled						\$135,000				
HVAC	\$15,000	\$25,000				\$3,000				
Paint/Repair Interior	\$4,000	\$10,000				\$2,000				
Restroom & Plumbing Upgrade	\$5,000	\$5,000				\$2,000				
Reconfigure/Repair, Rewrite Interior			\$50,000							
Electrical Upgrade					\$2,000					
Partition & Ceiling Removal				\$3,000						
Paint/Repair Exterior		\$15,000	\$15,000							
Roof Repair		\$10,000				\$2,000				
Chimney Repair						\$1,000				
Gutter Repair		\$3,000								
Fascia, Braces/Mortar & Pinion Repair		\$2,000								
Window Repair					\$5,000					
Landscaping	\$1,000	\$1,000	\$1,000		\$2,000			\$3,000		
Parking Improvements**	\$75,000	\$35,000	\$5,000	\$75,000	\$5,000					
Automatic Ticket Machines**	\$65,000						\$65,000			
Station Facilities Subtotal	\$285,000	\$120,000	\$136,000	\$180,000	\$140,000	\$17,000	\$207,000	\$138,000	\$10,000	\$1,233,000
SUPPORT FACILITIES**										
Signage	\$2,500	\$750	\$2,500	\$2,500	\$1,000		\$2,500	\$2,500	\$125,000	
Head End Power, Water & Sewer	\$125,000								\$25,000	
Service Building	\$25,000									
Support Facilities Subtotal	\$152,500	\$750	\$2,500	\$2,500	\$1,000		\$2,500	\$2,500	\$150,000	\$314,250
A&E Contingency										
Architecture & Engineering Fees @ 12%	\$52,500	\$14,490	\$16,620	\$21,900	\$16,920	\$2,040	\$25,140	\$16,860	\$19,200	
Contingency @ 10%	\$43,750	\$12,075	\$13,850	\$18,250	\$14,100	\$1,700	\$20,950	\$14,050	\$16,000	
A&E Contingency Subtotal	\$96,250	\$26,565	\$30,470	\$40,150	\$31,020	\$3,740	\$46,090	\$30,910	\$35,200	\$340,395
TOTAL STATION & SUPPORT FACILITIES COST	\$533,750	\$147,315	\$168,970	\$222,650	\$172,020	\$20,740	\$255,590	\$171,410	\$195,200	\$1,887,645
TRACK WORK** (Including Platforms, Track & Signal Relocations and Other Route Improvements Architecture & Engineering Fees @ 12% Contingency @ 10%)										
										\$997,000
										\$119,640
										\$99,700
										\$1,216,340
										Total \$3,103,985

*Modular Unit
**100% State Funded