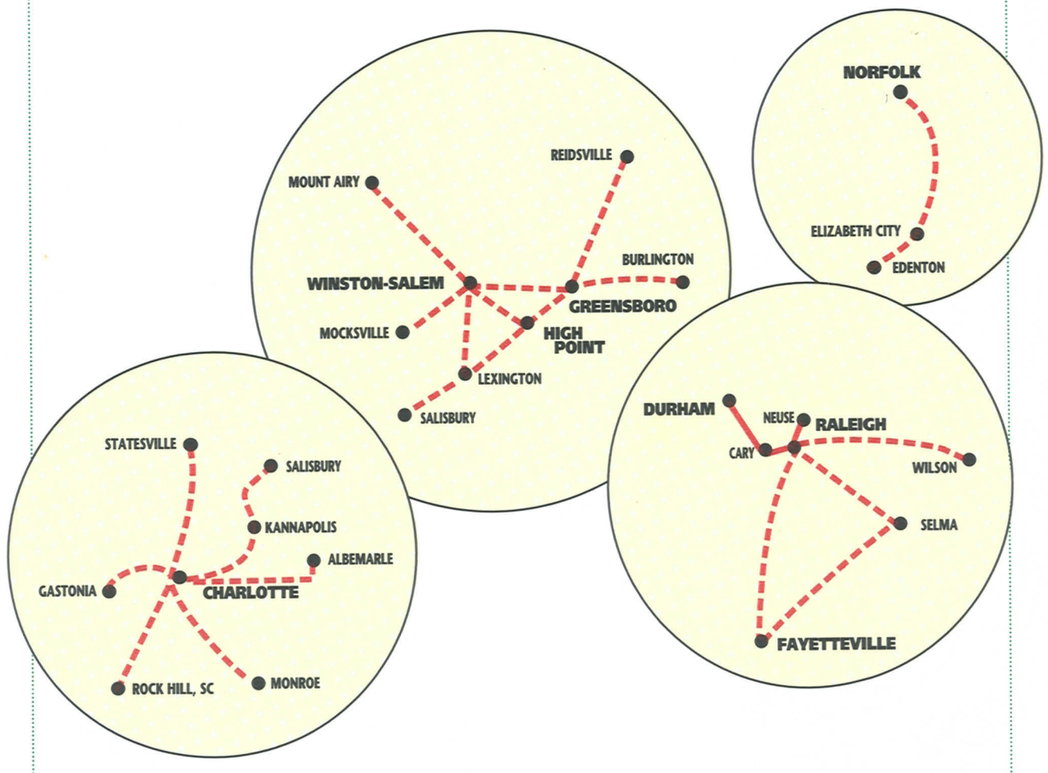
POTENTIAL NORTH CAROLINA COMMUTER RAIL CORRIDORS



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Secretary E. Norris Tolson

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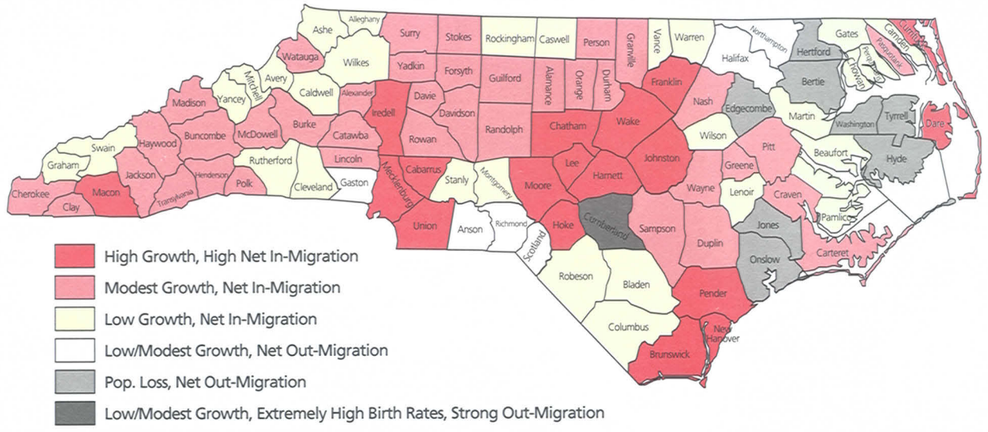

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CHARACTERISTICS OF POTENTIAL COMMUTER RAIL CORRIDORS

North Carolina increasingly lives in a world framed by interstate highways. Burgeoning population growth and economic development have led to increasing traffic congestion on major highways and thoroughfares, especially in the Mecklenburg, Triad and Triangle areas. Average highway speeds, particularly during rush hours, are declining while concerns about air quality along such corridors are rising. Indeed, the explosive growth North Carolina has experienced, the kudzu-like spread of residential and commercial developments into areas only recently rural, and the resulting traffic and urban congestion have led many Carolinians to express concern that these events may pose a threat to the state's unique heritage and quality of life.

There has, therefore, been a renewed interest in exploring the possible benefits to the state and its citizens of a wider number of transportation options, from bike trails and vanpools to trolleys and light rail transit. Proposals have been put forward to use existing railroad lines as commuter rail corridors radiating out from North Carolina's cities.

It is these proposals for rail commuter corridors that this paper will attempt to describe. However, it is important to see the potential for rail corridors in the context of the new urban world that interstate highways have created.

By and large, interstates are not very efficient transporters of commuters. They encourage, by their very nature, single occupancy vehicle trips, increasing the transportation infrastructure requirements far beyond that needed for any other commuter mode.

The interstate system was designed primarily as a national grid of defense highways linking regions and states together, providing the means for the rapid and efficient distribution of civilian goods and military cargoes, and the deployment of military personnel to ports and other embarkation points. It would also quickly prove to provide the average automobile-owning American much greater mobility and personal freedom than was previously possible.

Commuter needs and their daily trips to their work places were not central to the planning of interstates. Most interstates skirt or circle central cities on beltways and bypasses taking potential commuters past their destinations rather than to them. Instead interstates tend to funnel automobile commuters on to arterial streets, in many cases not designed for such traffic volumes, for the final miles of their journey to work.

What the interstates did do very well, however, was greatly increase the distances from the center city where bedroom communities could be built and where life was perceived to be better and the real estate more affordable than closer to town.

This suburbanizing of America quickly led to the creation of employment centers accessible only by interstates. If interstates did not serve downtowns well, the most unlikely but seemingly inevitable solution was to move the economic focus out of downtown and relocate major employment areas along various interstate corridors and beltway interfaces. Whether called Research Triangle Park or Tysons Corner or Rockville, it is in these "edge cities" that much of the country's economic activity now takes place. Such areas, with their vast parking lots and subterranean garages, are built almost solely for access by automobile.

The convenience and accessibility of such technology corridors and their ubiquitous shopping malls have, in many cases, drained much of the vitality from the central cities. The jobs and the shops simply moved out to where the people increasingly lived.

However, the point is rapidly being reached in numerous American cities where the traffic congestion and daily frustration of commutes from suburb to suburb and from home to work around the beltlines and beltways equals or exceeds the congestion of traditional suburb to central city commuter trips.

It is in this setting that the promise and benefits of modern rail commuter service must be evaluated. A rail line's infrastructure needs are minimal: a single track can carry as many commuters per hour as a six lane highway. A rail commuter service, through its ability to move large numbers of workers from their suburban homes to jobs in the central city (without the expense and difficulty of finding parking once there) can revitalize city cores, providing a renewed focus of commercial and cultural life in a region's traditional centers. Additionally, by reclaiming land and space left behind in the move to the suburbs, the renewed development and activity of downtowns can slow the sprawl of unplanned commercial development along a city's margins and in some cases reduce the stress on nearby farm land for conversion to malls and office blocks.

There are, however, certain requirements needed to make rail commuter corridors viable. Among them are suburban population density, sufficient highway congestion to cause consideration of travel options, ease of access to central city employment areas from the commuter terminal, comparability of rail/auto travel times, and perceived affordability of using the rail mode on a daily basis.

Successful commuter rail corridors seem to have certain characteristics in common. Among them is length of the rail corridor. Outside of New York City, where some commuter corridors are 72 to 75 miles in length, most commuter corridors are under 60 miles in distance. Of the dozen commuter lines serving Chicago, only four exceed 50 miles in length. The Peninsula Commute service linking San Jose with San Francisco is 47 miles long; and of the four Washington, DC lines, only the Virginia Railway Express route to Fredericksburg exceeds 50 miles. One and a half hours appears to be the maximum permitable commute time.

Proportion of core city population to commuter corridor populations served is as to the need, feasibility and viability of creating commuter rail or bus transit services along these corridors.

For those communities that are growing rapidly but have not yet reached critical levels of congestion along primary commuter routes, commuter rail or bus transit may still be a useful tool as a part of a long-term planning strategy. Effective integration of all transportation modes, including transit, combined with strategic land-use planning can be used to maintain healthy population and economic growth and preserve the future mobility of North Carolinians.

CURRENT CORRIDOR CONDITIONS

	Population Served	Core City Pop. %	Hwy Miles	Trip Times	Rail Miles	Trip Times
CHARLOTTE TO:						
Statesville	37,000	93	38	:45	43	2:00
Gastonia	82,000	85	24	:30	24	1:00
Rock Hill	51,000	90	26	:32	28	:30
Monroe	58,000	89	26	:40	24	:45
Salisbury	120,000	80	40	:45	44	:45
Albemarle	19,000	96	42	1:00	53	2:00
WINSTON-SALEM TO:						
Mocksville	10,500	94	25	:30	26	1:00
Mount Airy	16,500	91	44	:47	41	3:25
High Point	73,500 +	70	19	:25	N/A	:20
Lexington	35,000	83	23	:30	21	:50
GREENSBORO TO:						
Burlington	48,000	81	23	:25	21	:32
Reidsville	15,000	93	23	:25	24	:20
Winston-Salem	186,000 +	52	30	:50	29	:55
Salisbury	137,000 +	60	53	:50	49	:56
RALEIGH TO:						
Fayetteville (via Fuquay)	122,000	68	62	1:20	63	2:15
Fayetteville (via Selma)	168,000	61	79	1:30	77	1:35
Wilson	49,000	84	47	:50	50	1:20
Selma/Smithfield	44,000	86	30	:40	28	:38
NORFOLK TO:						
Elizabeth City	25,000	95	53	1:00	55	2:20
Edenton	25,000	95	81	1:35	84	3:30

The potential Tidewater commuter corridor would extend south from Norfolk and Chesapeake, Virginia, along US 17 to Elizabeth City (53 miles) and possibly Edenton (81 miles). The corridor population in Virginia and North Carolina is 464,000, of which 95 percent live in Chesapeake and Norfolk, leaving a current North Carolina population that would be served by a Tidewater commuter route of 25,000. Daily traffic counts in 1997 averaged 6,700 at the Virginia line, 9,000 at the Pasquotank County line, 13,900 at Elizabeth City, 11,700 at the Perquimans County line, and 7,300 at Edenton. US 17 was designed to handle 32,500 vehicles a day from the Virginia state line to 13 miles beyond Elizabeth City. For the 15 miles on to Edenton US 17 has a carrying capacity of 10,900 daily vehicles. Travel times between Norfolk and Elizabeth City are estimated to be just over an hour, with another 35 minutes required to get to Edenton. US 17 generally has a 55 mph speed limit on this route.

The parallel rail line from Virginia's Tidewater is owned by Norfolk Southern, with the majority of the line leased to the Chesapeake and Albemarle Railroad. Both the 55-mile segment to Elizabeth City and the 29-mile segment beyond to Edenton are unsignaled single track lines with 30 mph passenger train speeds. Given the rail line's present condition, a commuter trip from Norfolk to Elizabeth City would require two hours, 20 minutes. A trip from Norfolk to Edenton would take approximately 3 hours, 30 minutes.

NEXT STEPS

North Carolina is experiencing rapid population growth, particularly in its urbanized areas. It is appropriate that the state and its citizens are looking for multi-modal solutions to current and future traffic congestion problems in the state's major commuter corridors. Commuter rail service can play an important part in this effort to keep North Carolina's urban population mobile.

Yet the need for rail service in many of the commuter corridors described in this paper may be more a prospective than a present need. Along a number of corridors, the potential commuter population, while growing, is currently quite modest and could not support the investment required to create and operate competitive commuter rail service. In other areas, the highways' design capacities are still sufficient to handle the daily traffic flow over the road segments, although that does not mean that during the height of the rush hours there is not congestion and potential delays.

In certain corridors, the situation is somewhat different with highways burdened with commuter traffic beyond the road segments design capacity and with significant and increasing daily commuter flows into and out of centers of employment.

For such situations, several corridors should be selected where there are substantial commuter populations, where the highways carrying capacities have been reached or exceeded, and where the continuing population growth requires additional travel solutions. A short list of such corridors should then receive a detailed evaluation

another characteristic. San Francisco's population of 725,000 represents 33 percent of the San Jose–San Francisco corridor population. Chicago, with 2.8 million residents, represents 43 percent of the population of its commuter corridors. Washington, DC's population of 610,000 represents 35 percent of the population of the Virginia commuter corridors served by VRE.

To be successful a rail commuter corridor clearly must link a sizable suburban population with a substantial central city.

For comparison purposes, Charlotte's population represents 56 percent of the population to be served by its six proposed commuter corridors. Winston-Salem also comprises 56 percent of the population of its possible four rail corridors. Greensboro provides 35 percent of the population of its possible four corridors. Raleigh makes up 54 percent of the population to be served by its three possible rail corridors. When compared to population served by individual corridors, however, the ratios vary significantly.

Metropolitan area and county populations frequently contain residential densities inconveniently located for possible rail use. Therefore, in order to capture the populations most likely to use rail commuter service, city populations are used in lieu of metropolitan area populations in this paper and incorporated community populations are used, instead of county populations.

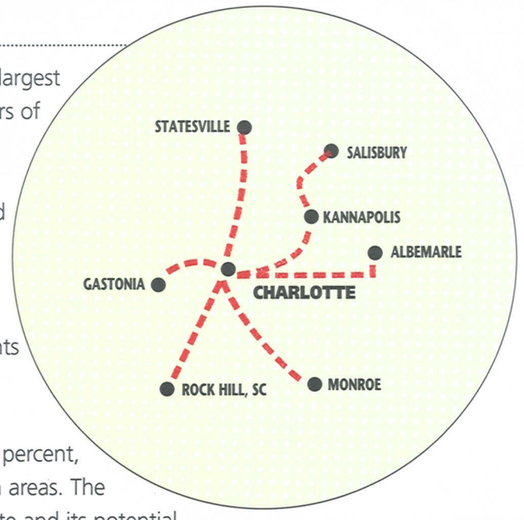
Many of the rail lines mentioned in this paper are currently not in a condition to support rail commuter service. The tracks, signal systems, roadbeds, and stations would need to be restored or improved to permit reliable and competitive running times. Such rehabilitation can be expected to cost between one and two million dollars a mile.

Average daily traffic counts on highways that parallel the corridors described have been included wherever possible. However, it must be noted that traffic counts, per se, give no indication of the possible origin or destination of the vehicles counted. This is especially true of traffic counts on interstate highways. To gather such information detailed traffic surveys would need to be conducted.

For each potential corridor, the design carrying capacity of the parallel highway also has been shown in order to give some idea of possible traffic congestion on the route. By and large, the carrying capacities of the highways in the corridors described are exceeded by daily traffic counts primarily in Charlotte and Raleigh commuter corridors. It should be noted, however, that traffic for specific time periods can be sufficient to cause congestion on highways whose total daily traffic load is within the highway's design carrying capacity.

This discussion of potential rail commuter routes has concentrated on four major North Carolina cities: Charlotte, Winston-Salem, Greensboro, and Raleigh and the rail corridors that might be developed to serve their rapidly growing commuter populations. In addition, a possible commuter route from Edenton and Elizabeth City to Norfolk is included.

CHARLOTTE



Charlotte is North Carolina's largest city and one of its greatest centers of commerce. Of the over 400,000 jobs in the Charlotte region, approximately 60,000 are located in the Uptown section, with 340,000 jobs found in the other areas, predominantly in the northeast and southeast quadrants of Charlotte.

Since 1990, North Carolina's overall population has grown 12 percent, mainly in the state's metropolitan areas. The counties which comprise Charlotte and its potential commuter corridors have grown at a slightly higher rate (12.45 percent) than North Carolina as a whole. The population growth rates range from 19 percent in Mecklenburg County and 17.6 percent in Iredell County to 2.8 percent in Gaston County and 6.5 percent in Stanly County.

Six rail corridors were selected as potential candidates for Charlotte commuter service. These possible corridors, linking Charlotte with Statesville, Gastonia, Rock Hill, Monroe, Norwood/Albemarle, and Salisbury, are discussed below.

CHARLOTTE–STATESVILLE

This 38-mile commuter corridor stretches north from Charlotte along I-77. The core corridor population comprises approximately 507,000 people of which 93 percent live in Charlotte, leaving a potential commuter population of 37,000 to be served by this route. Daily traffic counts on I-77 from Charlotte, in 1997, ranged from 91,000 just north of I-85 to 68,900 at the Iredell County line. North of the Iredell County line, daily traffic counts ranged from 45,000 to 53,400. I-77, on several segments, is carrying considerably greater traffic than the 49,000 daily vehicles it was designed to accommodate. Travel times between Statesville and Charlotte are estimated to be 45 minutes since 55 mph speeds are the maximum permitted along much of I-77 in this area. (In this corridor, as in all subsequent routes discussed, poor weather conditions, traffic congestion, highway construction, and other events may occasionally cause lengthened travel times.)

The parallel 43-mile Norfolk Southern single track rail line between Charlotte and Statesville is currently not signaled, and in its present condition could support rail passenger speeds of approximately 30 mph. In addition, nine miles of the line, from Mooresville to Troutman, have had track removed. Assuming this section of track is

Raleigh, leaving a potential commuter population of 49,000 to be served. Daily traffic counts in 1997 on US 264 averaged 13,100 near the Wake/Nash County line and 13,600 vehicles just east of the Wilson County line. US 264 between NC 97 and I-95 is designed to carry 49,100 daily vehicles. Travel times between Raleigh and Wilson are approximately 50 minutes. US 264, with a 65 mph limit outside the major urban areas, is mainly a limited access, multiple lane highway through Wake and Nash Counties.

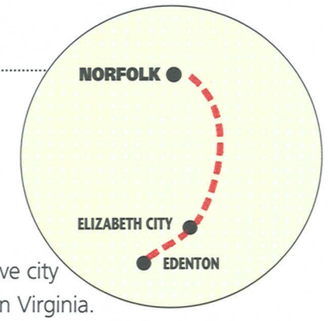
The parallel 50-mile Norfolk Southern rail line consists of an unsignaled single track with passenger trains restricted to 49 mph, although the track class could support somewhat higher speeds. With the present speed restrictions, a commuter trip on this rail line would take approximately one hour, 20 minutes.

RALEIGH–SELMA/SMITHFIELD

This 30-mile commuter corridor runs southeast from Raleigh along US 70. The core population of this routing is over 301,000, of which 86 percent live in Raleigh, leaving a potential commuter population to be served of 41,000. Average daily traffic counts in 1997 varied from 40,200 just east of the Wake/Johnston County line to 32,400 at the US 70/US70B split near Smithfield. US 70 southeast of Garner to Selma/Smithfield is designed to carry 32,500 vehicles a day. Trips between Raleigh and Selma/Smithfield take approximately 40 minutes on US 70, given the 55 mph speed limit on this highway east of Raleigh.

The parallel 28-mile North Carolina Railroad line, operated by Norfolk Southern, is an unsignaled single track line which permits passenger trains a maximum speed of 49 mph. Amtrak trains currently make the Raleigh–Selma run in 38 minutes.

NORFOLK–ELIZABETH CITY/ EDENTON



The Tidewater region of Virginia, already the second largest economic unit in the Commonwealth, is growing quickly and rapidly diversifying its commercial base to encompass military installations, shipyards, corporate headquarters, theme parks and vacation destinations. Virginia Beach, with its expansive city boundaries, has the largest incorporated population in Virginia. With its urban population projected to begin flowing over the border into North Carolina, a discussion of a possible commuter route into Virginia's Tidewater region would seem merited.

The population of the five North Carolina counties from the Virginia border to Elizabeth City and Edenton have grown more slowly (9.46 percent) since 1990 than North Carolina as a whole (12 percent), with the growth in population concentrated mainly in Currituck County (20.6 percent) and Pasquotank County (10.3 percent).

RALEIGH–FAYETTEVILLE (VIA FUQUAY)

This 62-mile commuter corridor winds its way south from Raleigh along US 401, much of which is an undivided two-lane highway. The core population of the corridor is 382,000 of which 68 percent live in Raleigh, leaving a potential commuter population of 122,000 to be served. Average daily traffic counts south along US 401 in 1997 ranged from a high of 19,000 in Wake County to 6,300 just south of the Harnett County line and 8,500 at the city limits of Fayetteville. The carrying capacity of US 401 generally is 28,400 daily vehicles from Raleigh to Fuquay and 10,900 vehicles beyond. Travel times between Raleigh and Fayetteville are approximately one hour, 20 minutes given the 55 mph speed limit posted for much of US 401 in this area.

The parallel 63-mile Norfolk Southern line from Raleigh to Fayetteville via Fuquay is an unsignaled single track line restricted to 35 mph for passenger trains, although the track class of this line could support somewhat higher speeds. Rail commuter trip times on this line would be approximately 2 hours, 15 minutes, given the current speed restrictions.

RALEIGH–FAYETTEVILLE (VIA SELMA)

This potential commuter corridor extends slightly over 79 miles southward from Raleigh to Fayetteville along US 70 and I-95. The core population of this routing is significantly greater than the Fuquay route to Fayetteville, although the overall distance is 17 miles longer. Of the 428,000 residents included in this corridor, 61 percent live in Raleigh, leaving a potential commuter population to be served of 168,000. Average daily traffic counts in 1997 along this routing ranged from 40,200 just east of the Wake/Johnston County line on US 70 to 42,300 on I-95 at the Johnston/Harnett County line, to 38,700 at the Cumberland County line. Carrying capacity of US 70 southeast of Garner is 32,500 vehicles a day. Travel times between Raleigh and Fayetteville on this routing are estimated to be one and a half hours, given the 55 mph speed limit posted on much of US 70 and the 65 mph permitted on this part of I-95.

The parallel 77-mile rail line via Selma consists of an unsignaled single track line from Raleigh to Selma, owned by the North Carolina Railroad and operated by Norfolk Southern. Amtrak trains on this segment are permitted speeds up to 49 mph. From Selma, a double track fully signalized CSXT line extends south to Fayetteville, along which Amtrak trains are permitted 79 mph maximum speeds. Potential rail commuter travel time between Raleigh and Fayetteville on the Selma route would be one hour, 35 minutes, although a head-on connection between the two lines does not currently exist at Selma.

RALEIGH–WILSON

This 47-mile commuter corridor stretches east from Raleigh along US 264. The core population of this routing is approximately 309,000, of which 84 percent live in

restored, at the line's current speeds, commuter rail travel times between Charlotte and Statesville would require approximately two hours.

CHARLOTTE–GASTONIA

This 24-mile commuter corridor runs west from Charlotte along I-85. The core corridor population has approximately 551,000 residents, of which 85 percent live in Charlotte, leaving a potential commuter population of 82,000 to be served by this route. Daily traffic counts on I-85 from Charlotte west to the Gaston County line, in 1997, ranged from 93,900 to 85,800. West of the Gaston County line to Gastonia the daily traffic count ranged from 83,100 to 88,700. (The consistency of the traffic volumes along I-85 may indicate that most of the vehicles are not making commuter trips.) I-85 from Charlotte to the Catawba River was designed to carry 113,000 daily vehicles, and 73,600 vehicles from there to northeast Gastonia. Travel times between Gastonia and Charlotte are estimated to be 30 minutes since 60 mph speeds are posted for I-85 in this area.

The preferred 24-mile commuter rail line runs between Charlotte and Gastonia via Mt. Holly. The 13 miles between Mt. Holly and Gastonia, owned by the North Carolina Department of Transportation, are currently out-of-service. The eleven miles of CSXT single track between Charlotte and Mt. Holly are unsignaled and could support passenger train speeds of approximately 30 mph. If the Mt. Holly to Gastonia track section were returned to service, commuter rail travel times of approximately one hour would be possible between Charlotte and Gastonia, assuming the route's current track conditions.

CHARLOTTE–ROCK HILL

This 26-mile interstate commuter corridor runs south from Charlotte along I-77. The corridor population consists of approximately 520,062 residents, of which 90 percent live in Charlotte, leaving a potential commuter population of 51,000 to be served by this route. Daily traffic counts on I-77 in South Carolina north of Rock Hill range from 50,400 just south of the Catawba River to 82,000 at the North Carolina border. Daily traffic counts on I-77 on the south side of Charlotte range from 145,800 near US 29/74 to 116,700 just above I-485, and 81,400 just south of I-485. I-77 from Charlotte south to the South Carolina border was designed to carry 96,700 daily vehicles. Travel times between Charlotte and Rock Hill are estimated to be 32 minutes with 55 mph speeds permitted for this section of I-77.

The parallel 28-mile single track Norfolk Southern line has an automatic block (ABS) signal system and could support passenger train speeds of 60 mph in its present condition. Norfolk Southern, however, restricts trains to 50 mph on this line segment, in effect making the possible rail commuter travel times of 30 minutes between Rock Hill and Charlotte slightly longer than the track could permit.

CHARLOTTE–MONROE

This 26-mile commuter corridor extends southeast from Charlotte along US 74, a multiple lane arterial highway. The corridor population is comprised of approximately 527,000 people, of which 89 percent live in Charlotte, leaving a potential commuter population of 58,000 to be served by this route. Daily traffic counts on US 74 in 1997 varied from just under 60,000 east of the split with NC 24/27 to 41,000 at the Union County line. In Union County, the traffic counts ranged from 46,000 to 33,700 near Monroe. US 74 has a carrying capacity of 44,300 from NC 24/27 to NC 51. Southeast of NC 51, US 74 was designed to carry 32,500 daily vehicles. Travel times between Monroe and Charlotte are approximately 40 minutes at a maximum speed of 55 mph.

The parallel 24-mile, single track, voice dispatched CSXT line is currently restricted to 40 mph with one nine-mile segment limited to 25 mph. In the line's present condition, commuter trips between Monroe and Charlotte could take approximately 45 minutes.

CHARLOTTE–SALISBURY

This 40-mile commuter corridor runs northeast from Charlotte along I-85. The corridor has approximately 590,000 residents, of which 80 percent live in Charlotte, leaving a potential commuter population to be served of 78,000. Daily traffic counts on I-85 from Charlotte to the Cabarrus County line ranged from 131,700 to 71,400 in 1997. In Cabarrus County, the average traffic counts on I-85 ranged from 71,400 to 53,600. In Rowan County near Salisbury, the traffic count was 52,600. I-85 was designed to carry 113,000 daily vehicles in Mecklenburg County east of I-77, 44,300 daily vehicles northeast of the split with NC 49 in Cabarrus County and 49,000 through much of Rowan County. With a 55-65 mph speed limits on much of this stretch of I-85, a trip from Salisbury to Charlotte can be made in approximately 45 minutes.

The parallel 44-mile North Carolina Railroad's fully signalized mainline, operated by Norfolk Southern, contains substantial sections of double track and permits Amtrak train speeds of up to 79 mph. Currently trips on Amtrak between Salisbury and Charlotte take 45 minutes.

CHARLOTTE–ALBEMARLE

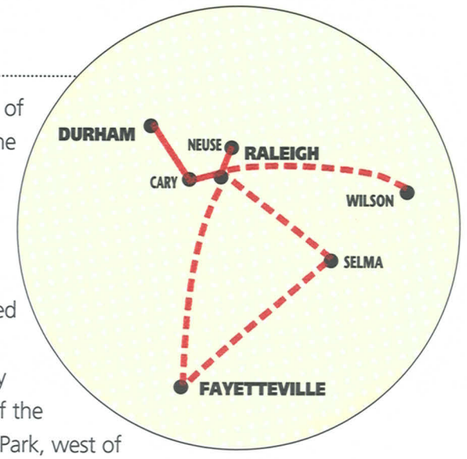
This possible commuter corridor stretches 42 miles east along NC 24-27 to Albemarle. The corridor population is approximately 489,000 residents, of which 96 percent live in Charlotte, leaving a potential commuter population of 19,000 to be served by this route. Daily traffic counts on NC 24-27 east of Charlotte to Albemarle range from 26,700 to 10,700 in Mecklenburg County, and from 12,400 to 8,300 in Cabarrus and Stanly Counties. NC 24-27's design capacity is 28,000 daily vehicles in Mecklenburg County and 10,000 vehicles through much of Cabarrus and Stanly Counties. Travel times between Albemarle and Charlotte are estimated to be one hour given the 55 mph speed limit on much of NC 24-27.

GREENSBORO–SALISBURY

This 53-mile commuter corridor stretches to the southwest from Greensboro along I-85. The core population of this corridor is over 338,000 of which 60 percent live in Greensboro, leaving a potential commuter population of at least 137,000 to be served. Daily traffic counts on I-85 in 1997 ranged from 68,900 on the southwest side of Greensboro to 40,400 at the Randolph County line, to 42,400 at the Davidson County line to 61,600 briefly where I-85 and US 29/52/70 converge to 59,400 at Salisbury. I-85's carrying capacity along most of this distance is 78,000 daily vehicles and drops to 49,100 daily vehicles in Rowan County. Travel times between Greensboro and Salisbury are approximately 50 minutes, given a 70 mph speed limit on much of this portion of I-85.

The parallel 49-mile mainline of the North Carolina Railroad, operated by the Norfolk Southern, is comprised of fully signalized single and double track segments which permit passenger train speeds of up to 79 mph. Current Amtrak travel time between the two cities is 56 minutes.

RALEIGH



Raleigh is not only the state capital of North Carolina, but a key element of the fast growing Triangle's biotechnology-based development. Employment centers in the Raleigh area are quite dispersed with the state government mainly downtown, as are jobs associated with North Carolina State University. Commercial development is increasingly concentrated in the northern reaches of the Beltline. Additionally, Research Triangle Park, west of Raleigh, is one of the largest employment areas in the Triangle.

Since 1990, the counties that comprise Raleigh and its potential commuter corridors have grown in population at a much higher rate (17 percent) than North Carolina as a whole (12 percent). This population growth has been particularly dramatic in Wake County (30.6 percent), Johnston County (27 percent), and Harnett County (20 percent), while growth in Wilson County (4 percent) and Cumberland County (7.5 percent) has been more modest.

Three rail corridors were selected as potential candidates for Raleigh commuter service. These routes, running to the south and east, would connect Raleigh with Fayetteville, Selma, and Wilson. (Additionally, the Triangle Transit Authority (TTA) is in the active planning stages for a commuter rail service that would link Durham-Cary-Raleigh-Spring Forest. The project, being already underway, is not discussed in this paper.)

from Sedalia to Burlington. Travel times between Greensboro and Burlington are approximately 25 minutes given the 65 mph speed limit along much of I-40/85.

The parallel 21-mile single track rail line between Greensboro and Burlington is owned by the North Carolina Railroad and operated by the Norfolk Southern. As the line is currently unsignaled, Amtrak passenger train speeds are restricted to 59 mph, making trip times between the two communities 32 minutes.

GREENSBORO–REIDSVILLE

This 23-mile commuter corridor stretches northward from Greensboro along US 29. The population of this possible corridor is 216,300 of which 93 percent live in Greensboro, leaving a potential commuter population of just under 15,000. Daily traffic counts on US 29 near Monticello averaged 21,700 in 1997, with 25,500 vehicles counted just north of the Rockingham County line. US 29 in this region was designed to handle 44,300 daily vehicles. Travel time between Greensboro and Reidsville is approximately 25 minutes since US 29 on this segment is a limited access, multilane highway posted for 55 mph, with some stretches of 65 mph permitted in Rockingham County.

The parallel 24-mile segment of Norfolk Southern's mainline is composed of single and double track fully signalized sections with maximum passenger train speeds of 79 mph. Possible rail commuter time between Reidsville and Greensboro would be 20 minutes.

GREENSBORO–WINSTON-SALEM

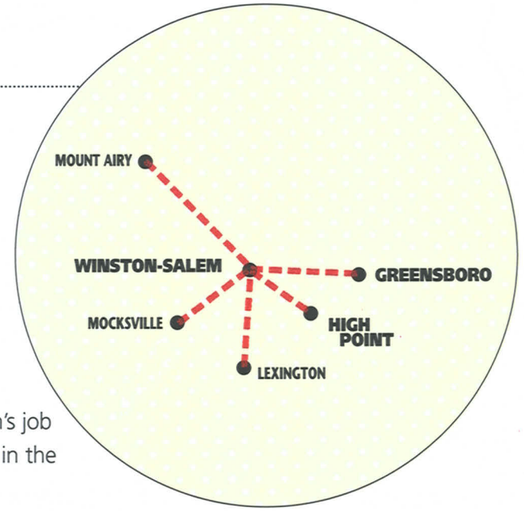
This 30 mile potential corridor stretches westward from Greensboro to Winston-Salem along I-40 and I-40 Business. The corridor has somewhat over 387,000 residents, 52 percent of whom live in Greensboro. Given the proximity of these two cities and their comparable populations, it is highly likely that a sizeable reverse commute exists along this corridor. Daily traffic counts on I-40 in 1997 averaged 81,000 near Piedmont Triad Airport. Traffic counts in Forsyth County on I-40 ranged from 45,000 west of the Guilford County line to 49,600 at I-40 and US311 in Winston-Salem. I-40 business, which parallels I-40 to the north in Forsyth County, carried an average of 28,000 daily vehicles in 1997. I-40 was designed to handle 44,300 daily vehicles from Greensboro to the split of I-40 and I-40 Business, and 49,100 daily vehicles west of the split. Just to the north I-40 Business has a carrying capacity of 64,500 daily vehicles. Travel times between Greensboro and Winston-Salem are estimated to be 50 minutes given that much of I-40 and I-40 Business is posted for 55 mph in this area.

The parallel 29-mile Norfolk Southern rail line consists of a single track, with signalized and unsignaled sections, with speeds restricted to 35 mph, although the signalized portions would be capable of significantly higher track speeds. With current speed restrictions, rail trip times would be 55 minutes.

The somewhat circuitous 53-mile rail line would require, in its present condition, just under two hours for the Charlotte–Albemarle trip. The 44-mile Charlotte–Norwood segment is owned by the Aberdeen Carolina and Western Railway, while the nine-mile Norwood–Albemarle segment is part of the Norfolk Southern. A head-on connection between the two lines does not exist at Norwood. Maximum speed for both single track, unsignaled line segments is currently 30 mph.

WINSTON-SALEM

Winston-Salem is a major regional center in western North Carolina with a diverse and growing economic base. Employment areas are dispersed, with industrial parks to the north and south, and banking and financial services concentrated on the west side. Winston-Salem's job growth is especially pronounced in the Kernersville and Rural Hall areas.



The nine counties that comprise the Triad region have grown in population since 1990 at a slightly more modest rate (10.34 percent) than North Carolina as a whole (12 percent). The population growth rates range from 15.1 percent in Stokes County and 14.1 percent in Randolph County to 3.6 percent in Rockingham County.

Four rail corridors were selected as potential candidates for Winston-Salem commuter service. These possible corridors, linking Winston-Salem with Mocksville, Mount Airy, High Point and Lexington, are discussed below.

WINSTON-SALEM–MOCKSVILLE

This 25-mile commuter corridor stretches southwest from Winston-Salem to Mocksville along I-40. The core corridor population is comprised of approximately 182,500 people of which 94 percent live in Winston-Salem, leaving a potential commuter population of 10,500 to be served by this route. Daily traffic counts on I-40, in 1997, from Winston-Salem to the Davie County line ranged from 48,200 to 38,600. Closer towards Mocksville daily traffic counts averaged 26,000. I-40 has a carrying capacity of 73,600 in Forsyth County and a portion of Davie County and 49,000 in most of Davie County. Travel times between Winston-Salem and Mocksville are approximately 30 minutes with maximum speeds permitted on this section of I-40 ranging from 55 to 70 mph.

The parallel 26-mile single track, unsignaled Norfolk Southern rail line between Winston-Salem and Mocksville could support passenger train speeds of up to 59 mph. NS, however, restricts trains on this line to 35 mph, making potential commuter travel times between Winston-Salem and Mocksville approximately one hour.

WINSTON-SALEM–MOUNT AIRY

This 44-mile commuter corridor extends from Winston-Salem northwest to Mount Airy along US 52. The corridor population has approximately 188,000 residents, of which 91 percent live in Winston-Salem area, leaving a potential commuter population of 16,500 to be served by this route. Daily traffic counts on US 52 drop from 51,000 north of downtown Winston-Salem to 35,000 nearing the Stokes County line. Daily traffic counts on US 52 in 1997 in Stokes and Surry Counties ranged from 30,400 to 20,600. US 52 was designed to accommodate 49,000 daily vehicles through this region. Travel times between Winston-Salem and Mount Airy are estimated to be 47 minutes given the maximum 55-65 mph speeds allowed on these sections of US 52.

The 41-mile unsignaled single track rail line between Winston-Salem and Mount Airy is composed of two segments. The 11 miles between Winston-Salem and Rural Hall are a Norfolk Southern line capable of supporting 60 mph speeds, with trains restricted by NS to 30 mph. The 30 miles beyond Rural Hall to Mount Airy are over the Yadkin Valley Railroad with maximum permitted speeds of 10 mph. Potential commuter travel times between Winston-Salem and Mount Airy over these railroads, in their present condition, would be three hours, 25 minutes.

WINSTON-SALEM–HIGH POINT

This 19-mile commuter corridor extends east of Winston-Salem along US 311. The corridor population is approximately 245,000, of which 70 percent live in Winston-Salem, leaving a potential commuter population of at least 73,500 to be served by this route. Given the close proximity of these two communities and the sizes of their population, there may well be substantial reverse commuter flows from Winston-Salem to High Point greatly increasing the importance and use of this corridor for commuter purposes. Daily traffic counts in 1997 on US 311 east of I-40 ranged from 13,800 to 16,800 in Forsyth County and from 29,300 to 27,000 in Guilford County. US 311 is designed to handle 49,100 vehicles daily. Travel times between these two cities are approximately 25 minutes given the 65 mph speeds permitted on US 311 in Forsyth County.

No rail line directly connects Winston-Salem and High Point. To provide commuter rail service between these points, a new rail line would need to be constructed along the US 311 right-of-way permitting 20 minute rail travel times between Winston-Salem and High Point.

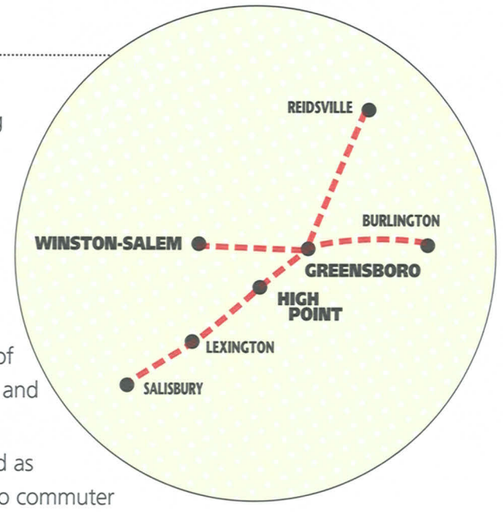
WINSTON-SALEM–LEXINGTON

This 23-mile commuter corridor runs south of Winston-Salem along US 52. The corridor population is approximately 207,000 of which 83 percent live in Winston-Salem, leaving a potential commuter population of 35,000 to be served by the route. Daily traffic counts on US 52 between Winston-Salem and Lexington ranged between 25,700 and 19,700 in 1997. US 52 is this area has a daily carrying capacity of 49,100 vehicles. Travel times between Lexington and Winston-Salem are estimated to be 30 minutes since the maximum speeds permitted vary from 55 mph to 65 mph for this segment of US 52.

The parallel 21-mile rail line is owned by the Winston-Salem Southbound Railway. This unsignaled, single track Class II line in its present condition is restricted to 30 mph for passenger trains. A commuter trip between Winston-Salem and Lexington over this route would take approximately 50 minutes.

GREENSBORO

Greensboro, the leading city in the Triad, is a major manufacturing center with employment concentrated in a busy downtown area as well as surrounding industrial parks. Current economic development is especially pronounced along I-40 east of downtown, and west of downtown in the Guilford College and Piedmont Triad Airport areas.



Four rail corridors were selected as potential candidates for Greensboro commuter service. These possible corridors, linking Greensboro with Burlington, Reidsville, Winston-Salem and Salisbury, are discussed below.

GREENSBORO–BURLINGTON

This 23-mile commuter corridor extends eastward from Greensboro along I-40/85. The core population of this corridor is 245,000 of which 83 percent live in Greensboro, leaving a potential commuter population of 43,000 to be served. Daily traffic counts for 1997 for I-40 from Greensboro to the Alamance County line ranged from 67,100 to 80,300. East of the Alamance County line to Burlington, the average daily counts ranged from 80,300 to 90,800. (It should be noted that traffic counts increased the farther east the measurement was taken from Greensboro.) I-40/85 was built to accommodate 66,500 vehicles daily from Greensboro to Sedalia and 124,000