

RICHMOND REGIONAL MASS TRANSIT STUDY

Executive Summary

May 8, 2008



Richmond Area Metropolitan Planning Organization
c/o Richmond Regional Planning District Commission
9211 Forest Hill Avenue, Suite 200
Richmond, VA 23235
804-323-2033
www.richmondregional.org



Acknowledgment

Prepared in cooperation with the U.S. Department of Transportation and the Virginia Department of Transportation.

Disclaimer

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The Richmond Area Metropolitan Planning Organization (MPO) recognizes the work of the Richmond Regional Mass Transit Study Advisory Committee who worked tirelessly to develop and review this study. The members were appointed by the MPO and include representatives from the Technical Advisory Committee (TAC) the Citizens Transportation Advisory Committee (CTAC) and the Elderly and Disabled Advisory Committee (EDAC):

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VDRPT

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Charles Badger**

VDOT Planning Division

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Liz McAdory*

Virginia Conservation Network

John Zeugner
Adele MacLean*

United Way

Cora Dickerson
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The Richmond Area Metropolitan Planning Organization (MPO) is the federal and state designated regional transportation planning organization that serves as the forum for cooperative transportation decision-making in the Richmond area. The Richmond Regional Planning District Commission is the contracting agent and staff for the Richmond Area MPO.

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CRAC

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Jon Mathiasen*

GRTC Transit System

John M. Lewis
Lawrence C. Hagin*

RMA

Robert M. Berry
James B. Kennedy*

Richmond Regional PDC

(Vacant)
Daniel N. Lysy*

VDOT

Thomas A. Hawthorne
Mark E. Riblett*

NONVOTING MEMBERS:

CTAC

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Virginia H. Axtell*

EDAC

Linda G. Broady-Myers
Marjorie L. Payne*

FHWA

Tammye Davis

FTA

Tony A. Cho

MPO Chairman's Citizen Appointee

Charles H. Rasnick

Ridefinders, Inc.

Von S. Tisdale
Cherika Ruffin*

VA Dept. of Aviation

P. Clifford Burnette, Jr.

Va. Dept. of Rail and Public Transportation

Charles M. Badger
Corey W. Hill*

* Alternates

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Allyson L. Finchum

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Senior Planner – Systems Administrator

Sarah G. Smith

Senior Planner

Leigh R. Medford

Planning Technician – GIS

Rhonda J. Bailey

Administrative Secretary

+ Study Project Manager

1 INTRODUCTION

The Richmond Area Metropolitan Planning Organization (MPO) has undertaken a comprehensive study of the development and implementation of a regional mass transit system for the Greater Richmond region. The study area includes the City of Richmond; Town of Ashland; Counties of Charles City, Chesterfield, Hanover, Henrico, Goochland, Powhatan, and New Kent. This Regional Mass Transit Study (RMTS) has been conducted in coordination with a comprehensive analysis of operations that the GRTC Transit System is conducting for its existing service area of the City of Richmond, and Henrico and Chesterfield Counties. The RMTS analyzes the potential for public transportation throughout the region and considers all surface public transportation modes, including local and express bus, car and vanpool programs, demand responsive specialized services, bus rapid transit, street car/trolley, light rail, and commuter rail.

The fundamental goal of the Regional Mass Transit study recommendations is to ensure people throughout the region have mobility options while also enhancing the regional economy and offering options to single-occupant vehicle use. The study reflects a truly regional approach in applying public transportation as a tool to sustain the region's quality of life and economic growth. The study proposes mid-range (10 years) and long-range (25 years) transit service enhancements and provides recommendations for dedicated, on-going funding programs. The study addresses all surface public transportation modes including local and express bus, car- and vanpool programs, ADA/specialized public transportation services, bus rapid transit, street car/trolley, light rail, and commuter rail. It also provides recommendations for supportive land uses appropriate to enhancing public transportation service.

Greater Richmond, like metropolitan areas throughout the country, is facing a host of traffic congestion, environmental and economic development issues driven primarily by the continued dispersed patterns of residential and economic development. These patterns, coupled with a strong economy, have resulted in a virtual explosion of automobile travel that has far exceeded population growth over the last decade. Specifically, this regional mass transit study has been developed in response to the following issues:

- Traffic is becoming a major concern in many places of the metropolitan area.
- Traditional public transportation is becoming increasingly difficult to provide because of the continuing low-density development in the area.
- Air quality issues (potential ozone non-attainment) associated with expanded automobile travel are potential threats to public health and economic development.
- Roadway funding, right-of-way constraints and air quality issues make it increasingly difficult to solve traffic problems by building more roads.
- The growth of job markets in suburban areas has resulted in a disconnect between entry level jobs and people needing employment.

Four Technical Memoranda were prepared to document the extensive research and analysis that was conducted as part of this study. These memoranda, which have been incorporated into the study Final Report, include:



Technical Memorandum #1 provides an overview of existing conditions in the Richmond region from demographic, land use, and transportation perspectives. This report provides an initial identification of areas in the Richmond region that may be appropriate for public transportation, based on demographic and employment forecasts and indicators of appropriate transit services. It also summarizes the most recent transportation and land use components of comprehensive plans for each of the jurisdictions in the region. Potential transit trip generators and attractors within the study area are identified and the transportation needs for the elderly, mobility impaired and low-income populations are summarized. The Technical Memorandum concludes with a review of a previously conducted Rail Transit Feasibility Study.

Technical Memorandum #2 reviews policies that influence decisions about the provision of transit service to the Richmond region and evaluates the ordinances of the local jurisdictions with regard to how they support or perhaps hinder the provision of transit service. Potential changes to land use policies that would be more supportive of public transit are presented. Information is provided on the construction, operations and maintenance costs for highways and bus, light rail, and commuter rail transit. Potential institutional arrangements for managing and operating transit service in the Richmond region are presented. The federal and state legislative provisions for funding transit service implementation are examined and projections are provided of capital and operating funding for transit in the Richmond region through the year 2031. This memorandum also includes an overview of the economic, health, and environmental benefits of transit, and a summary of the transportation needs for the elderly, mobility impaired and low-income populations.

Technical Memorandum #3 reviews the transit services provided in three metropolitan areas of similar size, population and demographics as Richmond: Charlotte, NC, Memphis, TN and Albany, NY. The report summarizes data relating to demographics, transit operations, transit ridership, and transit funding as well as insights gained through interviews with staff from transit agencies and Metropolitan Planning Organizations (MPOs) found in the peer regions. Socioeconomic indicators, commuting characteristics, and regional congestion of the three regions are analyzed and compared with Richmond. Transit service provision, ridership, long range transit plans, institutional arrangements, funding, and insights on successes and challenges are reviewed. The memorandum concludes with a summary of the transit supportive characteristics of each peer and a discussion of the lessons that the Richmond region can learn from these other regions.

Technical Memorandum #4 analyzes alternatives for the enhancement of transit service in the Richmond region. Key transportation corridors are identified, and recommendations for medium term (2016) and long term (2031) service improvements are developed. Nine key travel corridors in the region that are not adequately served by public transportation today are identified. Recommendations for transit service are made for each of these corridors using a variety of modes as appropriate to the levels of development and potential demand. Modes of service that are recommended included limited stop bus, express bus, bus rapid transit, light rail and commuter rail. For each corridor, recommendations are provided on appropriate frequencies and hours of service, and operating and capital costs have been estimated. The expansion of local bus service in nine additional corridors and the expansion of demand responsive transit services for the transportation disadvantaged to cover the entire region are also proposed and cost estimates are provided for this additional service. Technical Memorandum #4 concludes with tiered recommendations for medium term and long term transit service improvements.

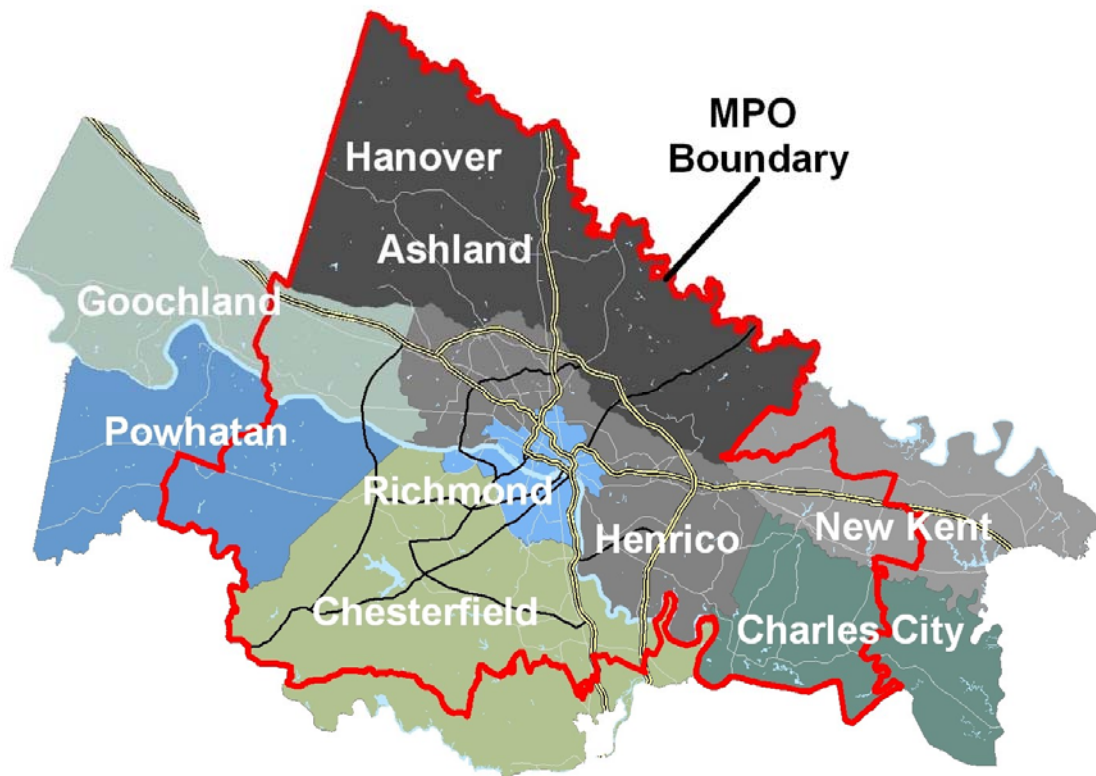
The study team held public meetings for the Richmond Regional Mass Transit Study on November 8, 2007 and April 2, 2008. Additionally, as a supplement to the Regional Mass Transit Study a series of meetings were sponsored by the Richmond Chamber of Commerce in the City and in three of the surrounding counties - Chesterfield, Hanover and Henrico. At each of these meetings the study concepts and issues were presented to representatives of the business community in the jurisdiction and business representatives provided input on the provision of transit service in the region. The public comments indicate that there is a broad clear consensus that additional transit service is needed as a key component of the continued growth of the region.

2 THE RICHMOND REGION

2.A STUDY AREA

Because the intent of this study is to develop a truly regional vision for public transportation, the study area, shown in Figure ES-1, extends beyond the Metropolitan Planning Organization (MPO) study area boundary to include the entire region. The study encompasses the City of Richmond, the Town of Ashland and the Counties of Charles City, Chesterfield, Goochland, Hanover, Henrico New Kent and Powhatan.

Figure ES-1 – Richmond Regional Mass Transit Study Area



Demographic indicators are useful in the identification of the current and anticipated spatial concentrations of people, households, employment, and automobile ownership throughout the region. These help to define the transportation needs and the likely effectiveness of various forms of public transit in addressing these needs. This study utilized current population (2007) and employment (2006) estimates developed by the Virginia

Employment Commission. These population and employment estimates only include the MPO urban study area. This data has been supplemented by the MPO through its Socioeconomic Data Work Group to produce the “Socioeconomic Data Report 2000-2031” which was approved by the MPO on November 8, 2007 and used as the basis for this study.

2.B POPULATION AND EMPLOYMENT GROWTH PROJECTIONS

As Table ES-1 indicates, between 2006 and 2031, the population of the Richmond MPO study area is forecast to grow by approximately 412,000 people, or 47%, from 876,000 to 1,288,000 people. Chesterfield County and Henrico County will experience the greatest population growth, accounting for over 70 percent of the population growth. The outlying counties of the region are all projected to experience dramatic rates of growth over the next 25 years, with Goochland and New Kent counties almost tripling in size. The Transportation Analysis Zones (TAZs) with the greatest increase in population (over 1,000 residents) tend to be located along major transportation corridors: I-95, I-64, and I-295. One exception is Chesterfield County, which is forecast to experience significant growth in its western region.

Table ES-1 – Population Growth 2006 – 2031, Richmond MPO Study Area¹

	2006	2016	2031	% Increase 2006-2031
Ashland	7,458	9,013	12,035	61.4%
Charles City County	6,110	6,940	8,491	39.0%
Chesterfield County	254,990	298,221	418,896	64.3%
Goochland County	8,337	12,684	24,726	196.6%
Hanover County	90,439	109,073	149,690	65.5%
Henrico County	285,734	324,023	416,819	45.9%
New Kent County	8,354	11,519	23,289	178.8%
Powhatan County	16,114	20,284	28,871	79.2%
Richmond City	<u>198,863</u>	<u>200,353</u>	<u>205,121</u>	<u>3.1%</u>
Grand Total	876,399	992,110	1,287,938	47.0%

Employment is projected to increase dramatically in the outlying counties of the region over the next 25 years. While the employment in the City of Richmond is projected to slightly decline, as shown in Table ES-2, Charles City, Chesterfield, Goochland, New Kent and Powhatan are all projecting to more than double their employment. This will continue the shift in the distribution of employment from the central urban core of the region to a more dispersed pattern throughout the region.

The growth in auto ownership is expected to exceed the growth in both population and employment. As Table ES-3 indicates, auto ownership is projected to grow by approximately 60% between 2006 and 2031. Again, the biggest increases will come in the outlying jurisdictions, with Ashland, Goochland, Hanover, and New Kent all more than doubling the number of vehicles.

¹ Reflects MPO study area data and forecasts; does not cover entire jurisdiction.

Table ES-2 – Employment Growth 2006 – 2031, Richmond MPO Study Area²

	2006	2016	2031	% Increase 2006-2031
Ashland	8,028	9,072	10,927	36.1%
Charles City County	1,535	2,028	3,088	101.2%
Chesterfield County	136,006	171,593	284,531	109.2%
Goochland County	6,750	11,621	34,112	405.4%
Hanover County	41,563	48,342	64,540	55.3%
Henrico County	240,596	258,803	312,532	29.9%
New Kent County	2,345	3,517	6,970	197.2%
Powhatan County	3,365	6,810	19,746	486.8%
Richmond City	<u>199,841</u>	<u>192,120</u>	<u>196,917</u>	<u>-1.5%</u>
Grand Total	640,029	703,906	933,363	45.8%

Table ES-3: Automobile Ownership Growth 2006 - 2031, Richmond MPO Study Area³

	2006	2016	2031	% Increase 2006-2031
Ashland	4,706	6,685	11,360	141.4%
Charles City County	5,131	5,880	7,360	43.5%
Chesterfield County	191,731	228,605	330,793	72.5%
Goochland County	7,577	11,311	21,179	179.5%
Hanover County	81,161	107,885	171,321	111.1%
Henrico County	209,632	238,361	311,028	48.4%
New Kent County	7,065	9,689	19,042	169.5%
Powhatan County	13,726	17,323	24,810	80.8%
Richmond City	<u>108,094</u>	<u>108,463</u>	<u>110,482</u>	<u>2.2%</u>
Grand Total	624,118	727,517	996,015	59.6%

2.C MAJOR TRANSIT TRIP GENERATORS

2.C.1 City of Richmond

The major potential transit generators in Richmond are arranged along five primary corridors: Jefferson Davis Highway (US 1/301) south of downtown, Midlothian Turnpike (US 60) to the southwest, Broad Street (US 250/33) to the northwest, Main Street and Carytown to the west, and Nine Mile Road and 25th Street to the east. In addition, groups of institutional transit generators can be found. The Diamond baseball stadium and the Arthur Ashe, Jr. athletic center are northwest of downtown. To the west are the Science Museum of Virginia, Children's Museum of Richmond, Virginia Museum of Fine Arts, and Virginia Historical Society. Also to the west are Virginia Commonwealth University, the Siegel Center, and the Landmark Theater. The highest concentration of transit generators lies in the downtown area, made up of government offices, tourism areas, and banking centers. Transportation centers such as Main Street Station and University and hospital campuses are other potential transit generators.

² Reflects MPO study area data and forecasts; does not cover entire jurisdiction.

³ Reflects MPO study area data and forecasts; does not cover entire jurisdiction.

2.C.2 North of Richmond

North of Richmond, potential transit generators are primarily in Henrico County and the Town of Ashland. Ashland is home to Randolph-Macon College as well as some planned mixed used development. Other transit generators in this part of the study area center on transportation hubs, such as Richmond International Airport, the Amtrak train stations in Ashland and at Staples Mill, and park-and-ride facilities along the interstate highways. The Broad Street commercial corridor in western Henrico County as well as concentrated nodes of commercial or mixed used development round out the remaining potential transit generators.

2.C.3 South of Richmond

In the southern part of the study area, potential transit generators follow two principal corridors in Chesterfield County – along US 360 and along US 1. In addition, several regional mixed use centers are planned in Chesterfield County near the intersections of arterial roadways. Similarly, in rural New Kent County and Charles City County potentially transit supportive planned development centers are located along primary cross-county roadways. The identified potential transit generators south of Richmond are mainly commercial or mixed use nodes, rather than major institutional uses.

2.D TRANSPORTATION NEEDS FOR ELDERLY, DISABLED, AND LOW-INCOME PERSONS

Mobility is an essential part of daily living. It can involve commuting to work, shopping, going to medical appointments, visiting friends and family, or going out for recreation. The elderly, disabled, and low-income population (often referred to as the transportation disadvantaged) may have difficulty providing their own transportation using a private automobile. In 2006 the Richmond Regional Planning District Study published *Public Transportation for the Elderly, Disabled, and Low-Income: Phase I – Needs Assessment Report*, which describes the problems of providing transportation options, and the currently available options, to the transportation disadvantaged. A significant portion of the region's population is transportation disadvantaged, and the size of this population is expected to grow over the next 25 years.

The elderly population in the Richmond region is growing and becoming a larger proportion of the total population. Approximately 10.5% of the population of the Richmond region is age 65 or older, with 85 percent of the region's elderly population living in the City of Richmond, Chesterfield County, and Henrico County. Approximately 17.6% of the residents of the Richmond region are classified as disabled, with long-lasting physical, mental, or emotional condition that interferes with important daily activities, may be impeded from holding a job or traveling alone outside the home. In two jurisdictions in the region, the City of Richmond (25.5%) and Charles City County (26.0%) over one quarter of the residents are classified as disabled. Households with incomes below the poverty line are less likely to own automobiles than more affluent households. Ninety percent of recipients of public assistance do not own a car and those below the poverty line account for over half of all households with no car. These populations often require flexible transportation options to work non-traditional work shifts. In the Richmond area, Charles City County and the City of Richmond have higher than average poverty rates (10 percent and 20.5 percent respectively), and 93 percent of the region's total poverty population is concentrated in Richmond, Chesterfield County, and Henrico County. Transit use is five times greater by those living below the poverty line than those living above the threshold. Most low income

households spend large shares of their income to afford a car, since poor transit service still requires them to own an auto for basic mobility needs.

There are a variety of transportation services provided in the Richmond region. Although each jurisdiction is served by some form of transit service, the form transit takes varies by target population, service type (fixed-route versus demand-responsive) and operating hours.

GRTC operates accessible fixed route service as well as demand responsive services through the CARE and CVAN programs. CARE complements GRTC's fixed routes with demand-responsive paratransit service. Henrico County and the City of Richmond provide CARE service throughout their respective jurisdictions. CVAN is a service provided by the Virginia Initiative for Employment not Welfare (VIEW) participants. Curb-to-curb transportation is provided among homes, places of employment, and child care facilities for those on public assistance within Richmond, Henrico County, Chesterfield County, and Hanover County. The service is free to eligible customers and is available 24 hours per day. The vehicles are not equipped with wheelchair lifts.

Demand responsive paratransit service is provided for Chesterfield County and portions of Henrico County by Access Chesterfield. This service is open to residents who are either over the age of 60, below the poverty line, or are disabled, regardless of age. It also provides service to the surrounding areas of Fort Lee, Colonial Heights, Richmond, and Petersburg.

Various public and private human service organizations provide transportation throughout the region. Logisticare, Powhatan-Goochland Community Action Agency, Goochland Fellowship and Family, Quin Rivers Community Action Agency, Senior Connections, Smart Ride, American Red Cross and Shepherd's Center of Richmond and Chesterfield provide transportation for the special needs populations that they serve.

There are many needs and issues when it comes to serving the transportation disadvantaged. High cost, limited service area and hours and restrictions on the types of trips served all restrict the ability of the transportation disadvantaged to travel through the region. The destinations that many transportation disadvantaged people travel to are scattered throughout the region, hindering the ability to travel.

3 LAND USE

3.A EXISTING AND PROJECTED LAND USE PATTERNS

Use of transit service historically has been related to the characteristics of the resident population in the areas served (e.g., household income, auto ownership) and the characteristics of the developed area (e.g. household density, concentrations of employment, street patterns). The potential effectiveness of transit in attracting riders in any given area depends on multiple factors including the quality of service available, the degree of highway congestion, costs and availability of parking, and the patterns of travel between residences and workplaces, shopping, medical services and related uses.

The Institute of Transportation Engineers (ITE) developed guidelines for minimum transit service levels based on three ranges of residential density as shown in **Table ES-4**. One bus per hour is recommended for Transportation Analysis Zones (TAZs) with between four to six dwelling units per acre, one bus per 30 minutes for TAZs with between seven and eight dwelling units per acre and light rail or feeder bus service for TAZs with over nine dwelling

units per acre. TAZs that do not meet the minimum residential density for fixed transit service could have park-and-ride services available.

Table ES-4: Service Levels by Residential Density

Minimum Service Level	Residential Density Thresholds
1 bus/hour	4-6 DU per Acre
1 bus/30 minutes	7-8 DU per Acre
Light rail and feeder buses	9 DU per Acre

Figure ES-2 shows the current residential densities by TAZ in 2006 and **Figure ES-3** shows the projected densities for 2031, respectively. Most TAZs with residential densities above four dwelling units per acre are located in Richmond and Henrico County. These TAZs currently have transit service.

The guidelines for provision of transit service to employment centers tend to be more related to the absolute number of workers or to the amount of office space in a location than to the density. Data collected at employment centers across the nation suggest a rule of thumb for suburban office parks of about one bus per hour per million square feet of office space. In central business districts, the greater concentration of employment typically supports a higher level of transit service **Figure ES-4** and **Figure ES-5** illustrate the current and projected 2031 density of employment throughout the region.

While substantial growth in population and employment is forecast for the Richmond region, this growth is likely to be dispersed throughout the region. Richmond City is expected to experience a limited net increase in population and a slight decrease in employment.

Forecasts of residential densities and employment density show that most areas in which fixed-route transit is appropriate are currently served by public transportation. With the currently forecast patterns of development, opportunities for effective expansion of fixed-route, fixed-schedule public transportation in the forecast years of 2016 and 2031 are limited, although the residential density forecasts combined with the forecasts of growth in employment suggest a need for more frequent service in some portions of Henrico County and extension of service into portions of Chesterfield County. An expansion of park-and-ride facilities and express bus services would be appropriate for serving persons commuting from suburban locations to downtown Richmond.

However, even if the general pattern of development in large portions of the region is such that fixed-route transit services is not warranted, there can be sections of the area or specific projects that are developed in ways that would support transit services. Having land use and development policies that recognize the elements that lead to transit-supportive projects, making these policies known to developers, supporting developers in their efforts to adhere to the guidelines, and engaging the transit operating agency in review of proposed developments can create conditions that permit effective and efficient transit. Even if the initial developments are not of a magnitude that supports quality transit, the cumulative effect over time can be significant.

Figure ES-2 – Households per Acre (2006)

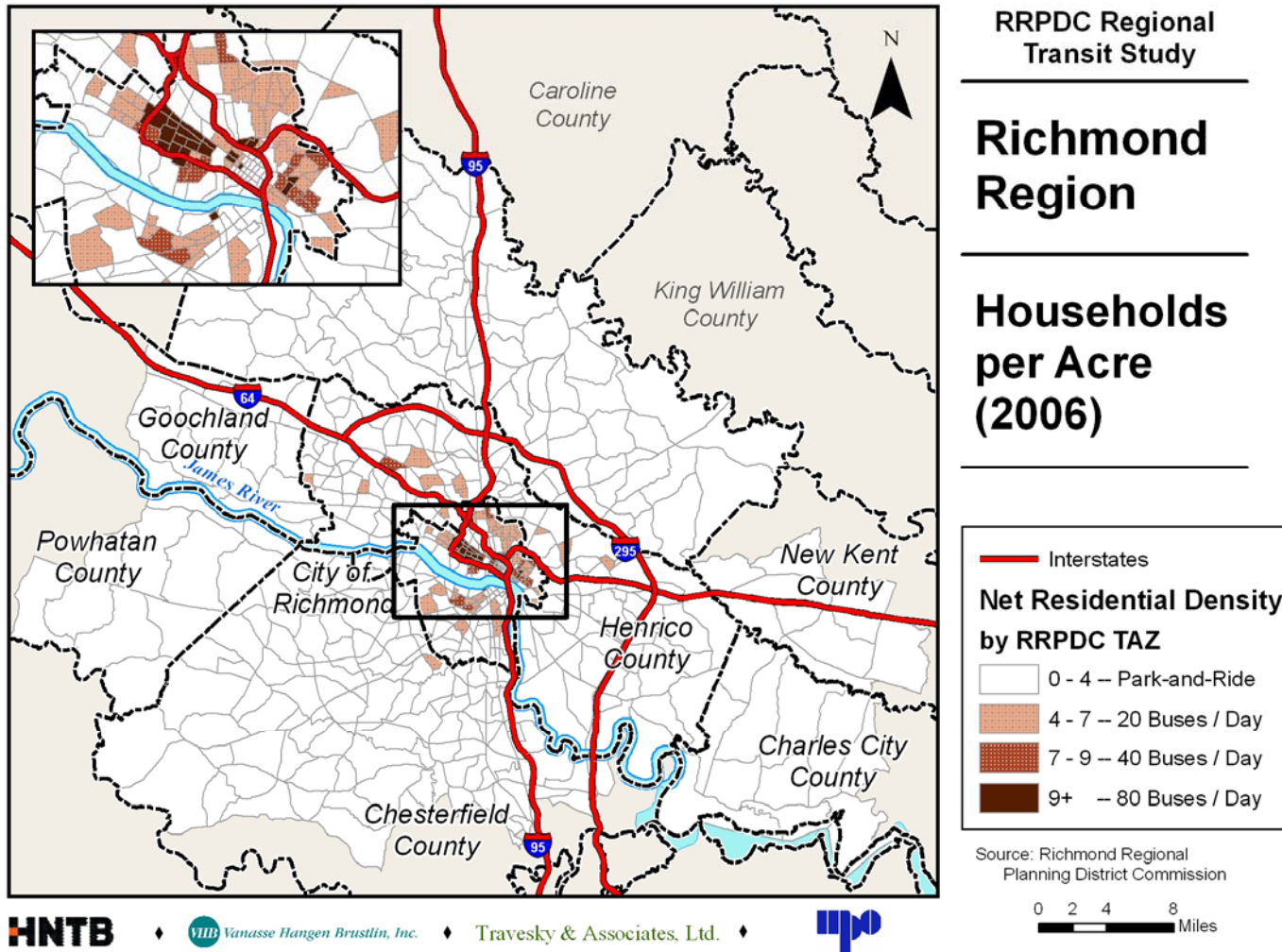


Figure ES-3 – Households per Acre (2031)

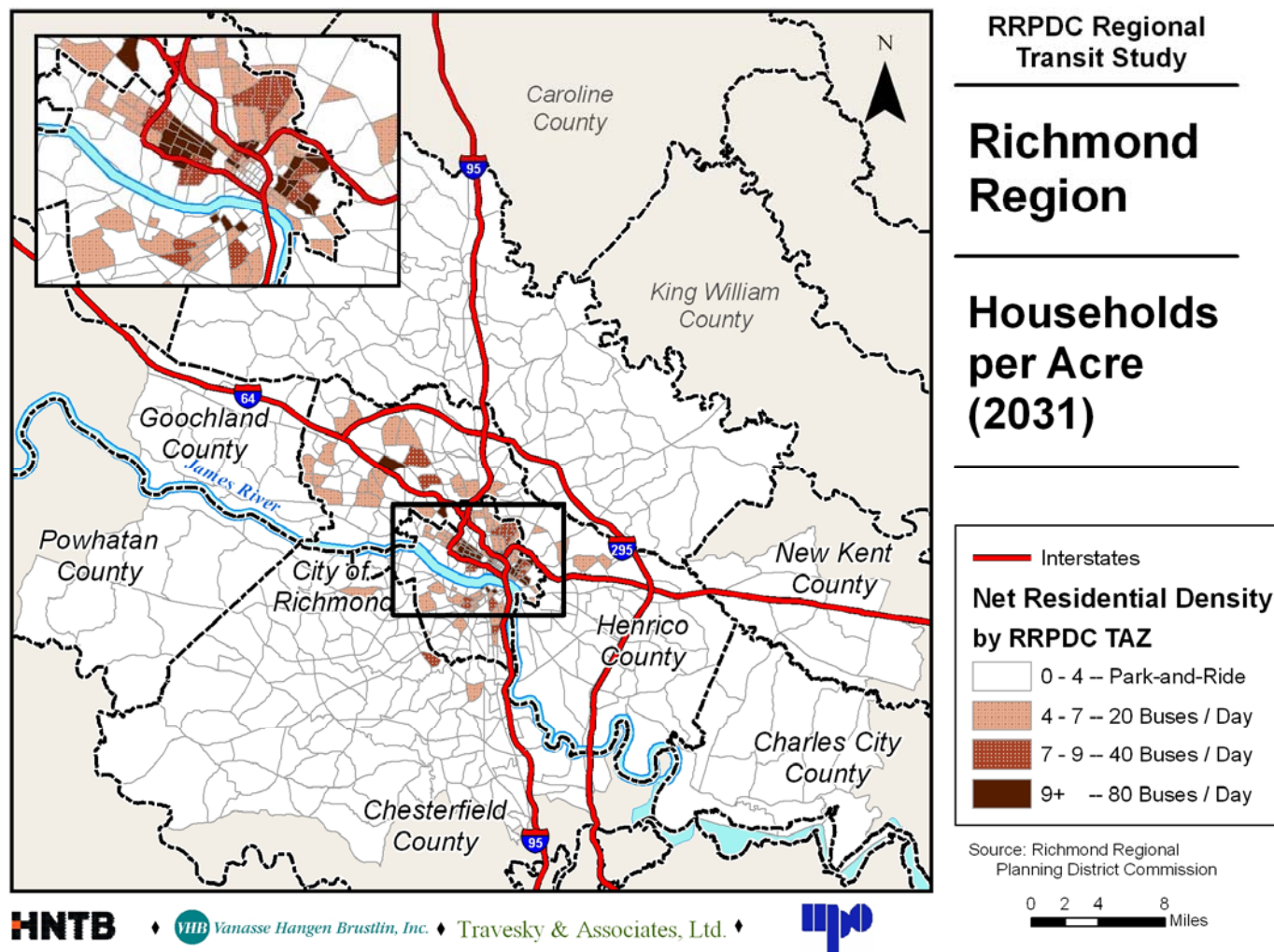


Figure ES-4 – Employees per Acre (2006)

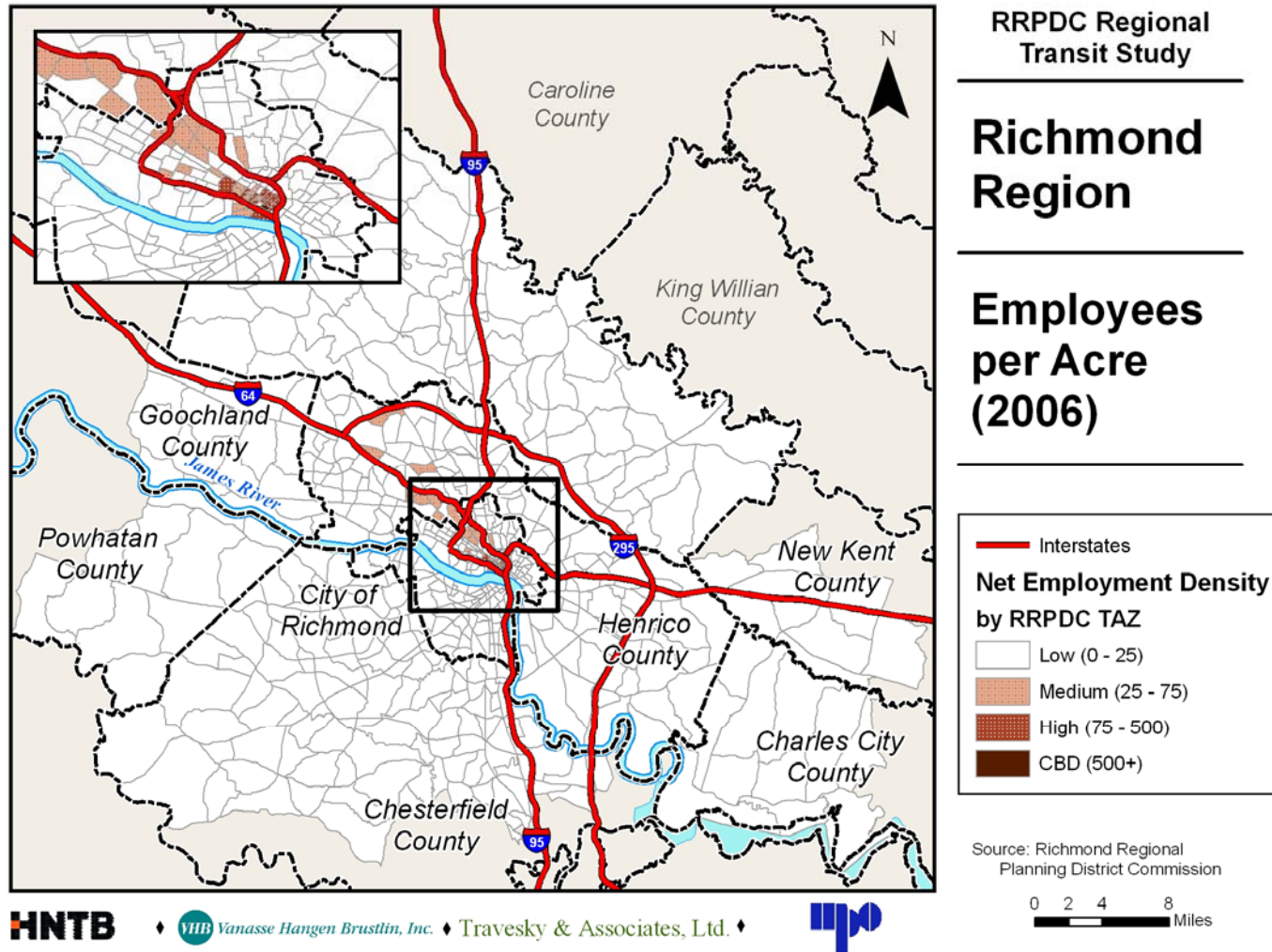
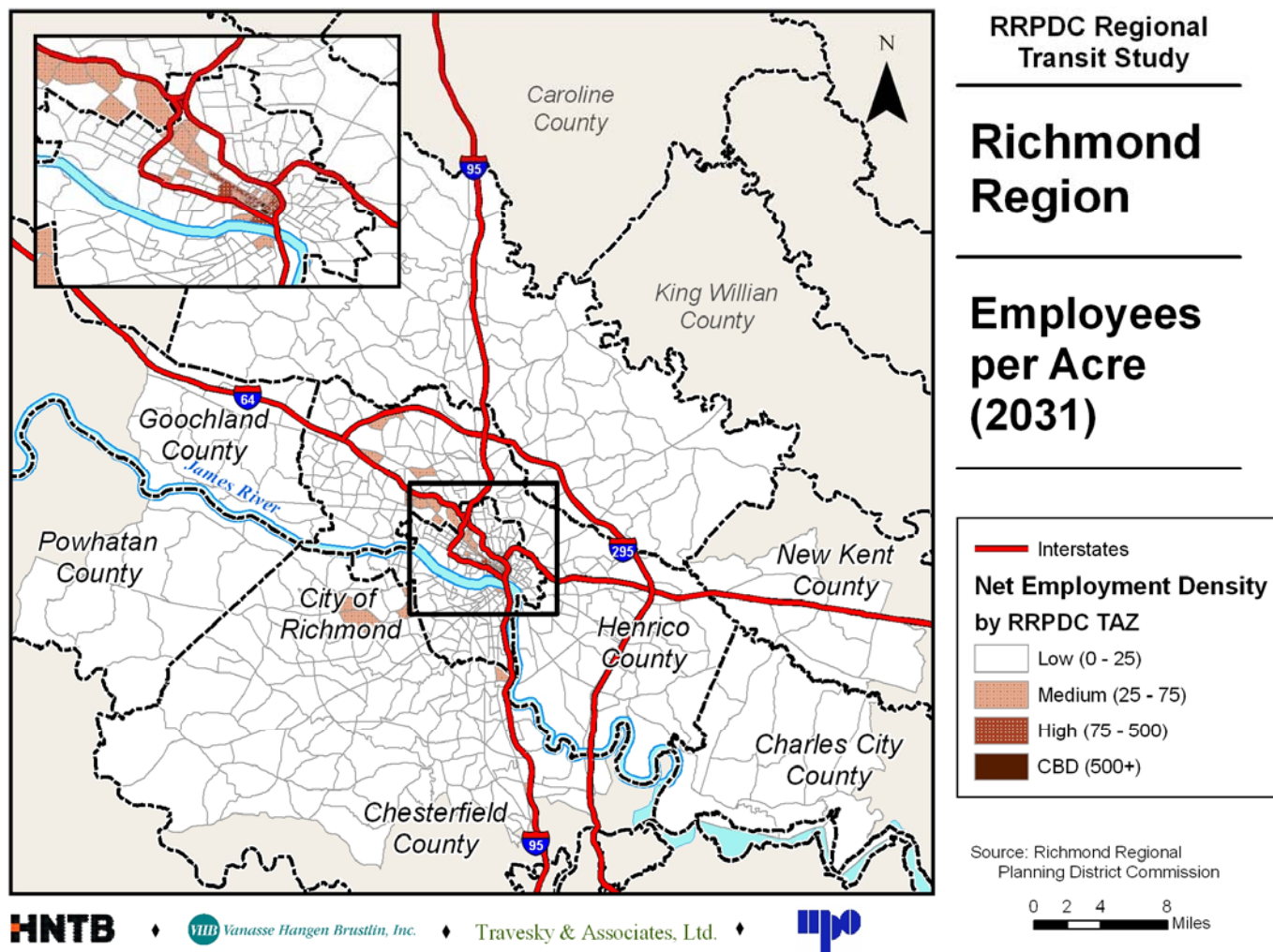


Figure ES-5 – Employees per Acre (2031)



3.B TRANSIT SUPPORTIVE LAND USES

For transit to be efficient and effective, it must operate in an environment that concentrates potential riders around transit stations and stops. Transit services are most effective when travelers walk to and from them, but can also work when there is high quality feeder between transit service stops and major origins and destinations. The features of development that would support high ridership include:

- Sufficient density of residential, commercial, and employment increases the number of potential riders in the transit station/stop service area
- Short blocks with grids patterns permit more direct pedestrians access to transit stations/stops
- Mixed-use development
- Minimum parking requirements allow developers to provide less parking, which reduces the advantage of driving
- Reduced building setbacks encourage more compact pedestrian- and transit-oriented development

One example of a transit-oriented development is Market Commons, which is located at the Courthouse Metrorail station in Arlington, Virginia. This area, displayed in Figure ES-6, provides a variety of uses, including residential, employment, and institutional areas that support alternative modes of transportation, such as transit, walking, and bicycling. A short subway ride connects Market Commons with employment centers in downtown Washington, DC.

Figure ES-6: Transit-Oriented Development at Market Commons



4 INSTITUTIONAL ISSUES

4.A THE NEED FOR A REGIONAL PUBLIC TRANSPORTATION ENTITY

As transit services in the Richmond region continue to grow, it is important to consider the institutional arrangements for managing, planning, monitoring, operating, and funding transit. Currently, most fixed-route and demand-response service is operated by the GRTC Transit System. GRTC is a public service corporation owned by two jurisdictions: the City of Richmond and Chesterfield County. GRTC provides service under purchase-of-service contracts with the served jurisdictions (i.e. Richmond, Henrico and Chesterfield). While jurisdictions could expand transit services by directly purchasing individual routes from GRTC, this is an ineffective method of operating a regional system. As the region continues to develop and pressures mount for transit services to extend beyond traditional service areas, it is appropriate to consider different institutional arrangements for providing transit service. There are several arrangements that could be utilized in the Richmond region to provide public transportation services. Each arrangement has specific attributes, applicability to the region, and advantages and disadvantages.

GRTC in its current form is not an effective institutional structure to fund and operate a truly regional transit system. More appropriate regional institutional structures are available that would give all participating members a voice in the planning and operations of regional transit services and at the same time define cost allocations and funding mechanisms that would provide the regional entity with a stable financial base. One such institutional structure would be formation of a Regional Transportation Authority with defined revenue sources. This would require an act of the state legislature. While the form of the financial powers that will be granted to Authorities is yet to be fully defined, the likelihood is that some mechanism can be developed and approved. At the time of this writing, a special session of the General Assembly is being considered later in 2008 to address the issue of transportation funding.

4.B LEGISLATIVE ISSUES

The establishment of a regional transportation entity with regional authority to raise nonuser funds and fees can only be accomplished through legislative action by the Virginia General Assembly. Legislation to create a Richmond region transportation authority was proposed in the 2008 session of the General Assembly, but the bill was tabled. Currently, three transportation authorities exist in Virginia: the Northern Virginia Transportation Authority, the Hampton Roads Transportation Authority and the Williamsburg Transit Authority. The chief benefits of this arrangement are the regional approach and, if authorized by the legislature, the ability to collect taxes and fees to support transportation initiatives in the region. However, in February 2008, the Virginia Supreme Court ruled that such transportation authorities cannot constitutionally impose taxes and fees. One way to fund transportation authorities is for the legislature to levy a statewide or regional transportation tax. Alternatively, the legislature could grant to the local jurisdictions the power to levy similar taxes. Another possibility would be to constitute the Authority as a body with an elected board; this would meet the requirements of the Virginia constitution.

5 EXAMPLES FROM PEER REGIONS

Technical Memorandum #3 reviewed transit services provided in three metropolitan areas of similar size (land area), population and demographics as Richmond: Charlotte, NC (CATS), Memphis, TN (MATA) and Albany, NY (CDTA). In general, Richmond is similar in size and population to Albany and Memphis but shares more similarities in socioeconomic characteristics with Charlotte. Congestion in Richmond is most similar to Albany and Memphis. Congestion in Charlotte is worse. Richmond is the most efficient among the regions in providing transit service. Ridership, funding and service provision data show that GRTC serves less area, spends less money, but provides comparable ridership to the peer regions. Compared to CDTA and MATA, GRTC provides less service and spends less money but attracts comparable ridership. The data implies that GRTC concentrates much more than other peer agencies in serving the high ridership portions of the region.

While socioeconomic characteristics and congestion play some part in the success of transit in a region, forging regional cooperation, finding consistent funding sources, and coordinating land use and transportation decisions are also very important. With Richmond being an independent city, separate from surrounding counties, regional cooperation can be extremely challenging. However, Charlotte and Albany demonstrate that regional cooperation can happen in a variety of ways (Charlotte - by creating a separate multi-jurisdictional policy board, Albany - by having a regionally represented board and having a collaborative relationship between transit agency and MPO). Dedicated and stable transit funding in Charlotte has resulted in ambitious transit plans. Clearly identified transit funding was critical for the implementation of trolley service in downtown Memphis and advancing Bus Rapid Transit (BRT) in Albany. Rapid transit plans have a greater chance of success if the service is also coordinated with land use. Successful trolley service in Memphis was tied with economic development in downtown. An integrated land use transportation plan in Charlotte has identified both the growth centers and corridors for the region and the preferred rapid transit modes to serve the centers and corridors. The transit agency and MPO in Albany recognize that transit does not make sense economically if it chases emerging development.

In Charlotte, transit decision making is made by one body (the MTC) that collects and administers dedicated funding for transit. This same body has multi-jurisdictional representation and the voting members have strong influence in shaping land use. The half-cent sales tax in Charlotte has proven to be a stable funding mechanism with which the region can plan and develop transit improvements for corridors based on projected revenue from this source. This tax is strongly supported by the voting public in the region. A referendum to repeal the half cent sales tax for transit was soundly defeated in November, 2007 with 70% voting to retain the tax. In addition, the State of North Carolina is demonstrating a long term commitment to transit. The North Carolina Department of Transportation has moved towards a system of Full Funding Grant Agreements similar to the FTA approach that provides a commitment for one half of the non-federal share. This allows CATS to have a lot more confidence in the availability of state funding in the future.

In Albany, BRT is being implemented along a multi-jurisdictional corridor. The success of this plan can be attributed to cooperation between the Capital District Transportation Authority (CDTA), the Capital District Transportation Committee (CDTC), and the local jurisdictions. CDTA is currently working on implementing the BRT elements while CDTC, has worked with the municipalities in developing master plans for station areas. CDTA noted that when the cities and towns along the BRT corridor successfully worked to coordinate traffic signals between their jurisdictions, they warmed up to the possibility of cooperating to bring

BRT to the region. While the region has a dedicated revenue stream (1.25% of mortgage recording tax revenue), CDTA is concerned that is not a stable, predictable source.

Memphis has been able to successfully implement its downtown trolley service and use it as an engine for economic development. Critical to the success of that service was identifying funding and having strong support from those in Memphis. Regional rapid transit is farther from being realized in Memphis where transit policy and planning is shaped principally through MATA and its board which does not have regional representation. Advanced planning for light rail has been limited to only the Memphis portion of the identified priority corridor for rapid transit.

The Richmond region can learn several lessons from these three peer review regions. The more the elements of regional cooperation, dedicated funding, and coordinated land use/transportation planning are tied into each other, the more ambitious and far reaching the provision of transit service can become. The peer regions integrate these elements to various degrees with Charlotte the farthest along in integrating regional cooperation, funding, and land use coordination and consequently, Charlotte has the most ambitious plans. Albany has some elements in place with a dedicated funding source, regional representation in the CDTA board, and a collaborative relationship with the MPO. Albany is close to seeing implementation of a modest BRT plan. In Memphis, there is no dedicated source for transit funding, and the major transit decision making body is appointed by the City of Memphis. Implementation of their rapid transit plans has seen the least progress among the regions studied and is currently limited to the portion inside the city.

6 RECOMMENDED TRANSIT SERVICE ENHANCEMENTS

Use of transit service historically has been related to the characteristics of the resident population in the areas served (e.g., household income, auto ownership) and the characteristics of the developed area (e.g. household density, concentrations of employment, street patterns). The potential effectiveness of transit in attracting riders in any given area depends on multiple factors including the quality of service available, the degree of highway congestion, costs and availability of parking, and the patterns of travel between residences and workplaces, shopping, medical services and related uses. The demographic and development data, however, provide information that can be used to prepare conceptual frameworks for regional transit services, identifying the areas in which transit is most likely to be needed.

6.A MAJOR SERVICE CORRIDORS

The nine major travel corridors shown in Table ES-5 have been identified for possible transit service. For each corridor the general characteristics of the service are provided, including the route (length, span of service, headway), transit mode (light rail, commuter rail, local bus, etc), and operating and capital cost estimates. For the Broad Street, I-95 North, and Midlothian corridors, two potential modes were evaluated. For those corridors in which major investments are considered (i.e. Bus Rapid Transit, Light Rail, Commuter Rail) an estimate of the ridership potential is provided based on VDOT forecasts of the number of trips that start and end within the corridor (intra-corridor trips). The projected changes in population and employment totals and densities have been analyzed for each corridor to assess the level of transit service that can be justified in 2016 and 2031.

Table ES-5: Proposed Major Service Corridors

Corridor	Modes of Transit Service Proposed
A. I-95 North (Ashland)	Commuter Bus, Commuter Rail
B. Mechanicsville	Commuter Bus
C. I-64 East (New Kent County)	Commuter Bus
D. Richmond International Airport	Limited Stop Bus, Light Rail
E. Corridor E: I-95 South (Petersburg)	Commuter Bus
F. Powhatan	Commuter Bus
G. Midlothian	Commuter Bus, Commuter Rail
H. Broad Street	Bus Rapid Transit, Light Rail
I. I-64 West (Goochland County)	Commuter Bus

6.B LOCAL SERVICES

This study also addresses logical extensions of GRTC bus service into areas where service is now limited. This includes local bus services that provide circulation within major residential and commercial centers in Chesterfield County, Henrico and Hanover County and feeder service to the Broad Street BRT/LRT corridor in Henrico County.

1. Route 1 North to Ashland
2. Route 1 South
3. Route 5
4. Route 288 - Short Pump to Route 360
5. Hull Street Road (Route 360) – Chippenham Parkway to Route 288
6. Broad Street BRT/LRT Feeder Routes
7. Mechanicsville Local Routes
8. Midlothian Local Route – Chippenham Parkway to Chesterfield Town Center
9. Chesterfield County Local Routes
 - a. Hull Street Rd. to Government Center
 - b. Chester to Government Center via Route 10

6.C SERVICES FOR THE TRANSPORTATION DISADVANTAGED

The Americans with Disabilities Act (ADA) requires that complementary paratransit service be provided within $\frac{3}{4}$ miles of local bus routes, BRT/LRT routes, and commuter rail stations. However, access to public transit services by the transportation disadvantaged is a critical need for the entire region. This study recommends that in addition to the ADA-mandated service in the local and BRT/LRT service corridors, demand responsive paratransit services for the transportation disabled be expanded to cover all of the jurisdictions in the Richmond Region. This service could be provided by expanding Community Assisted Ride Enterprise (CARE) service operated by GRTC, or individual jurisdictions could develop their own systems similar to Access Chesterfield. However paratransit services are provided, it is essential that the service be comprehensive and truly regional so that users can take trips during weekdays, evenings and weekends to any location throughout the area.

7 SERVICE RECOMMENDATIONS

7.A TIERED RECOMMENDATIONS

Based on the projected growth patterns and the prior studies of opportunities for transit service expansion, a three-tiered approach to expanding transit was identified. The following suggested priority ordering is proposed for the Richmond region:

Tier I – Includes those corridors and modal alternatives for which existing development patterns of and the size of the travel market indicate that there is a current demand for the proposed service. These improvements are feasible for implementation by the mid-term target date of 2016.

Tier II – Includes corridors and modal alternatives which will be effective investments by 2031 given the current projections for population and employment.

Tier III – Includes investments in corridors and modal alternatives which will not be effective investments prior to 2031 unless there are substantial changes patterns of growth that are projected for the region.

Table ES-6 lists the tiered transit service recommendations for the Richmond Region. **Figure ES-6**, **Figure ES-7** and **Figure ES-8** show the corridors in which service enhancements are recommended. Tier I projects are the highest priority, but the recommended services within each tier are not prioritized.

Figure ES-6: Tier I

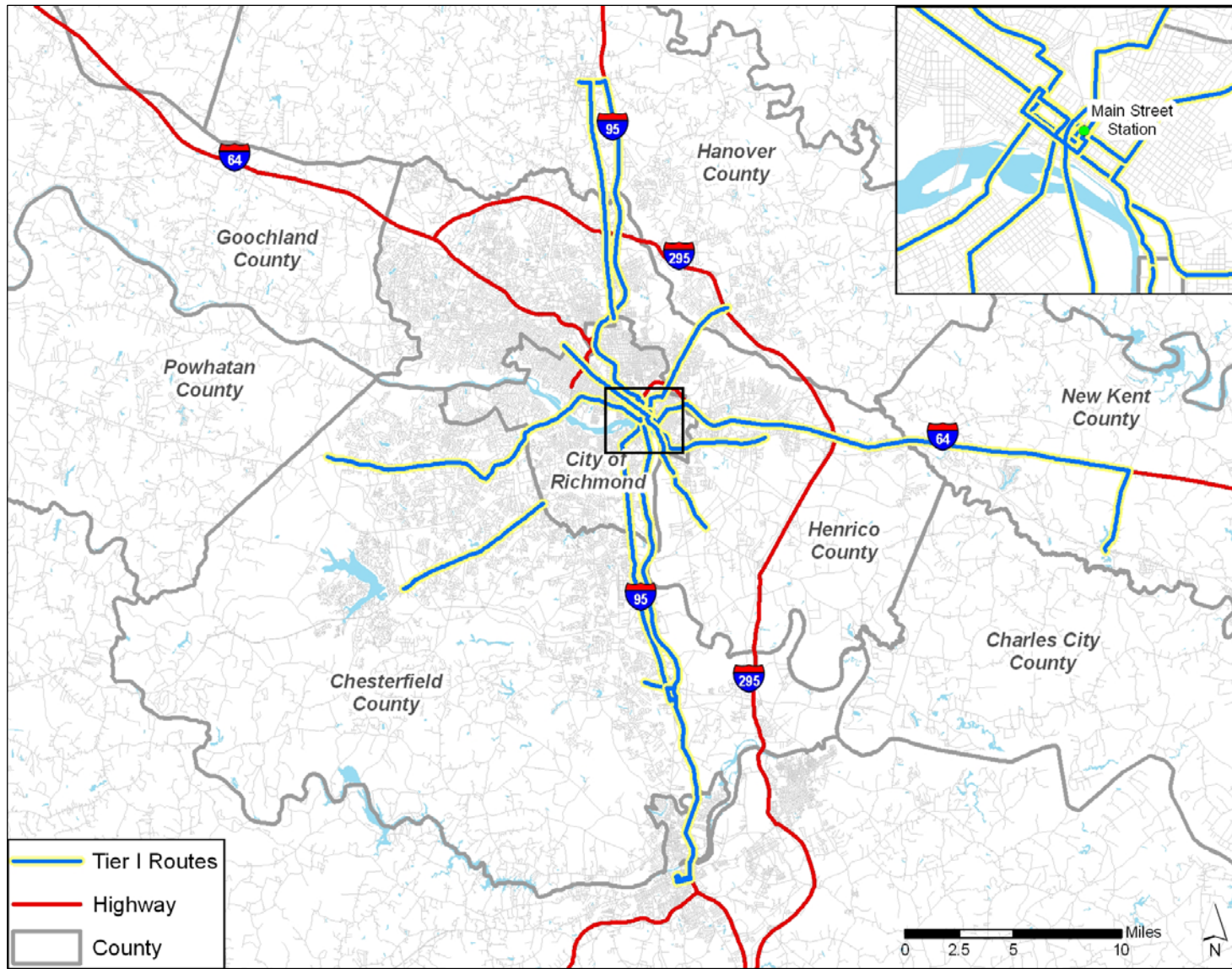


Figure ES-7: Tier II

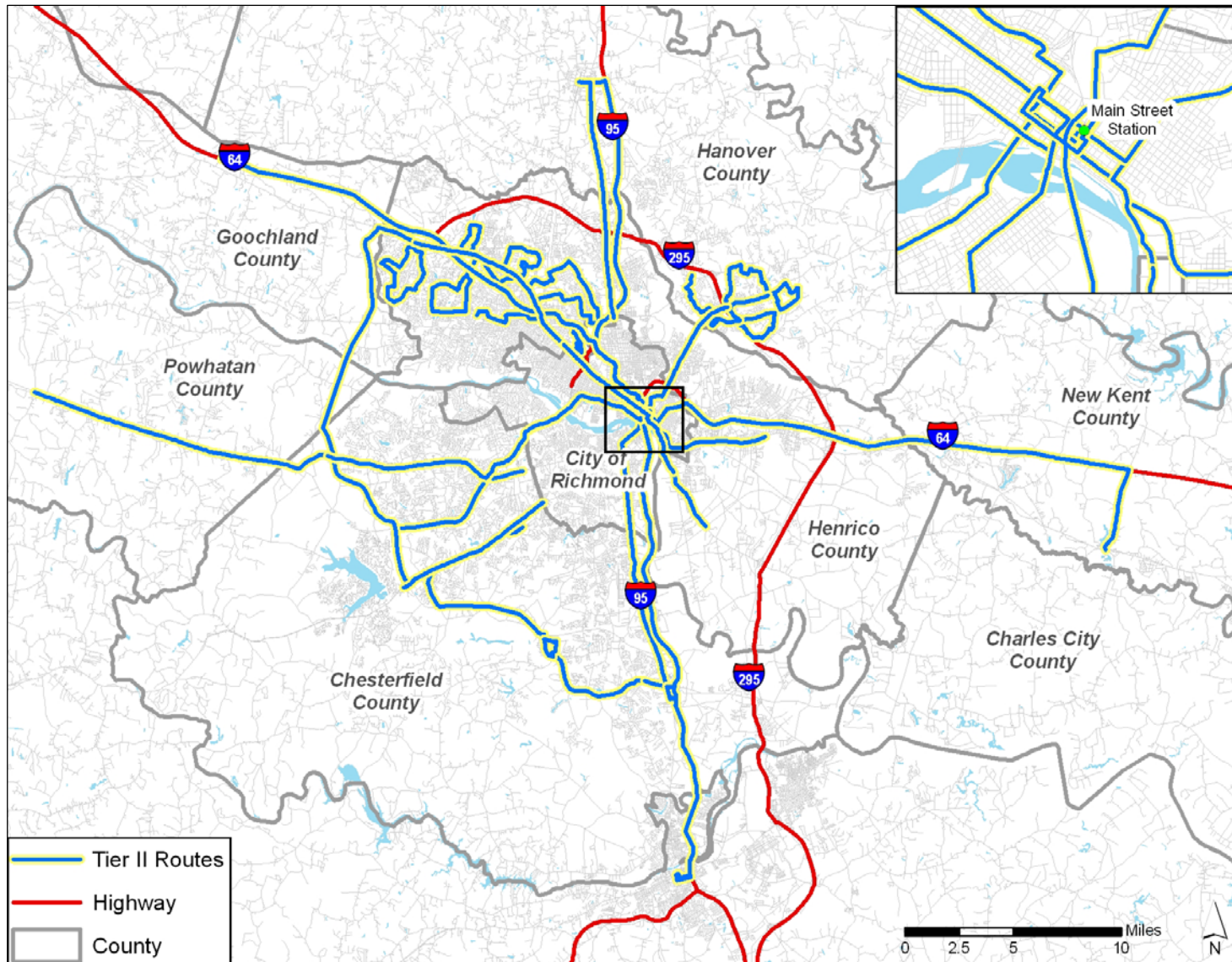


Figure ES-8: Tier III

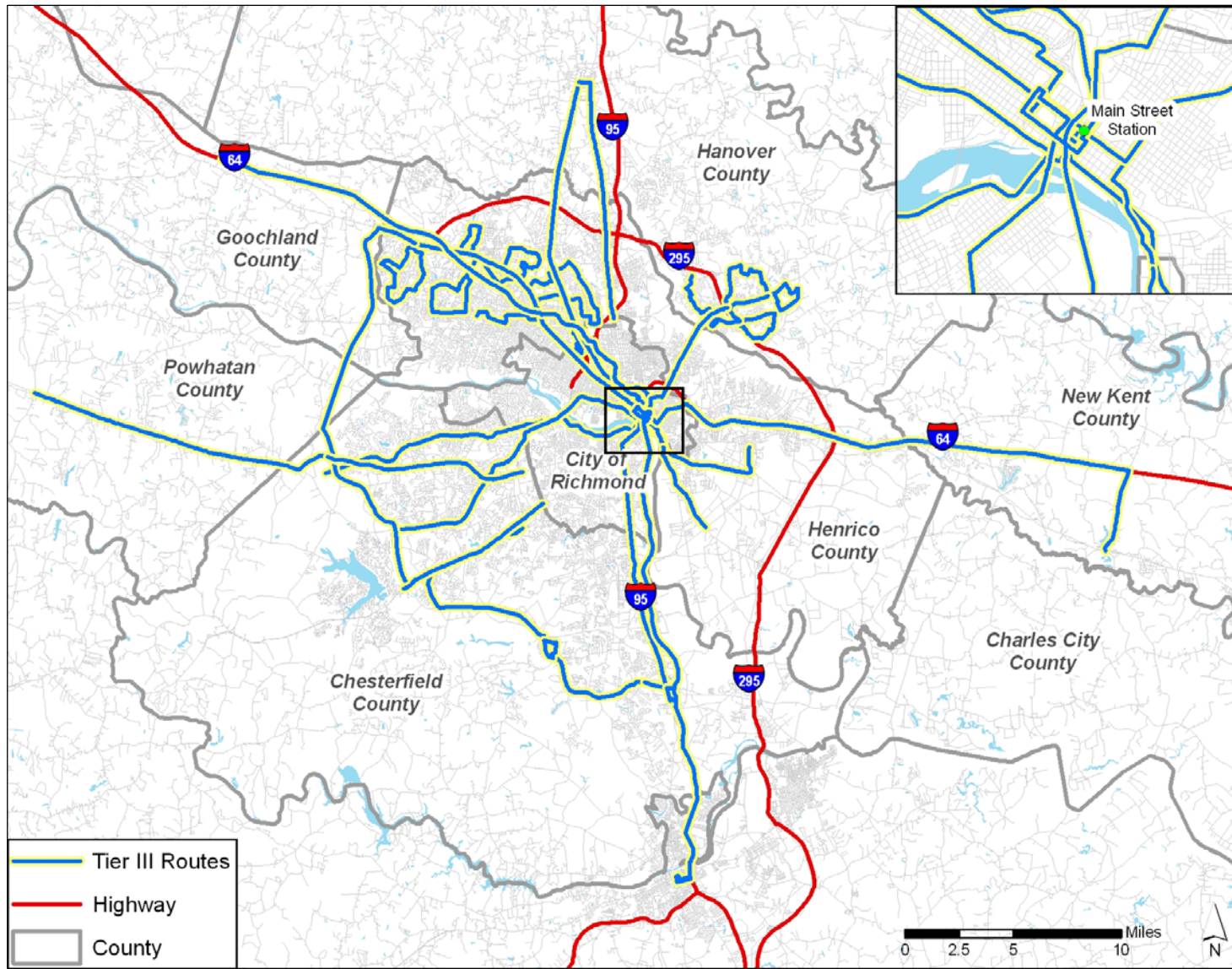


Table ES-6: Corridor/Modal Alternatives by Tier

Tier	Corridor/Local Route	Mode
Tier I	Airport	Limited Stop Bus
	Broad Street	Bus Rapid Transit (Phase I)
	I-95 North	Commuter Bus
	I-95 South	Commuter Bus
	I-64 East	Commuter Bus
	Midlothian	Commuter Bus
	Mechanicsville	Commuter Bus
	Route 1 North	Local Bus
	Route 1 South	Local Bus
	Route 5	Local Bus
	Hull Street Local Bus	Local Bus
Tier II	I-64 West	Commuter Bus
	Powhatan	Commuter Bus
	Broad St	Bus Rapid Transit (Phase II)
	Broad St	Feeder Buses (8 routes)
	Chesterfield	Local Buses (2 routes)
	Mechanicsville	Local Buses (3 routes)
	Midlothian	Local Bus
	Route 288	Local Bus
Tier III	Broad Street	Light Rail Transit
	Midlothian	Commuter Rail
	I-95 North	Commuter Rail
	Airport	Light Rail Transit

7.B OPERATING COSTS

Table ES-7 provides a summary of operating costs based on a proposed initial service plan (i.e. route, frequency, and span of service) for Tier I, Tier II, and Tier III recommendations. This includes the cost of existing services. Operating costs would increase if more frequent service is required to satisfy demand. Tier I recommendations would cost approximately \$43.6 million per year. Operating costs increase to \$63.4 million for Tier II and \$90.0 million for Tier III. As **Table ES-7** shows, several of the bus services that provide service in Tier I and Tier II, are eliminated in Tier III in favor of fixed-guideway services. For example, commuter bus service to Ashland (I-95 North corridor) and Midlothian, as well as the Broad

Street BRT and the Airport Limited Stop bus services are replaced with light rail and commuter rail services.

Table ES-7: Operating Costs 2006 (in millions of dollars)

Corridor/Local Route	Tier I	Tier II	Tier III
Existing Service	\$31.0	\$31.0	\$31.0
Airport Limited Stop Bus	\$0.7	\$0.7	--
Broad Street BRT	\$3.0	\$4.9	--
I-95 North Commuter Bus	\$0.4	\$0.4	--
I-95 South Express Bus	\$1.6	\$1.6	\$1.6
I-64 East Commuter Bus	\$0.5	\$0.5	\$0.5
Midlothian Commuter Bus	\$0.3	\$0.3	--
Mechanicsville Commuter Bus	\$0.1	\$0.1	\$0.1
Route 1 North Local Bus	\$1.6	\$1.6	\$1.6
Route 1 South Local Bus	\$2.0	\$2.0	\$2.0
Route 5 Local Bus	\$1.2	\$1.2	\$1.2
Hull Street Road	\$1.2	\$1.2	\$1.2
I-64 West Commuter Bus	--	\$0.5	\$0.5
Powhatan Commuter Bus	--	\$0.6	\$0.6
Broad St Feeder Buses (8 routes)	--	\$5.3	\$5.3
Chesterfield Local Buses (2 routes)	--	\$5.4	\$5.4
Mechanicsville Local Buses (3 routes)	--	\$3.0	\$3.0
Midlothian Local Bus	--	\$1.6	\$1.6
Route 288 Crosstown Local Bus	--	\$1.6	\$1.6
Broad Street Light Rail	--	--	\$20.7
Midlothian Commuter Rail	--	--	\$2.0
Ashland Commuter Rail	--	--	\$2.5
Airport Light Rail	--	--	\$7.6
Total	\$43.6	\$63.4	\$90.0

Table ES-8 shows the projected funding gap between the projected operating costs and the projected non-local operating funds that will be available to the Richmond region in 2016 and 2031. This represents the minimum level of operating funds that the region would need to contribute, if all of the routes are implemented. In reality, federal and state funding programs require a local match. To implement Tier I recommendations the projected operating gap is \$18.6 million and increases to \$34.3 million to implement Tier II. The projected operating gap for Tier III depends on the implementation year, but is estimated to be less than \$60.9 million. These figures include the cost of complimentary paratransit services, which adds between \$0.3 million and \$1.2 million to projected operating costs.

Table ES-8: Projected Annual Operating Funds Gap (2006 dollars)

	Tier I	Tier II	Tier III
Projected Operating Costs	\$43.6	\$63.4	\$90.0
Projected Operating Funds (non-local sources)	\$25.0	\$29.1	>\$29.1
Projected Funding Gap (local share)	\$18.6	\$34.3	<\$60.9

The analysis showed that absent more rapid growth in state and federal transit funding than has occurred since 1996, local funding would need to be an ever increasing portion of operating funds. Realization of this funding level would require either that local governments devote larger amounts to transit from general revenues or that mechanisms be established to generate additional local taxes and fees.

7.C CAPITAL COSTS

Capital costs for proposed transit services were calculated using industry average unit costs. Bus vehicle costs were based on recent procurements throughout the United States and are shown in 2006 dollars. The cost of a local bus is estimated at \$350,000 and a commuter bus is \$400,000. The total number of buses required was determined using the peak hour vehicle requirements for each proposed service plus an approximately 20% spare ratio. The cost of park and ride lots was included at \$1 million per lot. The bus capital costs do not include the costs of vehicle replacement, bus stop enhancements for local buses, or maintenance and storage facilities.

Table ES-9 provides a summary of projected capital costs based on a proposed initial service plan for Tier I, Tier II, and Tier III recommendations. Capital costs could increase if more frequent service is required to satisfy demand. Tier I recommendations would cost approximately \$52 million in 2006 dollars. Capital costs increase to nearly \$680 million to implement Tier II, and nearly \$1,600 million to implement Tier III. As **Table ES-9** shows, several of the bus services that provide service in Tier I and Tier II, are eliminated in Tier III in favor of fixed-guideway services. For example, commuter bus service to Ashland (I-95 North corridor) and Midlothian, as well as the Broad Street BRT and the Airport Limited Stop bus services are replaced with light rail and commuter rail services.

Table ES-9: Projected Capital Costs (2006 dollars)

Corridor/Local Route	Tier I	Tier II	Tier III
Airport Limited Stop Bus	\$1.8	\$1.8	--
Broad Street BRT	\$26.3	\$54.4	--
I-95 North Commuter Bus	\$2.9	\$2.9	--
I-95 South Commuter Bus	\$2.4	\$2.4	\$2.4
I-64 East Commuter Bus	\$3.9	\$3.9	\$3.9
Midlothian Commuter Bus	\$3.9	\$3.9	--
Mechanicsville Commuter Bus	\$3.9	\$3.9	\$3.9
Route 1 North Local Bus	\$2.1	\$2.1	\$2.1
Route 1 South Local Bus	\$2.1	\$2.1	\$2.1
Route 5 Local Bus	\$1.3	\$1.3	\$1.3
Hull Street Local Bus	\$1.3	\$1.3	\$1.3
I-64 West Commuter Bus	--	\$3.9	\$3.9
Powhatan Commuter Bus	--	\$2.9	\$3.9
Broad St Feeder Buses (8 routes)	--	\$7.6	\$7.6
Chesterfield Local Buses (2 routes)	--	\$8.4	\$8.4
Mechanicsville Local Buses (3 routes)	--	\$3.4	\$3.4
Midlothian Local Bus	--	\$1.7	\$1.7
Route 288 Crosstown Local Bus	--	\$4.6	\$4.6
Broad Street Light Rail	--	--	\$973.0
Midlothian Commuter Rail	--	\$80.0	\$80.0
Ashland Commuter Rail	--	\$91.0	\$91.0
Airport Light Rail	--	\$395.0	\$395.0
Total	\$52.0	\$678.5	\$1,589.5

8 INSTITUTIONAL RECOMMENDATIONS

The Richmond Regional Mass Transit Study recommends that the following actions be taken on a regional level for the expansion of public transportation services in the region:

- Create a regional transit authority
- Establish a secure dedicated regional source of funding
- Encourage transit supportive land use
 - Higher residential, employment and commercial densities

- Mixed use development
- Short blocks, grid patterns and reduced setback requirements
- Provide transit supportive services
 - Improve pedestrian and bicycle facilities
 - Expand Employer supported transit pass programs
 - Expand emergency ride home program to cover the entire Richmond Region
- Expand demand responsive service for elderly and disabled persons to the entire region

9 NEXT STEPS/A CALL TO ACTION

The members of the RMTS Advisory Committee to this study, the participants in the Richmond Greater Chamber of Commerce meetings and the individuals who attended the two study public meetings were very supportive of the view that the Richmond region would benefit from expanded transit service. Similar views were expressed in the telephone survey conducted as part of the GRTC Comprehensive Operations Analysis. Projections of the growth in population, employment and personal vehicle travel indicate that congestion will become a greater issue over the next twenty-five years. Projections of the patterns of development, however, are for arrangements of land use and activity that will make it difficult to support a level of transit service that will be attractive to those who have a choice of modes. Further, the current institutional arrangement which makes GRTC dependant on annual appropriations from local governments makes it difficult for either regional planners or the transit agency to take pro-active positions for the concurrent development of transit facilities and transit supportive land uses.

If transit is to play a more significant role in serving the future travel needs of the Richmond region, changes in both development and organization will be required. Concentration of population and jobs in areas with interconnected street patterns makes it easier and less expensive to provide convenient and reliable transit service. Better transit service makes it more likely that travelers will choose to use the services offered.

To move ahead will require the cooperation and coordination of all the jurisdictions in the region. The public, the planning bodies, and elected officials will need to adopt the vision of a transit future. They will need to agree that concentration and density will be not only permitted but encouraged in the locations that are designated for transit investment. They will need to agree on a level of public support and seek the necessary legislation from the General Assembly to establish a Transit Authority or similar institutional structure with a dedicated and predictable source of funding. They will need to grant to the transit authority the right to comment on development proposals with the goal of assuring that efficient and effective transit services can be provided.

With these tools in place the region can work to achieve the broader transit concepts that comprise this regional study.