



# GRTC Transit System

Transit Development Plan  
Fiscal Years 2012 – 2017

Prepared by:



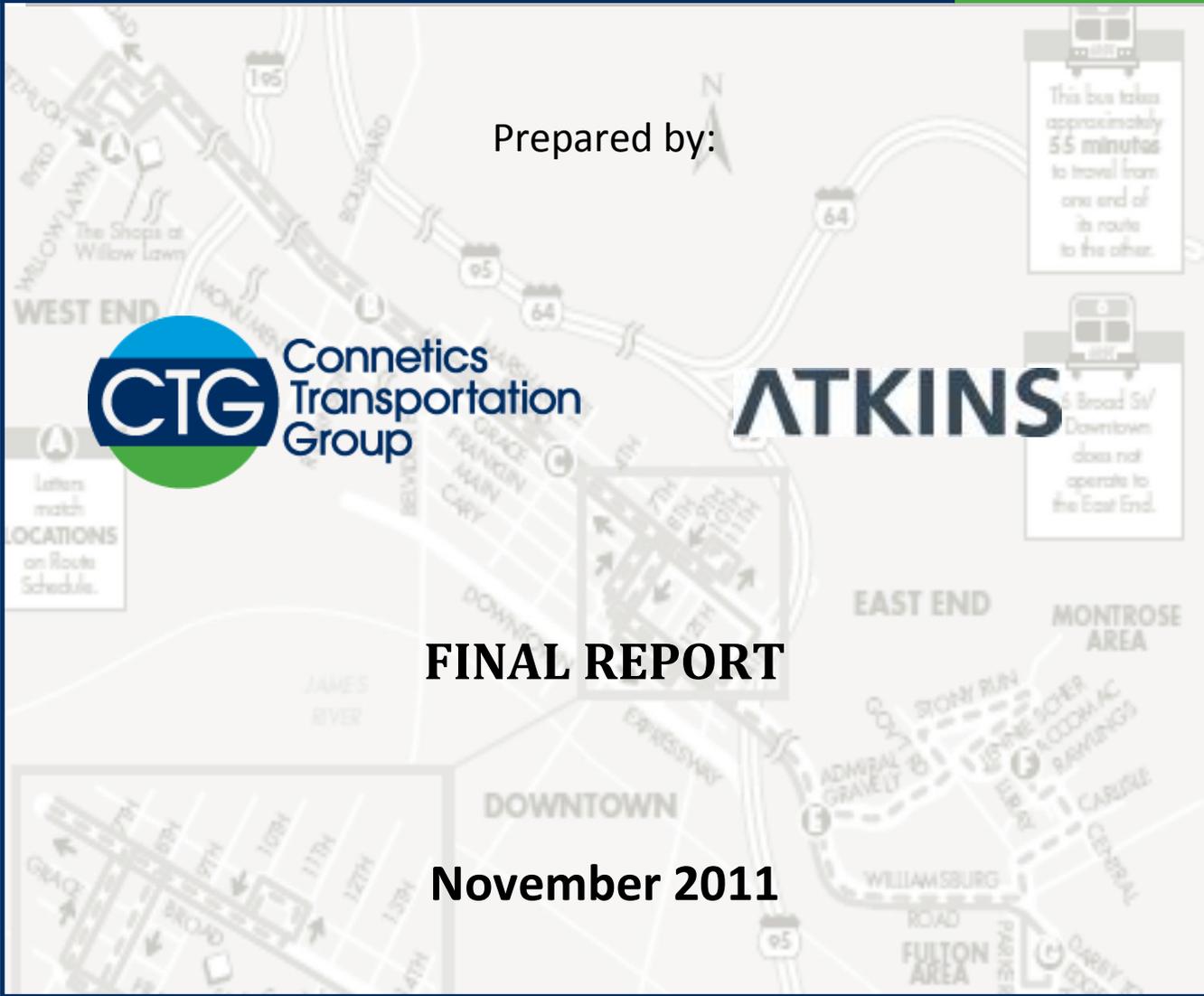
**ATKINS**

This bus takes approximately 55 minutes to travel from one end of its route to the other.

6 Broad St/ Downtown does not operate to the East End.

**FINAL REPORT**

**November 2011**



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## 1.0 OVERVIEW OF GRTC

Richmond, Virginia is located between Chesterfield and Henrico Counties in the central portion of eastern Virginia, approximately 100 miles south of Washington, DC on Interstate 95. The population within the city limits was 204,214 in 2010, with an estimated population of 1,231,675 for the Richmond-Petersburg Metropolitan Statistical Area as of July 1, 2009. The James River runs east-west through the city. Interstate 64 links Richmond to Williamsburg and Norfolk to the east and Charlottesville to the west. The Richmond area also has two railroad stations served by Amtrak for regional and interstate rail service.

The City of Richmond was founded in 1737 and is the capital of the Commonwealth of Virginia. During the American Civil War, Richmond served as the capital of the Confederate States of America and many important Civil War landmarks remain in the city, including the Virginia State Capitol and the White House of the Confederacy. Richmond was also the center of the slave trade and African-American culture and industry. African-American heritage and historic sites include the Black History Museum and Cultural Center and the Maggie L. Walker Historic Site.

The Greater Richmond Transit Company (GRTC) is the principal public transportation provider for the Richmond urbanized area. GRTC was created pursuant to authority granted to the City of Richmond in Section 2.03.3 of the Richmond City Charter and was incorporated on April 12, 1973. GRTC Transit Service provides fixed-route, paratransit, and specialized transportation services to the City of Richmond, Henrico County, Mechanicsville, Petersburg, and a small portion of Chesterfield County.

### 1.1 TRANSIT HISTORY

GRTC Transit System is the oldest mass transportation system in the United States. The roots of the GRTC Transit System can be traced back to 1860 when Richmond Railway Company served the city of Richmond, Virginia with two horse-drawn cars running along two routes. In 1888, as Virginia Railway and Power Company, the system built the first successful street railway service in the United States. Virginia Transit Company, its successor company, operated the Richmond transit system from 1944 to 1962, when it was purchased by American Transportation enterprises. It was sold in 1973 to the Greater Richmond Transit Company, an instrumentality of the City of Richmond, and became incorporated in April 1973 for the purpose of providing public transportation services to the Greater Richmond area. Chesterfield County purchased half of the company in 1989 and in November 2000 it became GRTC Transit System. In 2004, GRTC brought the C-VAN service in house to provide the service that a private contractor had been providing. Similarly, GRTC brought paratransit service in house in 2007. In 2010, GRTC moved into a new facility at 301 East Belt Boulevard.

### 1.2 GOVERNANCE AND ORGANIZATIONAL STRUCTURE

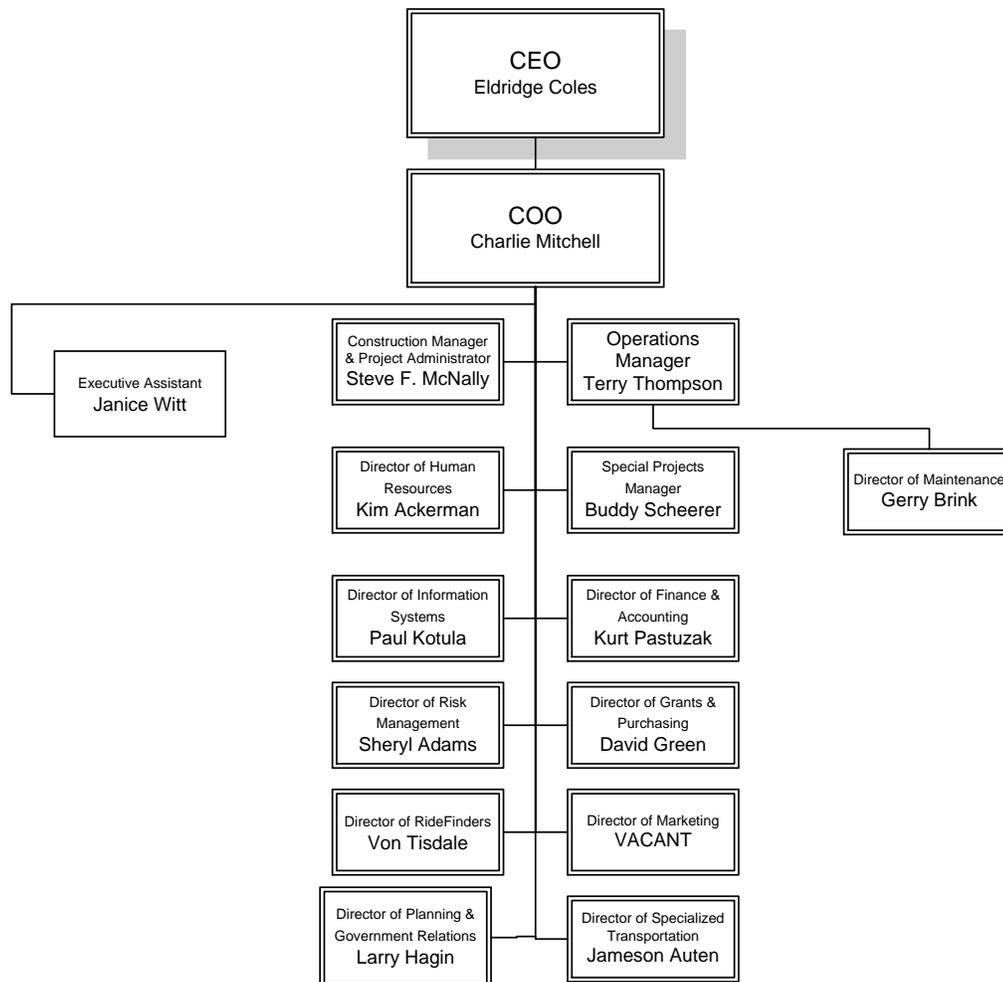
GRTC Transit System is 50 percent owned by the City of Richmond and 50 percent by Chesterfield County. It operates under the direction of its Chief Executive Officer and Chief Operating Officer. The

Chief Executive Officer is responsible for day-to-day management of GRTC and reports directly to the Board of Directors.

The GRTC Transit System Board of Directors consists of six members – three appointed by the City Council of Richmond and three by the Chesterfield County Board of Supervisors. The Board of Directors meets on the third Tuesday of every month at the GRTC Corporate Headquarters.

GRTC has eleven different departments headed by nine Directors. **Figure 1-1** presents an overview of the GRTC organizational structure as of January 2011. There are numerous staff members that provide support to each of the managers and directors listed on the organizational chart.

**FIGURE 1-1: GRTC ORGANIZATIONAL STRUCTURE**



### 1.3 TRANSIT SERVICES PROVIDED AND AREAS SERVED

GRTC Transit System provides fixed-route bus service and specialized services such as CARE, C-VAN, and RideFinders.

#### FIXED ROUTE BUS SERVICE

A fleet of 166 GRTC buses, cutaway vans and mini-buses provides fixed-route bus service over 45 routes within the City of Richmond, Henrico County, and parts of Chesterfield County and the City of Petersburg. GRTC's fixed-route services are a combination of local and express service. All fixed-route buses are equipped with wheelchair lifts. Fixed-route service operates in the City of Richmond between 5:00 a.m. and 1:00 a.m., seven days a week. Express routes between Downtown Richmond and Henrico County, Chesterfield County, Mechanicsville, and Petersburg operate between 6:00 a.m. and 7:00 a.m., Monday through Friday. Some express commuter route trips are serviced by over-the-road coaches, which offer amenities such as Wi-Fi technology and overhead storage.

GRTC's bus route structure (**Figure 1-2**) can largely be classified as a hub-and-spoke system, where service converges on a central downtown area – near Richmond City Hall and the VCU medical campus – and then fans out into the surrounding neighborhoods. **Table 1-1** shows the weekday, Saturday and Sunday service headways for GRTC's local fixed-route service. Based on the areas each route serves, GRTC has coded each local bus route into five color groups. As of February 2011, GRTC operated the following local routes:

- Blue – Routes 1, 2, 3, 4, 6, 10, 11, and 16 – serving downtown, the Fan district, Church Hill, and portions of the West End south of Broad Street
- Purple – Routes 7, 56, 91, and 93 – serving the East End including Richmond International Airport
- Orange – Routes 18 and 19 – serving portions of the West End north of Broad Street
- Black – Routes 22, 24, 32, 34, and 37 – serving the North Side and portions of the West End north of Broad Street
- Green – Routes 62, 63, 67, 70, 71, 72, 73, 74, and 101 – serving the Southside

GRTC operates 11 express bus routes (**Figure 1-3**) to Henrico and Chesterfield Counties. These express routes provide direct service from residential areas in the outlying counties to Downtown Richmond with few stops in between, and are especially geared towards commuters. Park-and-ride facilities are located along the express routes that offer commuters the ability to drive to a parking lot directly served by a GRTC bus. Pending and future service changes include Express Route 94/96 serving Fredericksburg and Ashland, which was discontinued effective March 28, 2011.

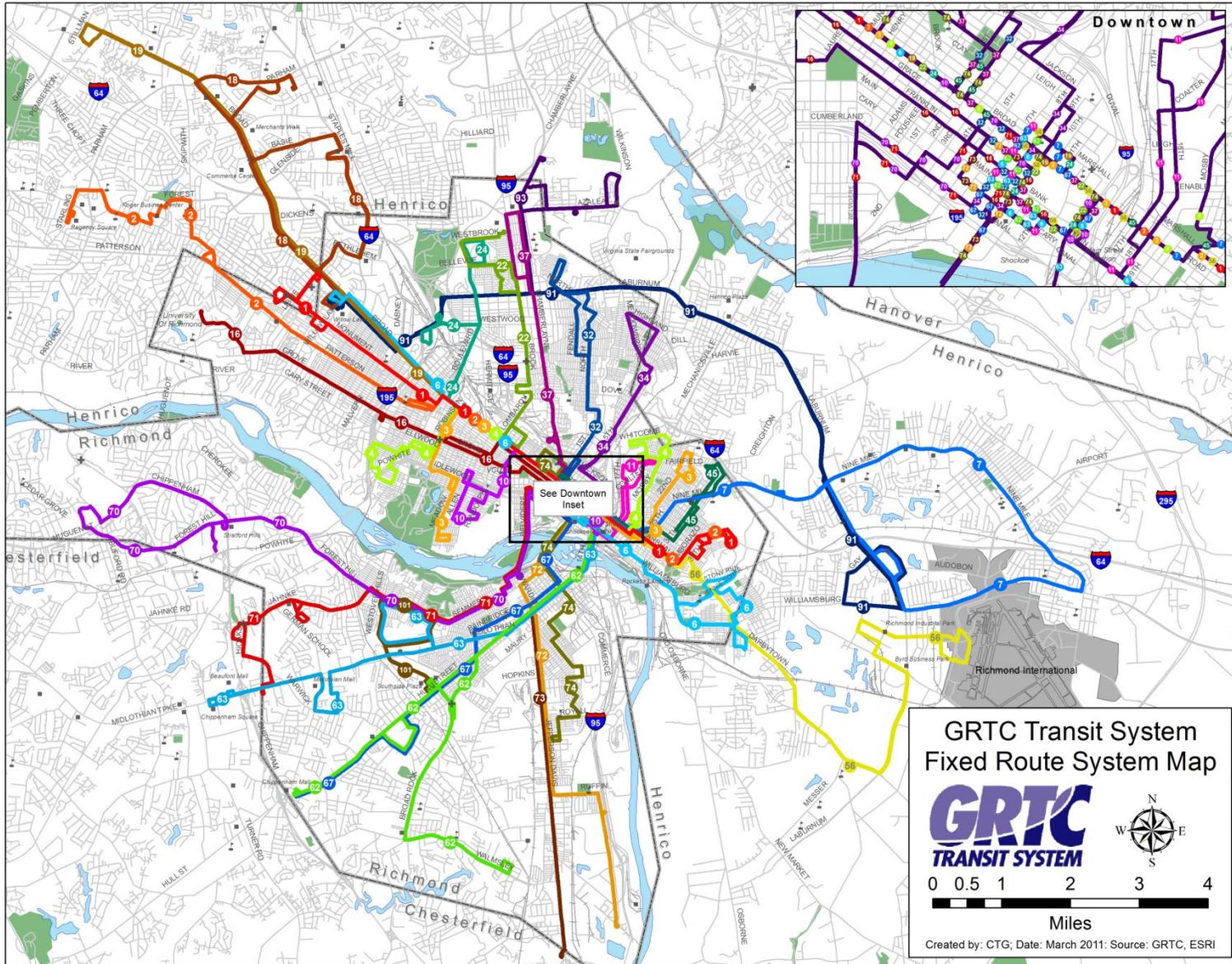
Finally, there are six GRTC routes (83, 84, 86, 87, 89, and 99) that serve the Virginia Commonwealth University (VCU) campus. Routes 83, 89, and 99 are discontinued effective fall 2011. Although these routes are open to the general public, they are specifically tailored to the needs of the VCU community.

GRTC's local, express, and VCU routes are described in greater detail in **Appendix A**.

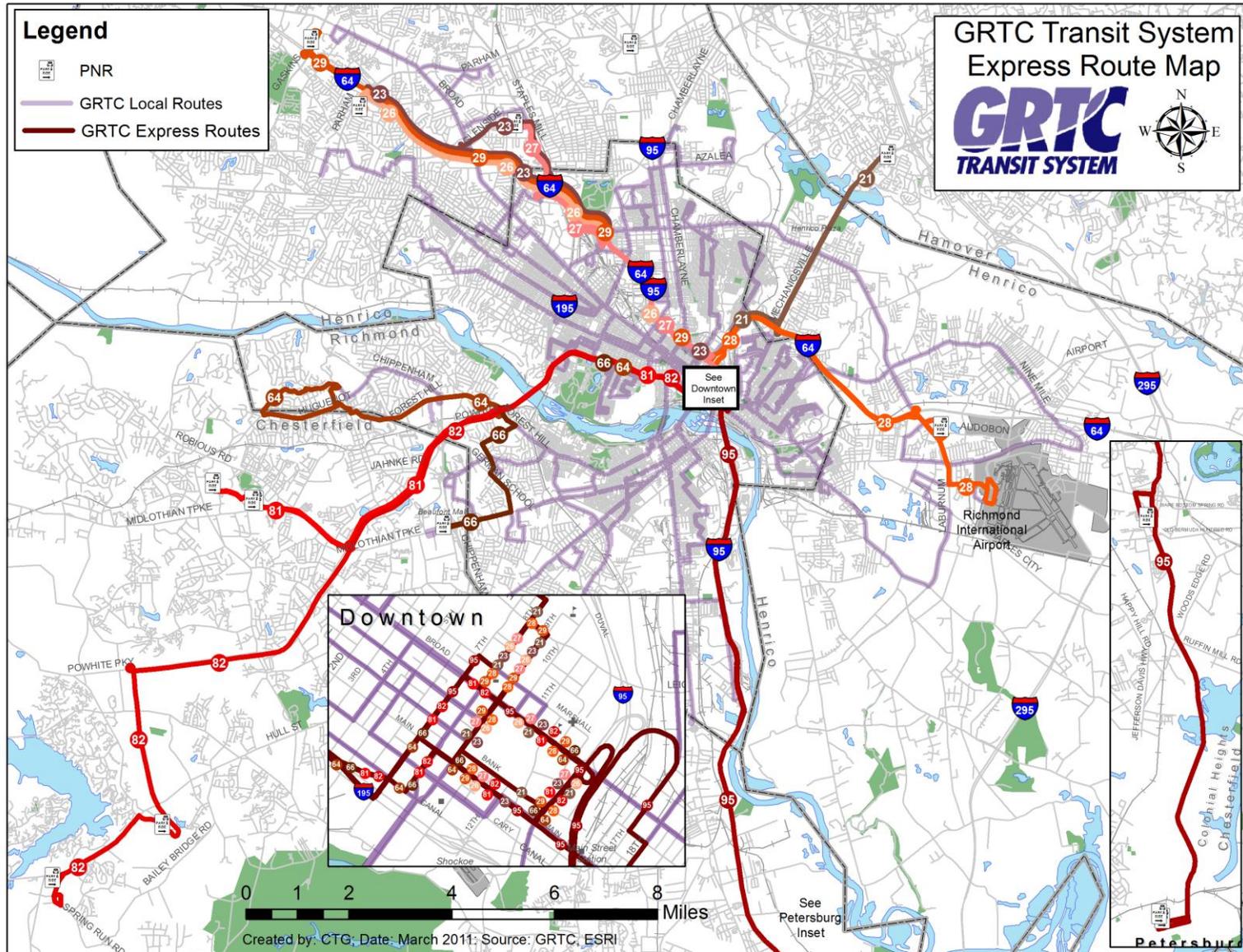
**TABLE 1-1: GRTC LOCAL ROUTE HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1/2	12	20	20	16.5	20	20	12	20	20	30	30	30
3/4	9	15	15	16.5	15	15	9	15	15	22.5	30	30
6	9	18	18	12	18	18	10	18	18	30	30	30
7	20	--	--	37	--	--	35	--	--	47	--	--
10	17	27	27	21	27	27	17	27	27	18	25	25
11	30	--	--	30	4 trips	--	30	--	--	--	--	--
16	20	--	--	60	--	--	15	--	--	15	--	--
18	55	--	--	55	--	--	55	--	--	--	--	--
19	varies	--	--	varies	--	--	varies	--	--	--	--	--
22	65	60	60	65	65	65	65	--	--	--	--	--
24	35	60	60	32	60	60	30	60	60	60	60	60
32	10	15	15	20	20	20	10	12	12	18	14	14
34	10	25	23	20	20	23	10	20	23	18	25	23
37	18	33	45	18	33	30	18	33	30	30	33	30
56	1 trip	--	--	--	--	--	1 trip	--	--	--	--	--
62/63	9	30	60	10	40	60	8	33	60	25	60	60
67	3 trips	--	--	--	--	--	3 trips	--	--	--	--	--
70/71	20	62	65	40	62	65	20	67	60	45	67	65
72	20	30	30	30	30	30	20	30	30	60	60	60
74	28	30	30	33	30	30	33	30	30	25	60	60
91	55	--	--	55	--	--	55	--	--	--	--	--
93	30	--	--	40	--	--	40	--	--	--	--	--
101	--	--	--	25	--	--	--	--	--	--	--	--

**FIGURE 1-2: GRTC FIXED-ROUTE SYSTEM MAP**



**FIGURE 1-3: GRTC EXPRESS ROUTE SYSTEM MAP**



#### COMMUNITY ASSISTANCE RIDE ENTERPRISE (CARE)

CARE, a division of GRTC Transit System, provides curb-to-curb paratransit service for persons with disabilities who are unable to use regular fixed-route transit service. This service is available to ADA-eligible riders in the City of Richmond, Henrico County, and portions of Chesterfield County. The vehicles in the CARE fleet have seating capacities for 8-12 persons and all are equipped with wheelchair lifts. CARE operators provide assistance to customers when boarding and exiting the vehicle.

CARE's hours of service are every day from 4:30 a.m. to 12:30 a.m. for City of Richmond residents and every day from 6:00 a.m. to 11:30 a.m. for Henrico County residents. Reservations are required and may be requested by phone or fax. Reservations should be made at least one day in advance, but no more than seven days before the desired trip. Standing reservations are available to riders who use CARE service at least four times per week, two times per day from the same origin to the same destination at the same time each day.

#### CENTRAL VIRGINIA ASSISTANCE NETWORK (C-VAN)

C-VAN, a division of GRTC Transit System, provides door-to-door transportation service that connects Virginia Initiative for Employment Not Welfare (VIEW) participants to jobs and daycare facilities using a fleet of vehicles with seating capacities for 8-12 persons. All VIEW participants must be referred to C-VAN by their local Department of Social Services. Reservations must be requested by phone.

#### RIDEFINDERS

RideFinders, a division of GRTC Transit System, is the regional rideshare and transportation demand management nonprofit agency with a commitment to improving the region's air quality, reducing traffic congestion, and promoting economic development and sustainability through the use of smart transportation methods. RideFinders' mission is to move more people in fewer vehicles by providing the following services and products to area commuters and businesses: carpool matching, vanpool formation and maintenance services, park-and-ride lot information, transit and road information, transit media sales, employee commute surveys, density plots, transportation fares, company relocation services, site analysis, telework consulting, the Emergency Ride Home, Downtown Commuter Guide and Commuter Bonus Bucks programs. RideFinders also participates in the regional transportation planning process with representation in the Long Range Transportation Plan, the Interagency Consultation Group, Tri-Cities MPO, and CTAC, voting membership in TAC, and non-voting membership in the MPO. Through these efforts and partnerships, RideFinders supports and promotes environmental stewardship, social responsibility, and economic development. RideFinders has a customer database of approximately 8,000 registered clients, employee transportation coordinators and business liaisons at over 400 companies, and supports 115 vanpools.

## 1.4 FARE STRUCTURE

The one-way base fare is \$1.50 for GRTC local routes and ranges from \$2.00 to \$3.00 for GRTC express routes. One child under age five rides free for each full paid fare, and children five years and older pay the full fare. The senior/disabled cash fare is \$0.75 on local routes for passengers 65 years of age or older, people with certain disabilities, CARE customers, and Medicare card holders. Reduced fare is not available on express routes or Route 19 (Pemberton). Transfers are \$0.25 or free for senior/disabled and CARE customers. When transferring to another bus, the transfer must be presented along with any increase in fare between the first and second buses.

VCU full-time students and employees can obtain a Student Transit Pass from the VCU Parking and Transportation office to ride free on the routes specific to the VCU community.

**Table 1-2** summarizes GRTC’s fare structure.

**TABLE 1-2: GRTC FARE STRUCTURE**

Service	Fare
Local Routes	\$1.50
Express Routes	
Express Routes 23, 26, 27, 28, 29, 64, 66	\$2.00
Express Routes 21, 81, 82, 95	\$3.00
Route 19 Pemberton	\$2.00
Child (under age 5 with an adult)	Free (one free ride per full paid fare)
Senior/Disabled Fare	\$0.75 (local routes only)
VCU Students and Employees	Free (Routes 83, 84, 86, 87, 89, and 99 only)
CARE tickets	
Book of 6 tickets	\$15.00 (\$2.50 each ticket)
Book of 10 tickets	\$25.00 (\$2.50 each ticket)
Transfers	\$0.25 (free for senior/disabled and CARE customers)
From Local to Local	Transfer only – no additional fare
From Express to Local	Transfer only – no additional fare
From Express to Express	Transfer only – no additional fare
From Local to Express or to 19 Pemberton with Regular Transfer	Transfer + \$0.50
From Local to Express or to 19 Pemberton with Senior/Disabled Transfer	Transfer + \$1.25
From Local Route to Route 21, 81, 82, or 95	Transfer + \$1.50
From Express Route to Route 21,81, 82, or 95	Transfer + \$1.00
From Local Route with Senior/Disabled Transfer	Transfer + \$2.25

Go Cards are available for \$5.00, \$10.00, and \$25.00 at select locations and can be used in lieu of cash for payment of fares and transfers. The cost of the trip is deducted from the card each time it is used and the remaining balance is indicated on the back of the card.

CARE tickets are \$15.00 for a book of six tickets or \$25.00 for a book of ten tickets. Go Cards or cash are not accepted as fare on CARE vehicles.

## 1.5 VEHICLE FLEET

As of February 2011, GRTC had a fixed-route fleet of 166 vehicles, including 151 standard buses, 7 cutaway buses and 8 mini-buses. The majority of the fixed-route fleet consists of 40-foot diesel buses. GRTC also has eight vehicles (all 35-foot buses) in contingency status. Six fixed-route buses (all 40') are scheduled for replacement in FY2012.

GRTC's paratransit and special transportation fleet consists of 75 cutaway buses, each with a seating capacity of 11 or 12 passengers. Twenty of GRTC's special transportation vehicles are scheduled for replacement in FY2012.

GRTC also maintains a non-revenue fleet of 28 vehicles, including sedans, sport utility vehicles (SUV), minivans, light trucks and heavy trucks. These vehicles are used for administrative/operations staff support and are not used to provide transit service.

**Tables 1-3 through 1-5** provide an inventory of GRTC's vehicles by type of service.

**TABLE 1-3: GRTC FIXED ROUTE VEHICLE FLEET**

Year	Make/Model	Type	Number of Vehicles
1998	Gillig Phantom	35' Standard Bus	23
2003	Bluebird Excel	35' Standard Bus	3
2001	Gillig Low Floor	40' Standard Bus	13
2003	Gillig Low Floor	40' Standard Bus	17
2008	Gillig Low Floor	40' Standard Bus	18
2009	Gillig Low Floor	40' Standard Bus	13
2000	Gillig Phantom	40' Standard Bus	40
2003	Gillig Phantom	40' Standard Bus	16
2008	MCI D4500CT	45' Commuter Coach	3
2010	MCI D4500CT	45' Commuter Coach	5
2002	Ford E450	Cutaway	3
2007	Ford E450	Cutaway	4
2009	Chevy C5500	Mini-Bus	8
<b>TOTAL FIXED ROUTE FLEET</b>			<b>166</b>

**TABLE 1-4: GRTC PARATRANSIT/SPECIAL TRANSPORTATION VEHICLE FLEET**

Year	Make/Model	Type	Number of Vehicles
2006	Chevy Supreme	Cutaway	35
2009	Ford E-350 StarTrans	Cutaway	38
<b>TOTAL PARATRANSIT/SPECIAL TRANSPORTATION FLEET</b>			<b>73</b>

**TABLE 1-5: GRTC NON-REVENUE VEHICLE FLEET**

Year	Make/Model	Type	Number of Vehicles
2007	Chevy Impala	Sedan	2
2010	Chevy Impala	Sedan	1
2000	Jeep Cherokee	SUV	1
2004	Ford Explorer	SUV	2
2006	Ford Explorer	SUV	3
2007	Ford Explorer	SUV	2
2010	Ford Escape	SUV	6
1998	Ford E350	Minivan	1
1999	Dodge Ram	Minivan	1
2000	Dodge Ram	Minivan	1
2004	GMC Sierra	Minivan	1
1997	GMC Sierra	Light Truck	2
2007	GMC Sierra	Light Truck	1
2010	Chevy Silverado	Light Truck	1
1991	Ford LN9000	Heavy Truck	1
2003	International 7600	Heavy Truck	1
2007	Chevy C5500	Heavy Truck	1
<b>TOTAL NON-REVENUE FLEET</b>			<b>28</b>

The useful service life for GRTC buses is 12 years, 10 years for mini-buses, and 4-5 years for cutaways and support vehicles. GRTC is in the middle of its bus replacement program that will ultimately replace its revenue generating fleet over the eight year period from FY08 to FY15. During that time, approximately 170 transit vehicles will be scheduled for replacement.

## 1.6 FACILITIES

GRTC currently owns or leases three facilities. In 2010, GRTC moved into a new corporate headquarters facility, which they own, at 301 East Belt Boulevard in Richmond. The new building houses all of GRTC’s approximately 560 employees working in operations, maintenance, and administration. The 12-acre site accommodates outdoor bus storage, a three-story 26,600 square foot administration building, and an adjacent two-story 100,600 square foot maintenance building. The maintenance building includes fueling lanes, automatic bus washers, maintenance bays, and a body shop. The facility has a state of the art data center to transfer and receive data from the GRTC fleet. The facility is the first public building in Richmond to achieve LEED Silver Certification. GRTC also owns their old headquarters facility at 101 S. Davis Street, which is being remediated in preparation for sale. Finally, GRTC leases a facility located at 5115 Commerce Road in Richmond for its paratransit operations. GRTC is working to purchase land adjacent to the new headquarters to park paratransit vehicles.

According to the 2008 Comprehensive Operations Analysis, GRTC has provided bus waiting shelters at 108 bus stops. In addition, GRTC currently has stops at 11 park-and-ride lots throughout the service area, but they do not own or lease any of these lots. The lots are either privately owned and shared, or publicly owned by VDOT or a municipality, as listed below.

- Bon Air Baptist Church Park-N-Ride, Forest Hill & Chocktaw
- Commonwealth 20 Park-N-Ride, Commonwealth Center Parkway & Rte. 288
- Fair Oaks Park-N-Ride, Millers Lane & Williamsburg Rd.
- Gaskins Park-N-Ride, VDOT, Gaskins & Mayland
- Glenside Park-N-Ride, Glenside & Staples Mill
- Chesterfield Lowes Park-N-Ride, Koger Center Blvd.
- Mechanicsville Park-N-Ride, VDOT, US HWY 360 Bus. & Shady Grove Rd
- Parham Park-N-Ride, Parham & Fordson
- Petersburg Park-N-Rides, Union & Tabb, Tabb & Market
- Spring Rock Green Park-N-Ride, Midlothian Turnpike & Greshamwood Place
- Swift Creek Baptist Church, N. Spring Run Rd.

GRTC has been working with the City of Richmond and DRPT to identify a viable transfer center for the system, as recommended in the 2008 Comprehensive Operations Analysis. During 2010, the focus of GRTC's efforts transitioned from designing a multi-modal transfer center at Main Street Station in Downtown Richmond to studying the feasibility of constructing a transfer center at a new location in the heart of the city's central business district.

## 1.7 TRANSIT SECURITY PROGRAM

The GRTC Transit Security Program Plan (February 11, 2010) describes the policies, procedures, and requirements to be followed by management, maintenance and operating personnel in order to provide a secure environment for employees, volunteers, and contractors, and to support community emergency response. The purpose of the plan is to establish and maintain the System Security Program for GRTC by:

- Establishing how security activities are organized;
- Outlining employee and department responsibilities with respect to security;
- Instituting threat and vulnerability identification, assessment, and resolution methodologies; and
- Setting goals and objectives.

The plan is updated annually to record and evaluate past security performance of the system, to identify modifications that are needed, and to establish objectives for the upcoming year. The Special Projects Manager has been designated as the Security Program Manager for development and implementation of the Security Plan.

## 1.8 PUBLIC OUTREACH

According to GRTC's Public Comment Procedures, public comment will be solicited and considered anytime there is:

1. Any change in any fare;
2. Total abandonment of service on any route;
3. A new transit route established; or
4. Any major service reduction (a major service reduction is defined as any change in service of 25 percent or more of the number of transit route miles on a route or any change in service of 25 percent or more of the number of transit vehicle miles of a route computed on a daily basis for the day of the week for which the change is made).

The public hearing for changes 1, 2 and 3 above will be held at the same time the City of Richmond City Council or the Henrico County Board of Supervisors (whichever is applicable) holds their public hearing on the matter. Local ordinances require the local governing body to hold a public hearing on these items. GRTC has chosen to combine its public hearing with that of the local governing body in order to improve efficiency. The public hearing for change 4 above will be conducted by the GRTC Board of Directors. Notice for any public hearing is published two weeks in advance in local newspapers.

If a dispute arises regarding a fare or service change, every effort will be made by GRTC's staff to resolve the dispute at the time it is raised. If the dispute is not resolved, it may be submitted to the GRTC Board of Directors for hearing and resolution. Finally, if the dispute is not resolved after the first two steps, the complaint may be submitted to FTA for hearing and resolution.

## 2.0 GOALS, OBJECTIVES AND STANDARDS

This chapter presents GRTC Transit System’s vision, mission and core values, identifies goals, objectives and strategies for the TDP, and recommends a set of performance measures for GRTC to evaluate service.

### 2.1 VISION, MISSION AND CORE VALUES

GRTC’s vision, mission and core values as described in the GRTC 2010 Annual Report are as follows:

#### **VISION**

GRTC Transit System seeks to become the leading provider of world class transportation services and mobility solutions

#### **MISSION**

GRTC Transit System's mission is to provide clean, safe, and reliable transportation to improve mobility and access throughout Central Virginia.

#### **CORE VALUES**

Absolute Integrity, Competence, and Diligence in the performance of our duties.

Commitment to providing exceptional customer service.

Responsiveness to the needs of the communities we serve.

Promotion of the personal and professional growth of our employees

### 2.2 GOALS, OBJECTIVES AND STRATEGIES

In accordance with the vision, mission and values describe above, GRTC has established goals, objectives and strategies for the 2012-2017 Transit Development Plan as described below.

#### **GOAL 1 PROMOTE GRTC ENVIRONMENTAL EFFICIENCY**

OBJECTIVE 1.1: Continue to pursue Green Building and Practices

- Continue Green initiative and pursuit of ISO 14001 certification
- Convert fleet to CNG fuel

#### **GOAL 2 PROMOTE SAFETY FIRST, SERVICE ALWAYS**

OBJECTIVE 2.1 Reduce accident frequency to less than 20 per month

OBJECTIVE 2.2 Keep Accident Rate per 100,000 miles to less than seven

- Maintain new hire training program
- Continue to require two-year refresher training for all operators
- Continue to recognize operators through Safety Rewards Program
- Conduct quarterly safety meeting

**GOAL 3 IMPROVE CUSTOMER EXPERIENCE**

OBJECTIVE 3.1 Work to ensure more comfortable, more efficient, and safer operations

- Continue to pursue a downtown transfer center location
- Implement more efficient route and schedule structure
- Improve security for customers and employees

OBJECTIVE 3.2 Improve communication with customers

- Provide schedule, route, and bus arrival information at bus stops
- Incorporate Social Media where appropriate
- Utilize web and smart phone bus arrival information
  - Seek opportunities for GRTC produced information
  - Pursue opportunities with Third Party Developers providing applications to smart phones

OBJECTIVE 3.3 Diversify fare payment options

- Explore Daily, Weekly, and Monthly Passes

OBJECTIVE 3.4 Diversify services provided

- Continue to pursue Bus Rapid Transit on Broad Street Corridor
- Investigate opportunities to provide Neighborhood Circulator service
- Explore E-Z Bus – Deviated Route service potential

**GOAL 4 IMPROVE OPERATIONAL EFFICIENCY**

OBJECTIVE 4.1 Develop and maintain an on-going performance monitoring program

OBJECTIVE 4.2 Review and assess system performance on a regular basis to determine if any corrective measures should be considered

OBJECTIVE 4.3 Utilize CAD/AVL to greatest extent possible

OBJECTIVE 4.4 Create Optimum Ride

- Right-Size Bus Fleet
  - Continue to implement Bus Replacement Program
  - Continue to add mini-buses to fleet
  - Continue to work toward providing Coach buses on long-haul express routes

**GOAL 5 IMPROVE GRTC FINANCIAL EFFICIENCY**

OBJECTIVE 5.1 Reduce operational costs

- Consolidate operations to new GRTC Facility
- Reduce cost of public schedules
- Explore other companywide cost saving measures

OBJECTIVE 5.2 Explore new revenue sources

- Examine opportunities for audio at bus stops
- Continue to pursue partnerships for new service

**GOAL 6 IMPROVE GRTC PUBLIC IMAGE**

OBJECTIVE 6.1 Make public aware of GRTC strengths

- Pursue ad campaign

**GOAL 7 IMPROVE EMPLOYEE EXPERIENCE**

OBJECTIVE 7.1 Provide opportunities for improving and maintaining health

- Continue regularly scheduled health fairs
- Investigate and conduct health-related programs

OBJECTIVE 7.2 Provide opportunities for operator input on schedules

- Provide liaison for operators to communicate with Planning and Schedules Department

**GOAL 8 IMPROVE PARATRANSIT OPERATIONS**

OBJECTIVE 8.1 Utilize technology to operate more efficiently

OBJECTIVE 8.2 Utilize technology to enhance customer experience

OBJECTIVE 8.3 Implement strategies to ensure capacity constraints are not encountered

OBJECTIVE 8.4 Explore opportunities to present fixed-route service as a viable mobility option

### 2.3 SERVICE PERFORMANCE STANDARDS

The 2008 Comprehensive Operations Analysis (COA) identified performance standards for GRTC to monitor system level and route level performance under the categories of Service Coverage, Patron Convenience, Fiscal Condition and Passenger Comfort. Performance standards serve as a benchmark to guide the decision making process by revealing underperforming routes, as well as routes that could support additional service. Effective performance measures require complete and consistent data collection. Ideally, performance measures are collected and calculated on a route-level basis.

This TDP recommends that GRTC continue to measure the performance of the fixed-route and express service based on the performance standards identified in the COA. It is important to note that these measures serve as guidelines to evaluate route level performance, but they are not inclusive of all factors that may dictate how a particular route may operate. The quantitative and qualitative measures in this section provide GRTC with an initial means to evaluate whether underperforming routes require further evaluation or changes.

#### SERVICE COVERAGE

Performance standards that measure service coverage include the availability of service in transit supportive areas, the frequency and span of service, as well as the directness of service based on the distance between the two route terminals, and how many patrons must make a transfer to complete a trip. The following service coverage standards are identified for this TDP.

- Availability:** Two measures that reveal the availability of the service at the production end and the attraction end of transit trips are included in this TDP. Production end availability looks at the maximum walking distance from areas with high household densities and a high percentage of households with no vehicles. This measure includes a combination of areas with densities large enough to support transit as well as areas that include a population with a greater need for transit. The attraction end is based on the number of employees within a ¼, ½ or 1-mile radius. Additional attraction end destinations are major retail hubs, colleges and universities with 1,000 or more students and large hospitals. **Table 2-1** shows the maximum walking distance to a transit line from the production end of the transit trip. **Table 2-2** shows the maximum walking distance to employment at the attraction end of the trip.

**TABLE 2-1: MAXIMUM DISTANCE: HOUSEHOLD DENSITY & % OF HOUSEHOLDS WITHOUT AUTOMOBILES**

% of Households w/out Autos	Population Density (Households per Acre)			
	Over 10	7 to 10	4 to 6.9	Under 4
Over 15.0	1/6 Mile	1/6 mile	¼ mile	½ mile
10.0 to 15.0	1/6 Mile	1/4 mile	½ mile	1 mile
5.0 to 9.9	¼ mile	½ mile	1 mile	
Below 5.0	½ mile	1 mile		

**TABLE 2-2: MAXIMUM DISTANCE TO TRANSIT LINE BY NUMBER OF EMPLOYEES**

Number of Employees	Maximum Distance to Transit Line
Over 100	¼ mile
50 to 100	½ mile
25 to 50	1 mile

- Service Frequency:** The frequency of service during peak and off-peak hours provides a measure of service availability. Service that operates more frequently is more attractive to riders. Fixed-route service operating during the peak hours should operate at a maximum headway of 15 to 20 minutes, and off-peak every 30 to 60 minutes, as shown in **Table 2-3**. It is important to note that some routes that serve a specific population or need may not warrant this level of frequent service. GRTC should weigh the productivity of the route versus the cost to operate the route at greater frequencies.

**TABLE 2-3: FREQUENCY OF SERVICE**

Type of service	Headway Maximum	
	Peak	Off-Peak
Weekday	15 to 20 minutes	30 to 60 minutes
Saturday		60 minutes
Sunday		Local Policy Driven
Express/Commuter		Demand Driven

- Span of service:** The COA recommended GRTC service hours begin at 5:00 a.m. and end at 11:00 p.m., as shown in **Table 2-4**. While this measure may not be productive on all routes, many of GRTC’s routes currently operate during the recommended time span. GRTC should continue to strive for expanded span of service for the most productive routes.

**TABLE 2-4: SPAN OF SERVICE**

Day	Begin	End	Hours
Weekday	5:00 a.m.	11:00 p.m.	18
Saturday	6:00 a.m.	11:00 p.m.	17
Sunday	6:00 a.m.	10:00 p.m.	16

- Directness/Routing:** The directness of routes can impact the productivity of routes. The COA identified two measures to reveal directness. The first measure is Terminal Distance, which requires that the distance between route terminals should not exceed the straight line mileage by 70 percent or 1.7. Factors, such as the location of major attractions and circuitousness of streets may limit the reasonability of applying this measure. A second measure of directness would be the percentage of transfers a passenger must make in order to complete their trip. The fewer transfers that GRTC patrons make, the more likely they will ride the service. This TDP recommends a maximum transfer rate of 30 percent on a route level basis, and five percent systemwide. Additionally, the wait time for a transfer on fixed-route service should not exceed five to 10 minutes during peak hours and 30 minutes during off-peak hours, as shown in **Table 2-5**.

**TABLE 2-5: ROUTING STANDARDS**

Criteria	Measurement	Level
Terminal Distance	Route Distance/Straight Line Mileage	Maximum 1.7
Directness	Percentage of Transfer Passengers	Maximum 30%
Interconnect Capability	Percentage of Transfer Passengers System-Wide	Minimum of 5%
Wait-time for a transfer	Peak Hour Wait Time/Off-Peak Hour Wait Time	Max. 5-10 minutes/max. 30 minutes

Service coverage standards should be measured annually, or anytime a significant change to a route is planned. If standards fall below these standards, GRTC should investigate measures to accommodate standards where appropriate.

**PATRON CONVENIENCE**

Patron Convenience includes standards for the speed the route travels, maximum loading standards, bus stop standards and service reliability, as described below.

- Speed:** Route speeds (in miles per hour) vary based on the density and frequency of stops along the route. Other impediments to speed are traffic delays and posted speed limit signs. The operating speed inside the Richmond CBD is recommended to be between eight to 12 miles per hour, with adjacent areas on the fringe operating at 10 to 14 miles per hour. Suburban routes should operate between 12 to 18 miles per hour, as shown in **Table 2-6**.

**TABLE 2-6: PATRON CONVENIENCE SPEED STANDARDS**

Location	Speed (MPH)
Core (Richmond CBD)	8 to 12
Fringe (adjacent to CBD)	10 to 14
Suburban (remainder of service area)	12 to 18

- Loading:** Maximum load factors identify how many passengers are left without a seat on a bus. A load factor of 1.00 indicates everyone has a seat, and all seats are full. Anything greater than 1.00 indicates passengers are standing, a load factor less than 1.00 indicates that there are empty seats on the bus. Express bus shuttles have a maximum load factor of 1.00 and local/shuttle routes have a maximum load of 1.20 during peak hours, as shown in **Table 2-7**. The maximum time passengers should be standing is 15 minutes.

**TABLE 2-7: LOADING SERVICE STANDARDS**

(Standing time max 15 min)	Maximum Loading Factor (Passenger/Seat)	
	Peak	Off-Peak
Service Type		
Express	1.00	n/a
Local	1.20	1.00
Shuttle	1.20	1.00

- Bus Stop Spacing:** Bus stop spacing can impact passenger convenience both positively and negatively. With more stop options, passengers have an easier time reaching a route. However, too many stops can slow the route down, taking away the convenience aspect. Thus, bus stop spacing standards are divided into four areas: the core (Richmond CBD), urban, suburban and rural, as shown in **Table 2-8**. Area types are defined by activity density, and take into account both population and employment densities.

**TABLE 2-8: BUS STOP SPACING**

Type of Area	Stops per Mile
Core (Richmond CBD)	300 - 1000 feet
Urban	500 - 1200 feet
Suburban	600 - 2500 feet
Rural	650 - 2640 feet

- Service Reliability (Dependability):** GRTC passengers want dependable service; thus, service reliability measures include the percentage of time the route arrives on-time. Service is considered to be on-time if it arrives between zero minutes early and five minutes late. Recommended standards for GRTC are shown in **Table 2-9**.

**TABLE 2-9: PERCENT ON TIME (ON TIME IS 0 MINUTES EARLY TO 5 MINUTES LATE)**

Period	Local	Express
Peak	90%	95%
Off-Peak	95%	n/a

Other reliability measures include the percentage of all trips operated, the percentage of trips that are dispatched, and the number of miles between service road calls. Accidents, breakdowns, traffic delays, and other factors can cause a scheduled trip to be missed. The percentage of trips operated, percentage of pull outs dispatched, and miles between road service calls should be maintained at the following levels:

- Percentage of Trips Operated: **99.8%**
- Pull-Outs Dispatched: **99.9%**
- Miles between Road Calls: **4,000**

Patron convenience standards should be evaluated quarterly. Should performance fall below standards for four consecutive quarters, GRTC should examine corrective actions where needed.

**FISCAL CONDITION**

Standards that measure the fiscal condition of GRTC at a systemwide level and individual route level include the farebox recovery ratio and passengers per vehicle hours.

- Farebox Recovery Ratio:** The farebox recovery ratio reveals how much of the operating cost are covered by the fares. A higher percentage indicates a greater percentage of the cost being covered by the fares or users. Farebox recovery ratios recommended in this TDP for the entire system, local and express routes are identified in **Table 2-10**. Rankings based on individual route performance are identified in **Table 2-11**.

**TABLE 2-10: SYSTEMWIDE FAREBOX RECOVERY**

Service Type	Percent
System (Regular Routes)	24
Local	30
Express	15

**TABLE 2-11: ROUTE LEVEL FAREBOX RECOVERY**

Route	Local	Express
Successful (Over 80%)	Over 24.0	Over 12.0
Marginal (60% to 80%)	18.0 to 24	9.0 to 12.0
Problem (Under 60%)	Under 18.0	Under 9.0

- Productivity:** Passengers per revenue hour is an industry wide standard that reveals how productive a route operates based on the number of passenger that ride per hour. Systemwide standards are identified in **Table 2-12**. Route level rankings are identified in **Table 2-13**.

**TABLE 2-12: SYSTEMWIDE PASSENGERS PER REVENUE HOUR**

Service Type	Percent
<b>System (Regular Routes)</b>	28
<b>Local</b>	21
<b>Express</b>	18

**TABLE 2-13: ROUTE LEVEL PASSENGERS PER REVENUE HOUR**

Route	Local	Express
Successful (Over 80%)	Over 20.0	Over 12.0
Marginal (60% to 80%)	15.0 to 20.0	9.0 to 12.0
Problem (Under 60%)	Under 15.0	Under 9.0

Fiscal measures should be examined quarterly. Should systemwide or individual routes fall below the standards for four consecutive quarters, GRTC should monitor underperforming routes and identify opportunities for improvement.

**PASSENGER COMFORT**

Passenger comfort standards include bus stop amenities, access to information, and a clean, well maintained fleet. Many of these standards are qualitative in nature, and can be measured through customer satisfaction surveys. This TDP recommends that GRTC continues to use the following standards for passenger comfort.

- **Benches/Shelters/Trash Cans:** Bus stop standards for adding shelters, benches and trashcans are based on the number of boardings at the stop. Stops with heavy ridership activity at 400 boardings and greater warrant shelters, benches and trash cans, as shown in **Table 2-14**. Other stops that do not meet these standards are addressed on a case-by-case basis, with other variables coming into play, such as passenger safety, location, etc.

**TABLE 2-14: BUS STOP AMENITIES**

Boardings	Shelter	Bench	Trash Can
<=100	No	Case-by-case	Case-by-case
101 to 399	case-by-case	Yes	Yes
>=400	Yes	Yes	Yes

- **Bus Stop Signs:** GRTC signs should include route information, logo, route numbers, telephone number and webpage address on every sign. Additionally, new kiosks with real time bus arrival information should be placed at major activity centers and transfer locations.
- **Revenue Equipment:** Revenue equipment standards ensure GRTC has a clean, comfortable, and well maintained fleet of buses. These standards are qualitative and can be measured through regular cleaning and maintenance logs, as well as customer satisfaction surveys.
- **Public Information:** Public information standards are based on the availability of GRTC patrons to access information about routes, schedules, service hours, etc. Better access to information can make it easier for new customers to ride GRTC, and existing customers to continue to ride the service. Recommended standards for GRTC include:
  - **Wait time for customer information during center operation:** 2.5 minutes maximum
  - **Percent of Missed Calls:** 5 percent maximum
  - **Availability of printed schedule information:** Schedules on all routes

Passenger comfort standards should be monitored regularly, with corrective action taken as issues arise.

### 3.0 SERVICE AND SYSTEM EVALUATION

GRTC provides fixed-route service via local, express and VCU shuttle service, and specialty transportation services including demand response paratransit service via CARE and C-VAN in the City of Richmond, Henrico County and parts of Chesterfield County. Further description of the transit service provided by GRTC is provided in **Chapter 1** and **Appendix A** of this TDP.

This chapter provides an evaluation of the existing service and includes an analysis of existing ridership, fare utilization, a historical performance evaluation of the past five years, peer review, onboard survey, public outreach efforts, facility and equipment characteristics, intelligent transportation systems, recent Title VI and Triennial Review, analysis of service area coverage, a land use summary and review of bicycle and pedestrian plans. The peer review and onboard survey findings are summarized in this chapter with complete analysis located in **Appendix B** and **Appendix C**, respectively.

#### 3.1 EXISTING SERVICE AND SYSTEM EVALUATION

The following is an analysis of the existing ridership for GRTC local fixed-routes, express routes, VCU service and CARE/C-VAN. This analysis uses calendar year (CY) 2010, January through December, GFI ridership data collected by GRTC to evaluate individual route level ridership for local, express and VCU fixed-route service, as well as data from GRTC’s Fiscal Year (FY) 2010 FITS report (July 2009 to June 2010) which includes CARE, C-VAN and manually collected ridership data.

In FY2010, GRTC had 10,193,867 total riders, as shown in **Table 3-1**. This figure includes 237,065 CARE customers and 15,686 C-VAN customers. Regular fixed-route service had 7,893,188 riders, and VCU routes carried 1,090,878 riders. The remaining ridership is spread among express route and vanpool customers.

**TABLE 3-1: FY2010 GRTC RIDERSHIP BY CUSTOMER TYPE (SOURCE: GRTC FY2010 FITS)**

Route Type	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
<b>Regular Service Customers</b>	655,070	645,661	683,385	713,494	616,946	623,381	616,829	606,361	718,555	692,745	661,713	659,048	<b>7,893,188</b>
<b>City Express Customers</b>	6,287	6,210	6,352	6,562	5,786	5,684	5,980	5,455	6,727	6,169	5,228	5,757	<b>72,197</b>
<b>Henrico Express Customers</b>	23,419	21,775	23,115	23,001	18,888	19,535	20,344	17,540	23,929	20,852	18,424	20,489	<b>251,311</b>
<b>Pemberton</b>	5,609	5,575	6,453	6,425	5,349	5,556	4,884	4,737	5,679	5,864	4,425	4,605	<b>65,161</b>
<b>CARE Customers</b>	19,787	19,525	20,020	20,817	18,367	18,491	18,467	16,727	22,133	21,704	19,952	21,075	<b>237,065</b>
<b>C-VAN</b>	828	955	1,077	1,231	1,489	1,454	1,734	1,310	1,602	1,178	1,427	1,401	<b>15,686</b>
<b>VCU Shuttle</b>	60,248	92,913	129,910	124,278	107,463	67,110	84,242	92,408	101,638	102,663	64,002	64,003	<b>1,090,878</b>
<b>Chesterfield Express Customers</b>	9,646	9,716	10,265	10,074	8,470	8,215	9,988	8,739	11,122	9,862	8,852	9,479	<b>114,428</b>
<b>Petersburg Express</b>	6,366	6,114	6,684	6,487	5,547	5,048	5,483	5,063	6,401	5,689	5,139	5,441	<b>69,462</b>
<b>Fredericksburg Express</b>	1,837	1,827	1,992	1,941	1,917	1,637	1,914	1,589	2,462	2,168	1,817	2,062	<b>23,163</b>
<b>Van Pool Customers</b>	30,063	30,552	29,849	31,784	33,514	28,893	29,904	28,441	27,361	32,453	29,801	28,713	<b>361,328</b>
<b>TOTAL CUSTOMERS</b>	<b>819,160</b>	<b>840,823</b>	<b>919,102</b>	<b>946,094</b>	<b>823,736</b>	<b>785,004</b>	<b>799,769</b>	<b>788,370</b>	<b>927,609</b>	<b>901,347</b>	<b>820,780</b>	<b>822,073</b>	<b>10,193,867</b>

Average weekday, Saturday and Sunday fixed-route ridership is 34,502 on weekdays, 18,312 on Saturday and 16,983 on Sunday. This is based on GFI data from a typical weekday, Saturday and Sunday in October 2010.

**MONTHLY RIDERSHIP (CY2010)**

Calendar year 2010 (January through December) GFI ridership data reveals ridership trends throughout the year on a route level and monthly basis. Although the GFI data underreports ridership on some routes, patterns do begin to emerge. For this section, the GFI data is broken into eight categories to simplify the analysis. These include local fixed-route service (blue-downtown, Fan District, Church Hill and West End south of Board Street; purple-East End and RIC; green-Southside; orange-West End north of Broad Street; and black-Northside and portions of West End north of Broad Street), VCU service, express routes and routes that have since been eliminated, as shown in the key. **Table 3-2** displays the monthly ridership by route from January to December 2010 as provided in the GFI database.

Key	
	Blue Local
	Purple Local
	Green Local
	Orange Local
	Black Local
	VCU
	Express
	Eliminated

**Table 3-2: GRTC Total Ridership by Route (Source: GRTC CY2010 GFI Data)**

Route	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Total
1	33,355	32,700	42,466	33,622	28,500	26,066	26,382	30,454	30,508	27,656	28,458	24,741	364,908
2	14,177	17,523	20,960	26,105	28,317	32,528	29,161	28,854	30,723	30,911	30,132	30,460	319,851
3	35,517	37,107	47,651	43,186	42,384	42,773	39,098	41,236	38,583	39,200	38,544	36,833	482,112
4	34,533	39,540	53,288	51,460	44,434	48,256	44,723	48,349	53,566	46,860	46,548	43,197	554,754
6	72,114	77,790	101,341	93,153	87,277	86,127	82,348	90,230	89,892	86,839	83,390	77,011	1,027,512
7	17,566	19,826	24,123	22,980	20,926	22,556	20,656	23,233	21,954	21,127	21,032	20,261	256,240
10	41,407	42,451	55,438	50,657	45,972	49,107	44,815	48,484	48,058	43,986	42,770	40,938	554,083
11	2,655	2,165	2,963	2,771	2,691	2,931	2,994	3,096	2,788	2,740	2,578	2,557	32,929
13	5,369												5,369
16	10,519	8,823	10,673	9,689	8,109	8,715	7,740	8,243	8,446	8,151	7,530	7,011	103,649
18	4,217	4,204	5,276	5,409	5,004	4,894	4,836	5,086	5,010	4,859	4,517	4,488	57,800
19	4,213	4,571	5,641	5,691	4,682	4,605	4,392	4,617	4,932	5,028	4,852	4,356	57,580
20	635												635
21					74	515	640	448	358	724	407	499	3,665
22	6,358	3,595	3,130	2,963	2,675	2,710	2,584	2,844	2,757	2,859	3,002	2,866	38,343
23	1,676	214	144	320	95	106	27	91	147	130	60	127	3,137
24	8,972	9,280	11,317	10,906	10,645	12,037	8,861	9,479	8,543	8,815	8,525	8,350	115,730
25	292	150	241	302	430	731	645	385					3,176
26	3,520	4,337	5,704	5,320	4,114	4,278	4,506	4,422	4,075	3,361	3,087	3,705	50,429
27	4,013	3,552	4,814	3,901	3,641	4,064	3,580	3,462	3,374	3,471	3,103	3,469	44,444
28	452	371	616	522	767	1,158	1,180	635	953	600	619	415	8,288
29	7,657	7,638	10,613	8,916	8,026	9,031	8,662	9,088	9,181	8,563	8,323	8,613	104,311
32	46,031	48,592	64,877	59,567	57,509	58,966	53,558	57,349	56,550	52,252	51,479	48,833	655,563
34	33,749	33,324	44,558	41,509	38,551	40,223	37,951	41,181	40,024	37,016	38,657	36,108	462,851
37	37,879	42,142	55,403	52,368	47,329	51,215	49,325	51,157	51,205	46,127	48,001	45,954	578,105
56	1,189	1,272	1,626	1,712	1,368	1,107	1,171	1,526	618	953	834	902	14,278
61	275												275
62	40,374	41,932	52,676	53,565	46,484	49,181	43,203	48,799	46,558	46,371	45,155	45,113	559,411
63	25,322	23,783	36,312	31,723	33,145	34,928	33,375	35,790	34,948	33,041	32,082	28,491	382,940
64	1,917	4,264	5,143	4,699	3,912	4,092	3,936	4,345	3,911	3,789	4,131	3,630	47,769
65	2,227												2,227
66	1,315	1,184	1,596	1,480	1,316	1,630	1,409	1,424	1,336	1,217	1,143	1,414	16,464
67	2,434	2,333	2,974	2,393	2,452	3,691	2,585	2,722	2,722	2,813	2,548	2,472	32,139
68	22												22
70	13,571	14,472	19,376	16,894	17,429	17,634	16,668	18,359	18,472	17,471	17,362	15,628	203,336
71	13,500	13,015	18,661	16,402	15,255	15,515	14,283	15,430	16,406	16,353	16,162	15,638	186,620
72	5,327	4,185	5,156	5,911	4,188	4,838	5,155	5,543	5,015	5,045	3,562	3,828	57,753
73	25,739	24,876	30,853	28,565	25,330	27,426	27,884	27,782	27,855	28,686	27,878	27,319	330,193
74	22,319	18,567	23,792	23,013	21,661	24,059	21,855	23,912	23,789	22,477	23,457	20,868	269,769
81	3,736	3,372	4,048	3,743	3,338	3,589	3,103	3,566	3,482	3,213	2,838	3,724	41,752
82	5,806	5,338	7,033	6,257	5,557	5,844	5,345	6,029	5,673	5,612	5,504	6,223	70,221
83								298	1,489	1,314	1,495	660	5,256
84	34,246	52,236	60,896	62,073	35,694	26,694	22,993	39,086	80,606	70,050	63,146	40,266	587,986
86	15,194	13,552	20,381	18,118	15,688	16,588	11,744	15,982	20,428	17,715	16,438	16,862	198,690
87	13,554	11,496	12,793	12,527	10,502	12,375	9,878	13,797	14,817	14,695	12,787	12,512	151,733
89	180	38	44	68	126	91	96	129	57	117	219	197	1,362
91	3,873	4,424	5,588	5,003	4,952	6,320	5,058	5,059	5,132	4,880	5,299	4,822	60,410
92	198	220	189	257	170	182	444	140	8				1,808
93	1,061	1,313	1,767	1,922	1,559	1,711	1,481	1,454	1,391	1,383	1,193	1,165	17,400
94	483	417	532	514	370	445	539	236	281	429	288	264	4,798
95	5,592	4,977	6,487	5,625	5,203	5,441	5,230	5,593	5,882	5,586	5,393	5,637	66,646
96	939	781	1,147	1,161	1,014	802	1,046	729	957	1,203	819	731	11,329
99	9,605	8,333	9,056	9,876	7,232	8,497	8,177	11,494	14,484	14,298	12,385	12,463	125,900
100		117	144	199	153	156	182	185	208	248	383	248	2,223
101		39	95	78	121	203	237	512	504	370	180	147	2,486
999	7	123	26	134	28	35	26	8	44	7	39	167	644
Other	68,651	20,361	168	498	2,017	320	206	488	237	226	308	628	94,108
Unknown	872	11,698	10,208	11,418	7,045	1,333	1,535	1,317	6,424	6,902	3,579	2,262	64,593
<b>Total</b>	<b>746,404</b>	<b>728,613</b>	<b>910,004</b>	<b>857,145</b>	<b>765,461</b>	<b>788,319</b>	<b>727,508</b>	<b>804,157</b>	<b>855,361</b>	<b>807,739</b>	<b>782,221</b>	<b>725,073</b>	<b>9,498,005</b>

**MONTHLY RIDERSHIP BY ROUTE TYPE**

Figure 3-1 reveals the total monthly ridership for local, express and VCU service. The eliminated routes are those routes that operated only partially during 2010. The unknown category includes ridership recorded as 999, other and unknown in the GFI data. In 2010, ridership reached its peak in March, April and September with decreases in ridership during the summer months. December, July and February had the lowest ridership among all months. February ridership likely decreased due to weather delays, and July and December declines are likely attributed to holidays and a reduced number of VCU riders.

**FIGURE 3-1: GRTC MONTHLY RIDERSHIP BY GFI ROUTE CATEGORY**

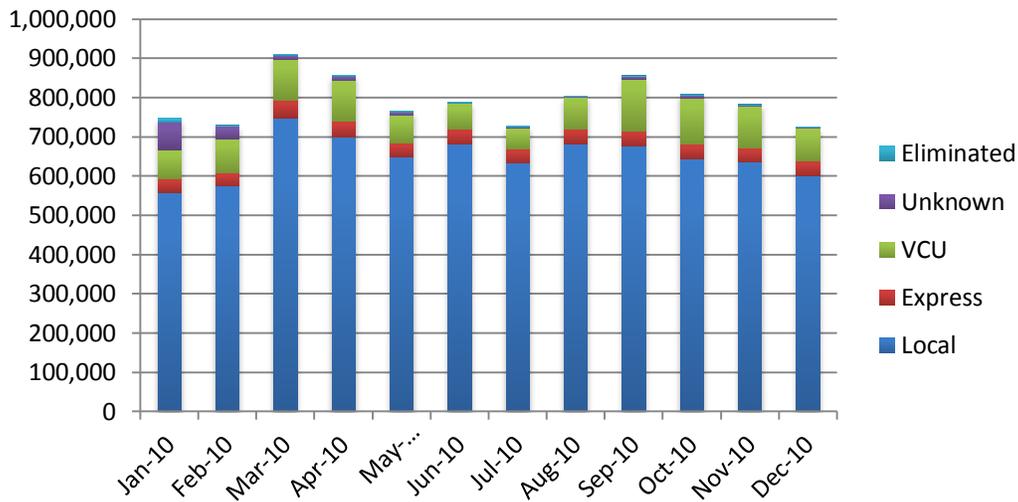
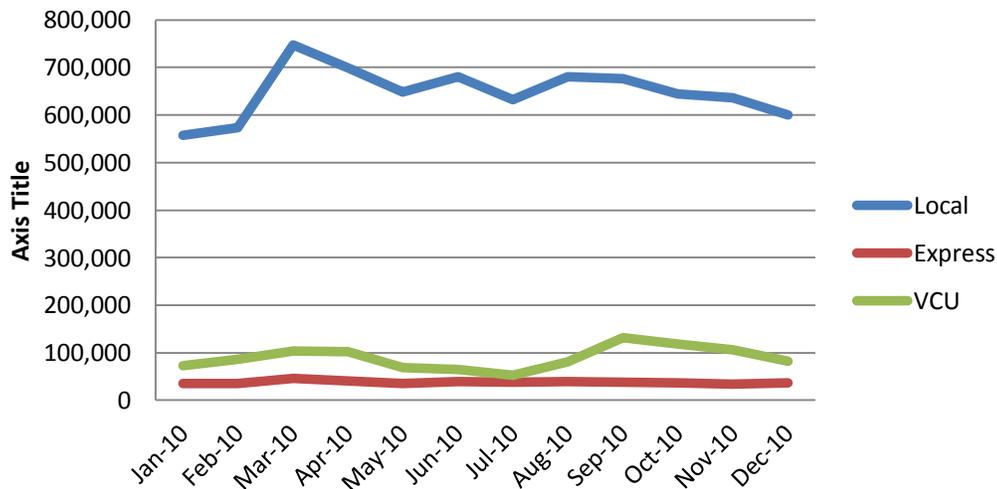


Figure 3-2 also shows the ridership trends for local, express and VCU routes over 2010. Local routes reached a peak in March and remained relatively steady throughout the remainder of the year with smaller peaks in June and August. VCU ridership declined during the summer months, with a peak in ridership in September. Express route ridership remained steady throughout the year.

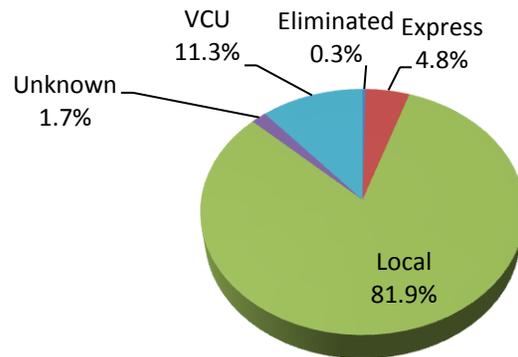
**FIGURE 3-2: LOCAL, EXPRESS AND VCU RIDERSHIP TRENDS (SOURCE: GRTC GFI DATA)**



**ANNUAL RIDERSHIP (CY2010)**

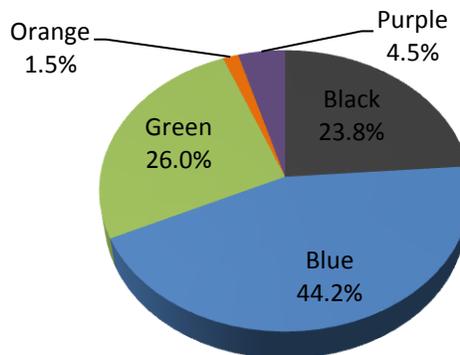
An overview of the annual ridership in calendar year 2010 reveals that local routes make up 81.9 percent of the ridership, and VCU routes comprise 11.3 percent of the ridership, as shown in **Figure 3-3**.

**FIGURE 3-3: PERCENTAGE OF TOTAL RIDERSHIP BY ROUTE CATEGORY (SOURCE: GRTC GFI DATA)**



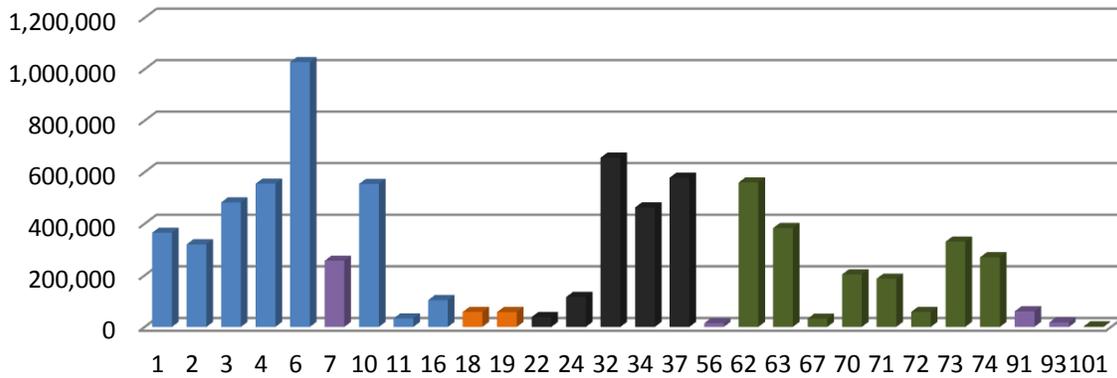
**Local Routes:** When local routes are further divided by the areas they served, the blue routes (1, 2, 3, 4, 6, 10, 11 and 16) make up 44.2 percent of the local route ridership. This is followed by the green routes (62, 63, 67, 70, 71, 72, 73, and 74) at 26 percent and the black routes (22, 24, 32, 34, and 37) at 23.8 percent, as shown in **Figure 3-4**.

**FIGURE 3-4: PERCENTAGE OF LOCAL ROUTE RIDERSHIP BY AREA SERVED (SOURCE: GRTC GFI DATA)**



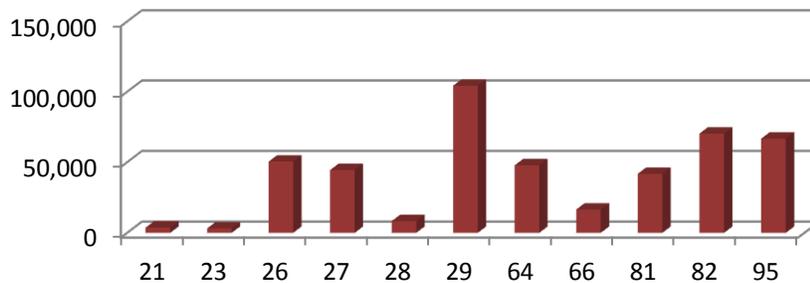
Further analysis of the local routes on an individual route level reveals that Route 6, Broad Street, had the highest ridership from January 2010 to December 2010, with 1,027,512 riders, as shown in **Figure 3-5**. This is followed by Route 32, Ginter Park, with 655,563 riders in CY2010. Among the local routes with complete ridership data that operated from January 2010 to December 2010, Route 93, Azalea Connector, had the lowest ridership at 17,400 riders. Route 56, South Laburnum, also had low ridership at 14,278. Route 56 is a low frequency route. Route 101, Southside Plaza/Belt Boulevard Connector, had low ridership at 2,486; however, ridership data was not complete for all months on this route.

**FIGURE 3-5: TOTAL CY2010 RIDERSHIP BY LOCAL ROUTE (SOURCE: GRTC GFI DATA)**



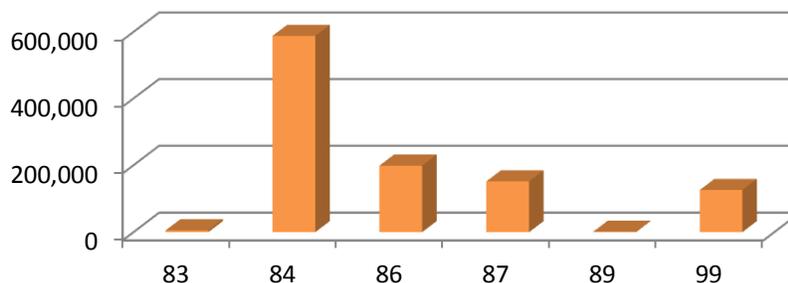
**Express Routes:** GRTC’s express service made up 4.8 percent of the total GFI ridership in CY2010. Route 29, the Gaskins Express, had the most ridership at 104,311 total riders, as shown in **Figure 3-6**. This is followed by Route 82, Commonwealth 20/Swift Creek Express at 70,221 total riders. Route 23, Glenside/Parham Express, had the fewest riders at 3,137; however, park-and-rides located on this route are also served by Routes 26 and 27, which had total ridership of 50,429 and 44,444, respectively.

**FIGURE 3-6: TOTAL RIDERSHIP BY EXPRESS ROUTE (SOURCE: GRTC CY2010 GFI DATA)**



**VCU Routes:** In CY2010, ridership on VCU service was highest on Route 84, Monroe Campus Connector, with 587,986 total riders, as shown in **Figure 3-7**. This is followed by Route 86, VCU Medical Campus – I Lot, with 198,690 total riders. Route 89, Medical Center Evening Route, and Route 83, Monroe Park Campus Connector, had the fewest riders at 1,362 and 5,256, respectively. Beginning in fall 2011, only Routes 84, 86 and 87 will be operating.

**FIGURE 3-7: TOTAL CY2010 VCU RIDERSHIP (SOURCE: GRTC GFI DATA)**



**DAILY FIXED ROUTE RIDERSHIP**

Daily fixed-route ridership provides the opportunity to evaluate individual route level performance on a typical weekday, Saturday and Sunday. This analysis includes GFI data collected in October 2010. This section provides an assessment of route level performance based on riders per mile, riders per hour and riders per trip. It is important to note that route miles and hours are from May 2011, and thus, some routes may have changed since the data was collected, and other routes may no longer be in service.

**Weekday Local Route Ridership:** Table 3-3 shows the fixed-route weekday riders per mile, hour and trip for GRTC’s local fixed-route service. The average number of riders per mile on GRTC local routes is 1.94. Route level riders per mile range from a low of .53 to a high of 6.22 riders per mile. Routes 10, 4 and 6 are the top three performing routes for riders per mile. The bottom three routes are Routes 91, 101 and 72. The local weekday fixed-route average number of riders per hour is 21.44, with a range of six to 57.15 riders per hour. The top three performing routes under this category include Routes 10, 4 and 62. The bottom performers are Routes 91, 101 and 24. The average number of riders per trip on GRTC routes is 13.07 with a range of 1.27 to 27.80 riders per trip. The top three performing routes are Routes 4, 10 and 6. The bottom three routes include routes 72, 24 and 101.

**TABLE 3-3: FIXED ROUTE WEEKDAY RIDERS PER MILE, HOUR, AND TRIP**

Route	Riders per Mile	Rank	Route	Riders per Hour	Rank	Route	Riders per Trip	Rank
10	6.22	1	10	57.15	1	4	27.80	1
4	3.58	2	4	33.43	2	10	24.96	2
6	3.13	3	62	31.11	3	6	22.27	3
62	2.94	4	6	28.83	4	3	20.63	4
34	2.88	5	32	28.49	5	62	20.41	5
32	2.80	6	71	27.76	6	71	18.76	6
3	2.75	7	67	27.48	7	1	18.06	7
63	2.36	8	73	27.01	8	2	17.25	8
74	2.31	9	3	26.51	9	56	16.25	9
37	2.22	10	34	25.52	10	63	16.05	10
1	2.21	11	63	25.05	11	74	14.83	11
71	2.16	12	1	23.54	12	67	14.56	12
67	2.02	13	56	23.21	13	32	14.42	13
73	1.88	14	74	23.03	14	7	13.55	14
11	1.62	15	70	19.80	15	73	13.21	15
2	1.60	16	7	19.37	16	70	12.62	16
7	1.42	17	2	18.44	17	37	11.62	17
70	1.29	18	37	18.38	18	34	11.47	18
18	1.29	19	18	17.84	19	19	10.87	19
56	1.28	20	93	16.57	20	18	8.46	20
19	1.25	21	19	16.45	21	16	7.47	21
93	1.16	22	11	15.82	22	91	7.04	22
16	1.10	23	16	12.93	23	93	4.88	23
22	0.63	24	72	8.63	24	22	4.67	24
24	0.61	25	22	8.08	25	11	4.35	25
72	0.59	26	91	7.68	26	72	4.32	26
91	0.55	27	101	6.09	27	24	3.85	27
101	0.53	28	24	6.00	28	101	1.27	28

**Weekday Express Route Ridership:** Table 3-4 shows the riders per mile, hour and trip for GRTC’s express routes. The average number of riders per mile is .81, with a range of .27 to 1.28 riders per mile. The top three performing routes are Routes 29, 81 and 82. The bottom three performing routes are Routes 95, 28 and 21. The average number of express riders per hour is 18.47, with a range of 6.52 to 32.73. The top three performing routes are Routes 29, 82 and 81. The bottom three performing routes include Routes 66, 21 and 28. The average number of express riders per trip is 11.79, with a range of 2.5 to 27.71 riders per trip. The top three performing routes for riders per trip include Routes 26, 82 and 29. The bottom three routes are Routes 66, 21 and 28.

**TABLE 3-4: WEEKDAY EXPRESS RIDERS PER MILE, HOUR AND TRIP**

Route	Riders per Mile	Rank	Route	Riders per Hour	Rank	Route	Riders per Trip	Rank
29	1.28	1	29	32.73	1	26	27.71	1
81	1.20	2	82	31.45	2	82	23.38	2
82	1.18	3	81	23.54	3	29	16.63	3
27	1.09	4	27	22.34	4	81	15.91	4
64	1.02	5	26	20.10	5	23	9.50	5
26	0.83	6	64	18.80	6	27	9.05	6
23	0.73	7	95	16.47	7	95	9.03	7
66	0.50	8	23	15.41	8	64	8.50	8
95	0.45	9	66	8.20	9	66	3.92	9
28	0.35	10	21	7.60	10	21	3.50	10
21	0.27	11	28	6.52	11	28	2.50	11

**Weekday VCU Ridership:** Table 3-5 shows the three VCU routes based on riders per hour, mile and trip. The VCU average is 9.77 riders per mile, 66.08 riders per hour, and 16.25 riders per trip. Route 84 performs better than the others.

**TABLE 3-5: WEEKDAY VCU RIDERS PER MILE, HOUR AND TRIP**

Route	Riders per Mile	Rank	Route	Riders per Hour	Rank	Route	Riders per Trip	Rank
84	21.77	1	84	146.53	1	84	42.74	1
87	4.36	2	87	28.52	2	87	3.30	2
86	3.19	3	86	23.19	3	86	2.71	3

**Saturday Local Fixed Route Ridership:** Table 3-6 shows the route level riders per mile, hour and trip for GRTC’s local fixed-route service on Saturday. The average number of riders per mile on Saturday is 2.92, with a range of .86 to 6.73. The top three performing routes on Saturday are Routes 10, 6 and 62. The bottom three performing routes are Routes 74, 11 and 12. The average number of riders per hour on Saturday is 32.29, with a range of 10.31 to 62.56 riders per hour. The top three performing routes are 10, 62 and 6, and the bottom three routes are 1, 22 and 11. The average number of riders per trip on Saturday is 19.31, with a range of 2.75 to 42.30 riders per trip. The top three performing routes are Routes 6, 62 and 63. The bottom three routes based on the number of riders per trip are Routes 74, 22 and 11.

**TABLE 3-6: SATURDAY LOCAL RIDERS PER MILE, HOUR AND TRIP**

Route	Riders per Mile	Rank	Route	Riders per Hour	Rank	Route	Riders per Trip	Rank
10	6.73	1	10	62.56	1	6	42.3	1
6	4.86	2	62	55.95	2	63	31.9	2
62	4.79	3	6	51.39	3	62	31.6	3
37	4.35	4	63	46.18	4	2	28.9	4
32	4.04	5	37	42.17	5	4	27.1	5
4	3.49	6	32	39.14	6	10	25.7	6
63	3.45	7	2	34.45	7	37	23.2	7
34	3.41	8	4	32.41	8	3	22.2	8
3	2.91	9	34	32.39	9	32	20.5	9
2	2.85	10	73	30.88	10	73	15.6	10
73	2.16	11	3	29.70	11	70	15.3	11
71	1.90	12	70	29.19	12	71	14.2	12
70	1.83	13	71	27.84	13	34	13.5	13
1	1.44	14	24	14.80	14	1	11.5	14
24	1.39	15	74	14.77	15	24	7.5	15
74	1.15	16	1	14.66	16	74	7.5	16
11	1.02	17	22	12.49	17	22	6.4	17
22	0.86	18	11	10.31	18	11	2.8	18

**Sunday Local Fixed Route Ridership:** Table 3-7 shows the route level riders per mile, hour and trip for local Sunday GRTC fixed-route service. The average number of riders per mile on Sunday is 1.47, with a range of .45 to 3.38 riders per mile. The top three performing routes are Routes 10, 32 and 37, and the bottom three performing routes include Routes 74, 22 and 71. The average number of riders per hour is 16.65, with a range of 5.7 to 31.38. The top three performing routes based on riders per hour are Routes 10, 70 and 32, with the bottom three being Routes 22, 71 and 62/63. The average number of riders per trip on Sunday is 9.49, with a range of 3.42 to 17.35 riders per trip. The top three performing routes are 6, 70 and 3, with the bottom three being Routes 22, 62/63 and 71.

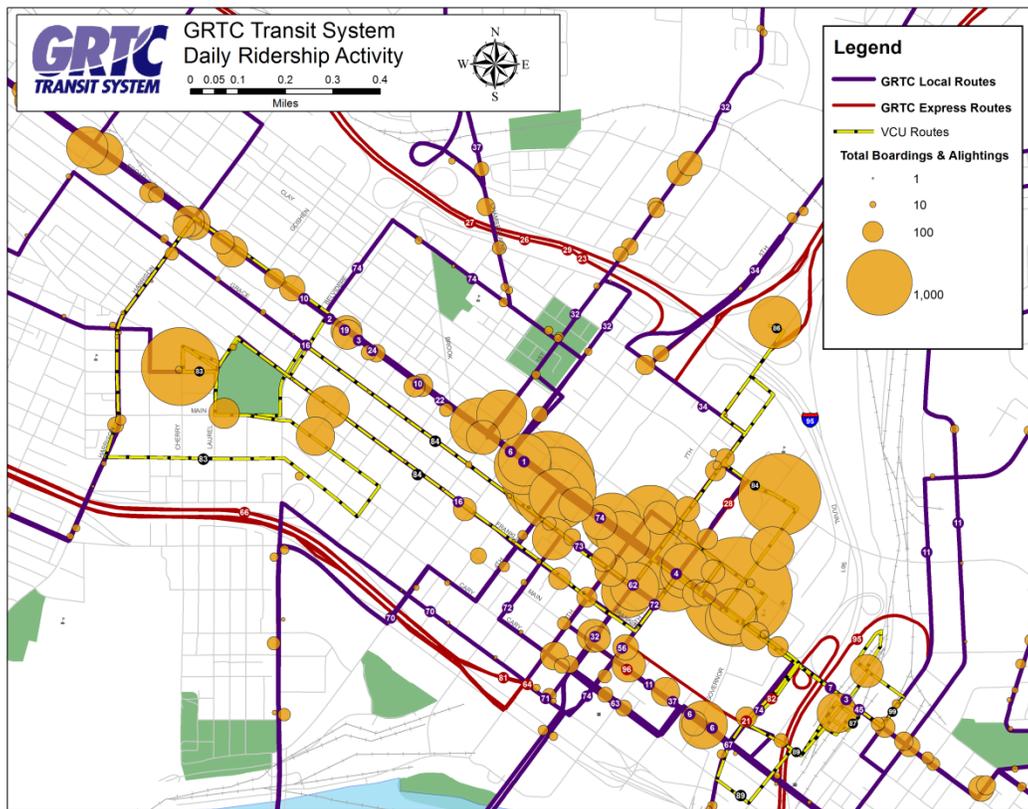
**TABLE 3-7: SUNDAY FIXED ROUTE RIDERS PER MILE, HOUR AND TRIP**

Route	Riders per Mile	Rank	Route	Riders per Hour	Rank	Route	Riders per Trip	Rank
10	3.38	1	10	31.38	1	6	17.35	1
32	2.19	2	70	27.15	2	70	13.73	2
37	2.14	3	32	23.36	3	3	13.24	3
6	1.96	4	6	23.18	4	10	12.88	4
3	1.79	5	37	22.12	5	4	11.95	5
34	1.69	6	3	18.67	6	37	11.10	6
70	1.60	7	73	17.55	7	32	11.10	7
4	1.54	8	34	17.33	8	2	9.84	8
73	1.23	9	4	16.03	9	1	9.35	9
1	1.18	10	1	11.97	10	73	8.85	10
2	0.97	11	2	11.71	11	34	6.68	11
62/63	0.74	12	74	8.98	12	74	4.55	12
74	0.70	13	22	7.78	13	62/63	4.21	13
22	0.54	14	71	6.79	14	22	4.00	14
71	0.45	15	62/63	5.70	15	71	3.42	15

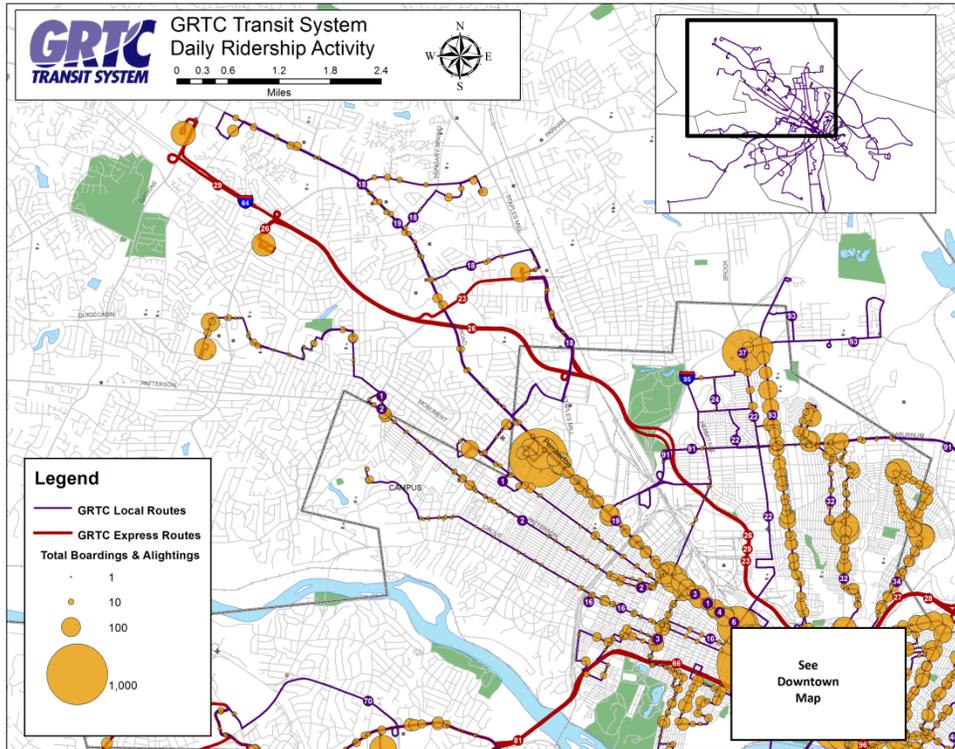
DAILY RIDERSHIP ACTIVITY BY STOP

Figures 3-8 to 3-12 show the daily ridership activity for all routes by stop for a typical weekday for Downtown Richmond, northwest Richmond and Henrico County, northeast Richmond and Henrico County, the Southside of Richmond and Henrico County, and express route stops in Chesterfield County. This data was collected using Ridecheck Plus in October 2010. As expected, ridership activity was heaviest at stops in Downtown Richmond. Stops at VCU and Willow Lawn also had high ridership activity. Other areas with high ridership activity include Southside Plaza at Belt Boulevard and Hull Street, the vicinity of the former Azalea mall on the Northside (Brook & Azalea), and the Forest Hills Walmart on the Southside. Generally, ridership activity is greatest at stops located at the end of the line and where multiple routes connect.

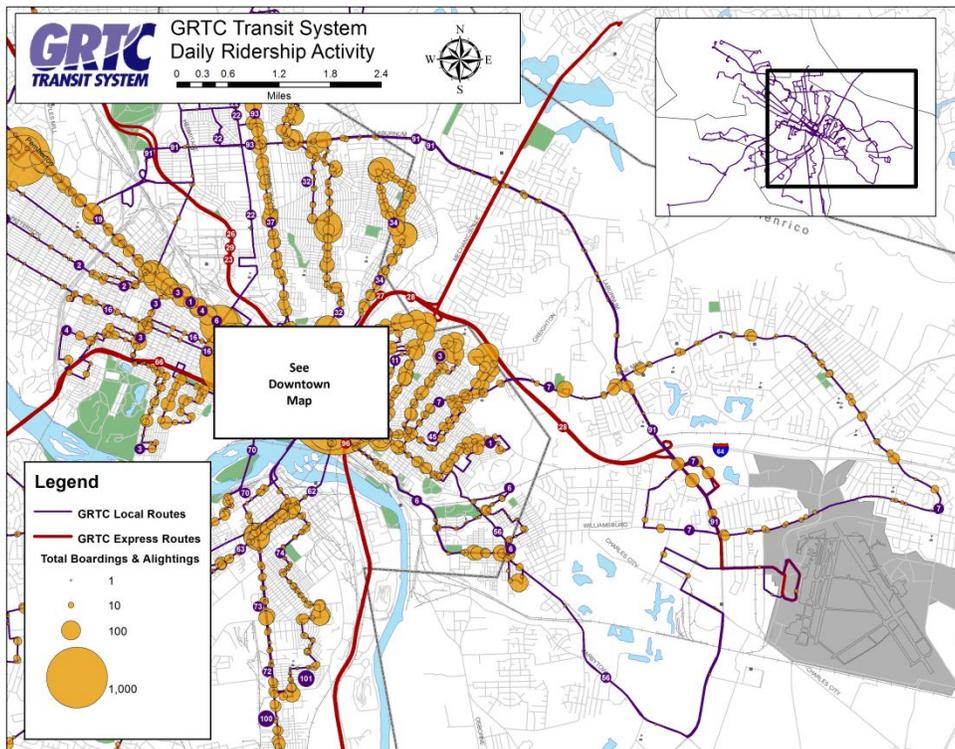
FIGURE 3-8: TOTAL BOARDINGS AND ALIGHTINGS BY STOP (DOWNTOWN RICHMOND)



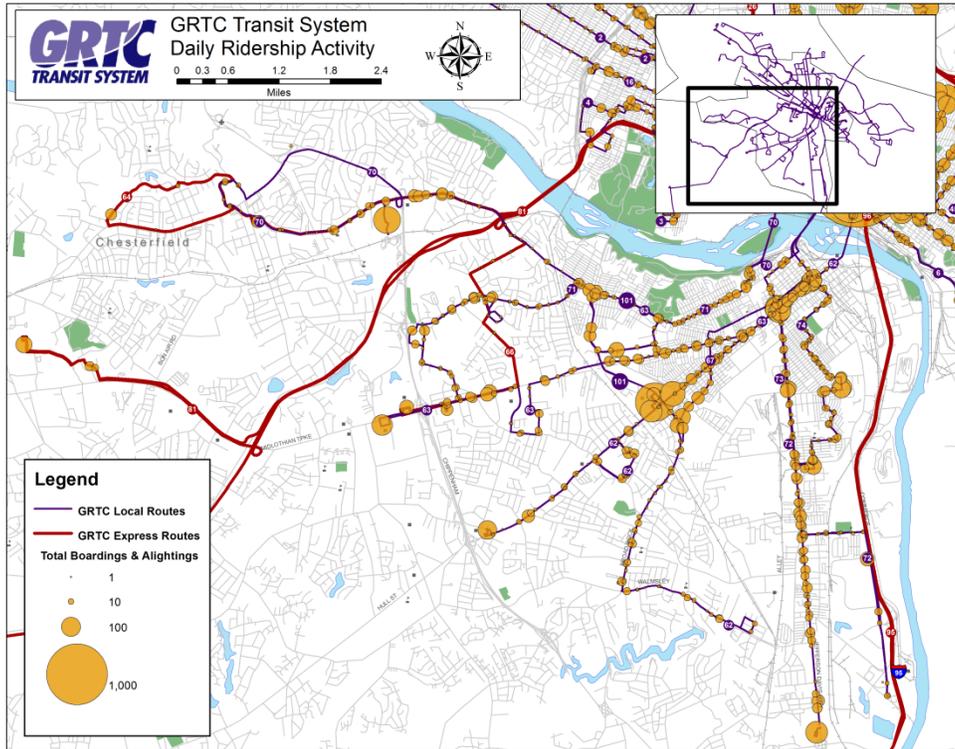
**FIGURE 3-9: TOTAL BOARDINGS AND ALIGHTINGS BY STOP (NORTHWEST)**



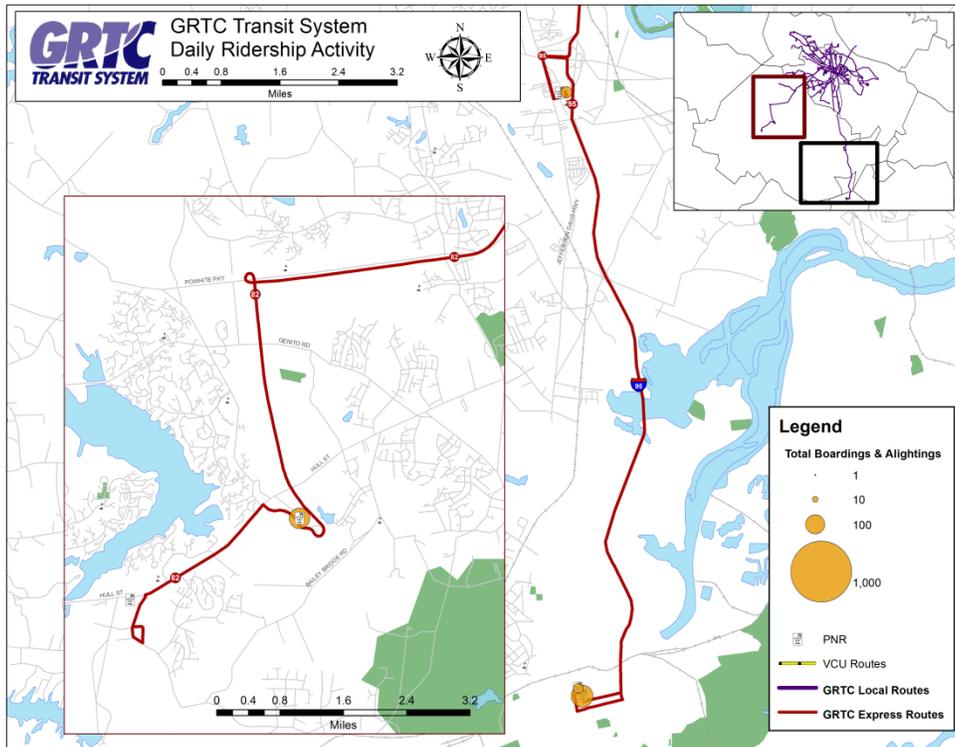
**FIGURE 3-10: TOTAL BOARDINGS AND ALIGHTINGS BY STOP (NORTHEAST)**



**FIGURE 3-11: TOTAL BOARDINGS AND ALIGHTINGS BY STOP (SOUTHSIDE)**



**FIGURE 3-12: TOTAL BOARDINGS AND ALIGHTINGS BY STOP (EXPRESS ROUTES)**

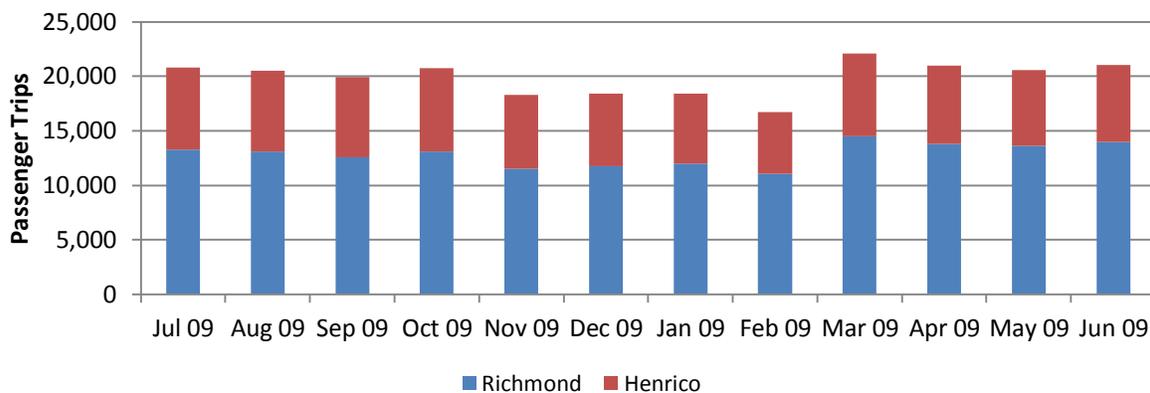


**CARE AND C-VAN RIDERSHIP**

A closer review of GRTC’s paratransit ridership helps to determine usage of ADA services. Specifically, ridership by jurisdiction, on-time performance and trip origins and destinations are evaluated in this section.

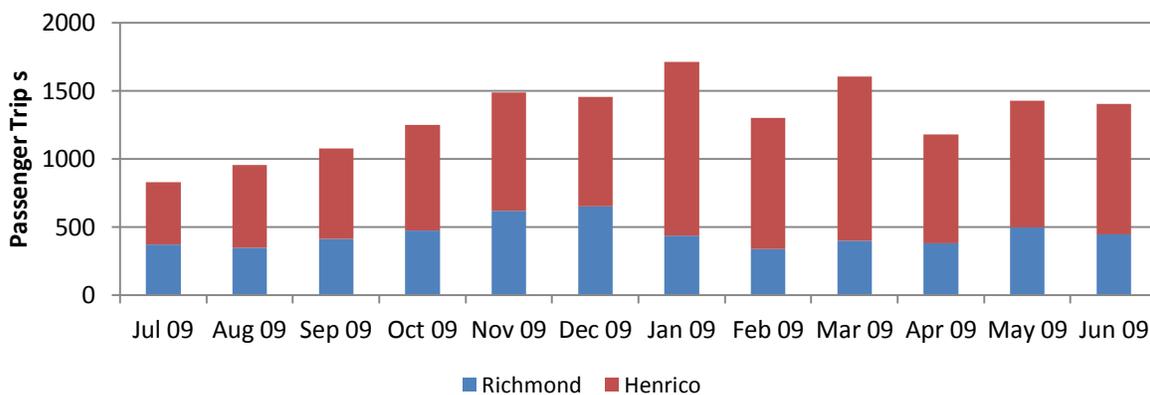
**Figure 3-13** presents CARE ridership for FY2010, with passenger trips identified by jurisdiction. Monthly ridership ranges from about 17,000 to 22,000. As illustrated in this figure, most CARE riders are City of Richmond riders. Recent trends indicate an increase in CARE ridership. March 2010 ridership was 23,120, which is a 4.7 percent increase over March 2009.

**FIGURE 3-13: CARE PASSENGER TRIPS BY JURISDICTION (FY2010)**



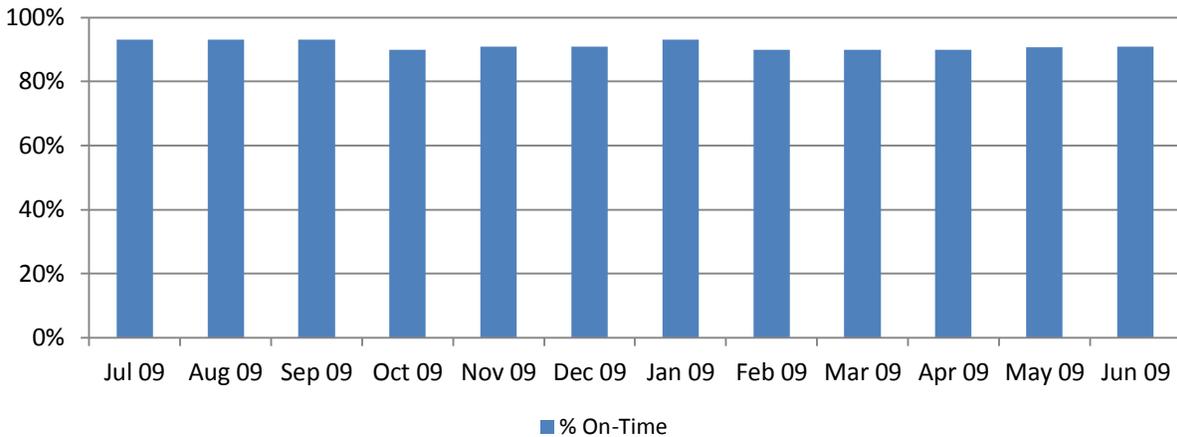
**Figure 3-14** presents C-VAN riders by jurisdiction over the FY2010 time period (July 2009 through June 2010). Monthly ridership for FY2010 ranges from 800 to 1,700 riders. Since June 2009, ridership has ranged from 1,300 to 2000 riders.

**FIGURE 3-14: C-VAN PASSENGER TRIPS BY JURISDICTION (FY2010)**



GRTC uses a standard on-time performance measure for CARE & C-VAN of being within 15 minutes of a scheduled pick-up time (i.e., up to 15 minutes early to 15 minutes late). This standard is tracked monthly. **Figure 3-15** presents GRTC’s on-time performance for FY2010. The average on-time rate was 91 percent over this time period. GRTC strives to achieve a 93 percent on-time performance rate each month.

**FIGURE 3-15: CARE & C-VAN ON-TIME PERFORMANCE (FY2010)**



GRTC’s C-VAN and CARE service is available to all residents in the City of Richmond and in Henrico County. Thus, GRTC’s service area for paratransit trips extends well beyond FTA’s minimum required ¼ mile distance from GRTC fixed-routes. GRTC Planning Department staff conducted an analysis of trip origins and destinations for trips completed for a two-month period in mid-2009. GRTC’s Department of Specialized Transportation was able to provide GRTC’s Planning Department with origin and destination data for 53,545 trips that occurred over this period. Of those trips, 51,459 were successfully located on a map with GIS software. Key findings from this analysis were as follows:

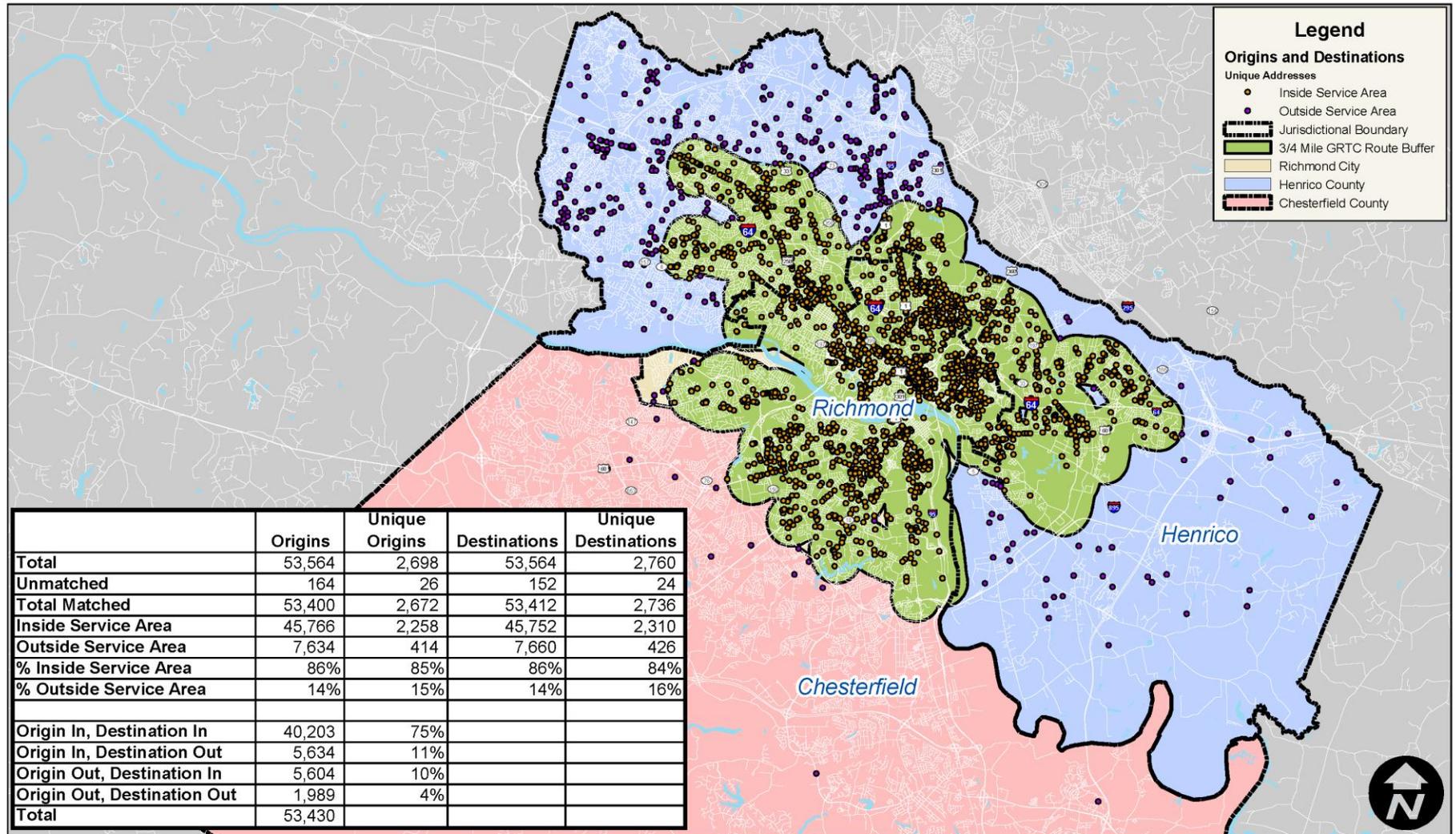
- 44 percent of the trip origins and destinations were in Henrico County
- 30 percent of these trips (6,779 trips, or 13% of all trips) were at locations outside of a ¼ mile radius of GRTC’s fixed-route bus system.

**Figure 3-16** illustrates average weekday trip origins and destinations for each unique location in the GRTC service area. As shown in this map, the highest amount of activity outside of the ¼ mile fixed-route buffer area is in western Henrico County. Eastern Henrico County has less activity spread over a dispersed area. Trip locations shown in this figure indicate a high concentration of trips along the West Broad Street corridor to the Short Pump area, and along Brook Road to Virginia Center Commons. A total of 75 percent of all trips were determined to begin and end within the ¼ mile fixed-route buffer area, with the remaining 25 percent having an origin and/or destination of a trip outside of the ¼ mile fixed-route buffer area. A total of four percent of all trips had both the origin and destination outside of the ¼ mile fixed-route buffer area.

As noted in subsequent sections of this chapter, ADA passenger trips have been growing. From FY2005 through FY2009, ADA ridership has grown by 17.3 percent. However, costs have grown by 87.6 percent over this same time period – partially because ADA service hours have grown by 58.5 percent. ADA service to areas outside of the ¼ mile fixed-route buffer area is more expensive to provide than service within the buffered area. Because trips are more dispersed, there are fewer opportunities to schedule multiple passengers on the same vehicle trip, thus requiring a larger commitment of buses and bus trips.

FIGURE 3-16:

## GRTC Transit Specialized Services Origins and Destinations



Source: GRTC Transit System  
 October 2009



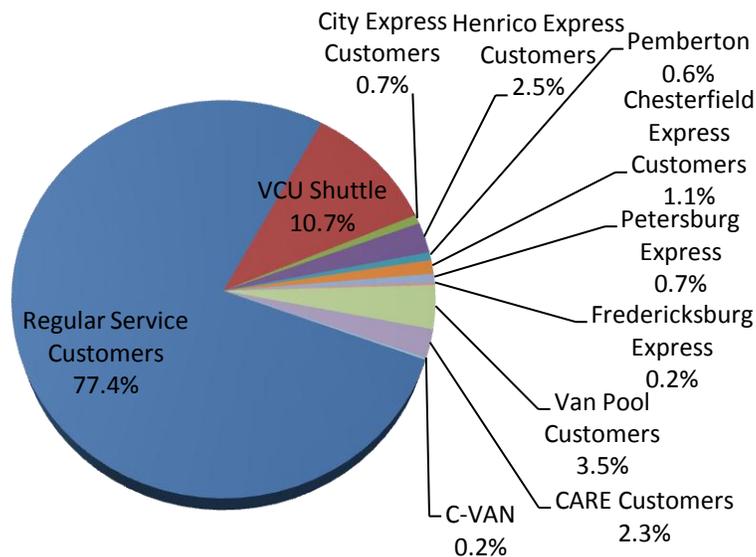
### 3.2 FARE UTILIZATION (FY2010)

The FY2010 FITS report provides a more accurate picture for use in the analysis of ridership by fare utilization or customer type. As previously noted, the GFI data lacks some level of accuracy and does not include CARE, C-VAN and other ridership associated with the various fare categories offered by GRTC. **Table 3-8** shows the FY2010 ridership as reported by GRTC in the FITS report, which includes all services provided and manual ridership counts for those routes that are underreported in the GFI data. Regular service customers make up 77.4 percent of GRTC’s total ridership, as shown in **Figure 3-17**. This is followed by 10.7 percent of the ridership attributed to VCU routes, 3.5 percent to vanpool riders, 2.5 percent to Henrico Express customers, 1.1 percent to Chesterfield Express customers and 2.3 percent to CARE customers.

**TABLE 3-8: TOTAL GRTC FY2010 RIDERSHIP (SOURCE: GRTC FY2010 FITS)**

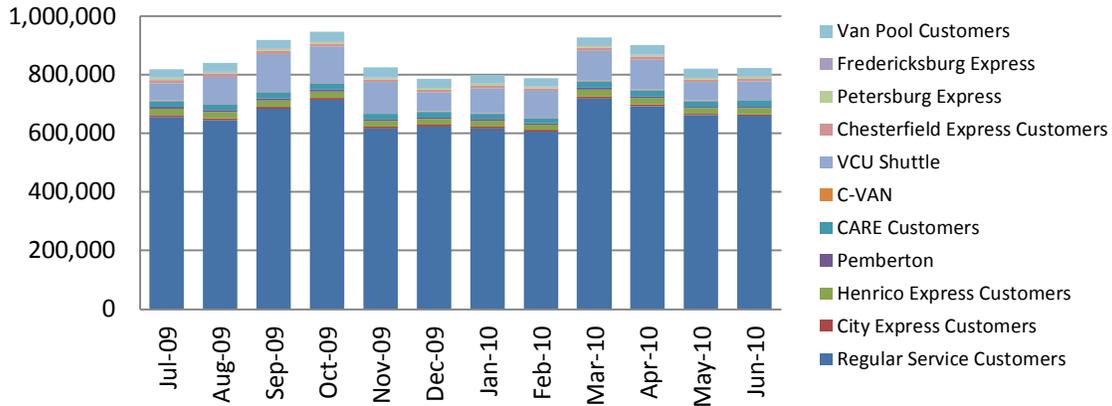
Route Type	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Total
Regular Service Customers	655,070	645,661	683,385	713,494	616,946	623,381	616,829	606,361	718,555	692,745	661,713	659,048	<b>7,893,188</b>
City Express Customers	6,287	6,210	6,352	6,562	5,786	5,684	5,980	5,455	6,727	6,169	5,228	5,757	<b>72,197</b>
Henrico Express Customers	23,419	21,775	23,115	23,001	18,888	19,535	20,344	17,540	23,929	20,852	18,424	20,489	<b>251,311</b>
Pemberton	5,609	5,575	6,453	6,425	5,349	5,556	4,884	4,737	5,679	5,864	4,425	4,605	<b>65,161</b>
CARE Customers	19,787	19,525	20,020	20,817	18,367	18,491	18,467	16,727	22,133	21,704	19,952	21,075	<b>237,065</b>
C-VAN	828	955	1,077	1,231	1,489	1,454	1,734	1,310	1,602	1,178	1,427	1,401	<b>15,686</b>
VCU Shuttle	60,248	92,913	129,910	124,278	107,463	67,110	84,242	92,408	101,638	102,663	64,002	64,003	<b>1,090,878</b>
Chesterfield Express Customers	9,646	9,716	10,265	10,074	8,470	8,215	9,988	8,739	11,122	9,862	8,852	9,479	<b>114,428</b>
Petersburg Express	6,366	6,114	6,684	6,487	5,547	5,048	5,483	5,063	6,401	5,689	5,139	5,441	<b>69,462</b>
Fredericksburg Express	1,837	1,827	1,992	1,941	1,917	1,637	1,914	1,589	2,462	2,168	1,817	2,062	<b>23,163</b>
Van Pool Customers	30,063	30,552	29,849	31,784	33,514	28,893	29,904	28,441	27,361	32,453	29,801	28,713	<b>361,328</b>
<b>TOTAL CUSTOMERS</b>	<b>819,160</b>	<b>840,823</b>	<b>919,102</b>	<b>946,094</b>	<b>823,736</b>	<b>785,004</b>	<b>799,769</b>	<b>788,370</b>	<b>927,609</b>	<b>901,347</b>	<b>820,780</b>	<b>822,073</b>	<b>10,193,867</b>

**FIGURE 3-17: PERCENTAGE OF GRTC TOTAL FY2010 RIDERSHIP BY CUSTOMER TYPE (SOURCE: GRTC FITS)**



**Figure 3-18** shows the total monthly ridership by customer type in FY2010. Much like the information presented with the GFI data above, ridership trends follow a similar pattern, with peaks in October and March.

**FIGURE 3-18: FY2010 MONTHLY RIDERSHIP BY CUSTOMER TYPE (SOURCE: GRTC FITS)**



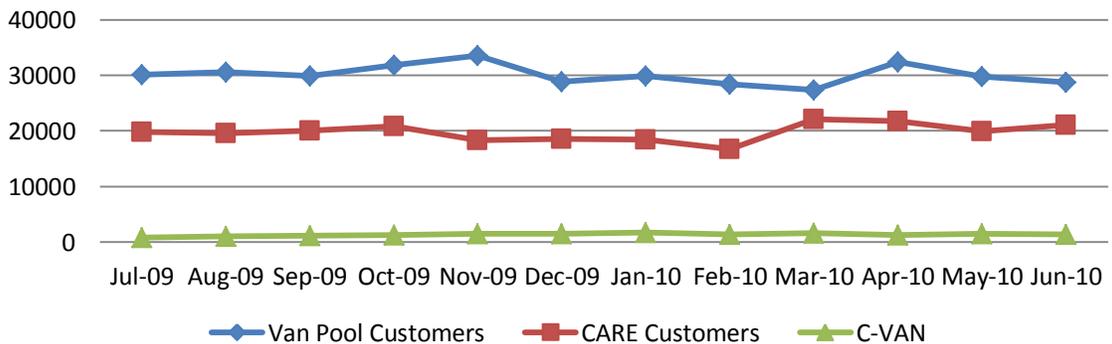
Further analysis of the express route customers by fare category reveals greater fluctuation in the Henrico Express customer ridership, which also boasts the most total express customers. The remaining express customer base remained steady, with fluctuations in winter and early spring.

**FIGURE 3-19: FY2010 TOTAL RIDERSHIP BY EXPRESS ROUTE CUSTOMERS**



A closer look at vanpool, CARE and C-VAN ridership reveals a steady ridership for C-VAN. CARE ridership increased in 2010 when it hit a peak in ridership in March after a dip in February. Vanpool ridership spiked in November 2009 and April 2010.

**FIGURE 3-20: TOTAL FY2010 RIDERSHIP FOR CARE, C-VAN AND VANPOOL CUSTOMERS (SOURCE: GRTC FITS)**



Another ridership consideration is the total number of senior/disabled customers that use the service, which equaled 663,580 in FY2010. GRTC also had a total of 2,347,458 transfers in FY2010, which is 23.0 percent of the total systemwide ridership. This includes 3.9 percent free senior transfers and 19.2 percent cash transfer customers. The performance standards identified in **Chapter 2** recognize a standard for transfers at no more than five percent systemwide. Although this measure of directness/routing is lower than the 23.0 percent of total transfers in FY2010, the FY2010 transfer percentage is consistent with FY2007 through FY2009.

### 3.3 FIVE-YEAR HISTORICAL TRENDS ANALYSIS

The following is an analysis of five-year transit evaluation measures for GRTC. Data comes from the National Transit Database (NTD) for the past five published years (2005 through 2009). The evaluation measures examined in this analysis include service effectiveness, cost effectiveness and service efficiency. Passenger trips per revenue hour and passenger trips per revenue mile are the two standards included in the service effectiveness evaluation measure, while operating cost per passenger trip, subsidy per passenger trip, and farebox recovery ratio are included as cost effectiveness measures. The service efficiency evaluation measures include operating cost per revenue hour and operating cost per revenue mile. **Table 3-9** presents GRTC’s service data for years 2005 through 2009 as reported in the NTD.

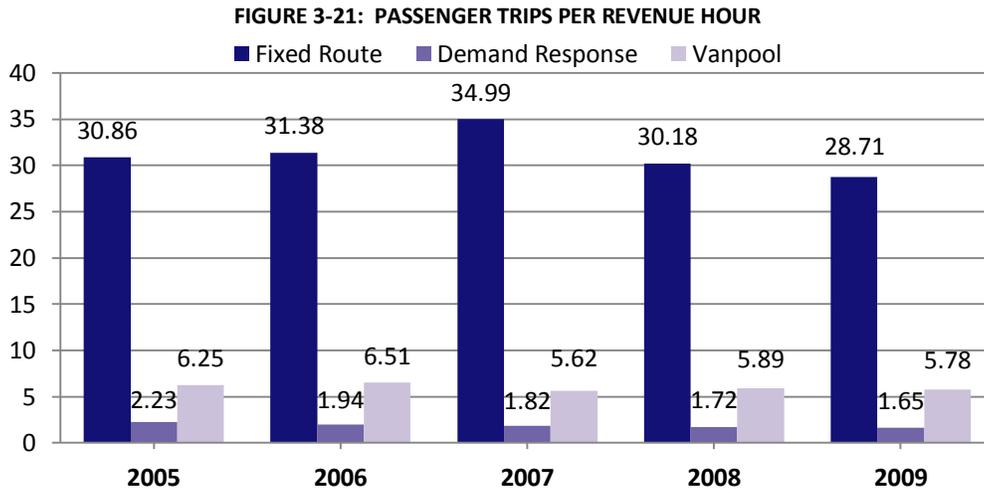
**TABLE 3-9: NTD DATA FOR FIXED-ROUTE, DEMAND RESPONSE AND VANPOOL SERVICES**

Year	Service	Passenger Trips	Revenue Hours	Revenue Miles	Operating Expense	Fare Revenues
2005	FR	12,415,055	402,243	4,480,961	\$ 27,885,019	\$ 8,854,657
	DR	197,020	88,383	1,463,415	\$ 3,394,724	\$ 476,059
	VP	150,650	24,104	1,204,676	\$ 481,263	\$ 303,398
2006	FR	13,449,342	428,640	4,744,467	\$ 30,713,769	\$ 8,718,792
	DR	211,638	108,820	1,717,269	\$ 3,408,761	\$ 470,751
	VP	163,576	25,146	1,300,988	\$ 591,665	\$ 413,313
2007	FR	14,724,023	420,861	4,794,193	\$ 34,028,915	\$ 10,071,447
	DR	212,755	116,971	1,875,160	\$ 4,149,527	\$ 474,847
	VP	201,096	35,784	1,799,028	\$ 1,162,985	\$ 924,417
2008	FR	13,595,343	450,406	5,193,891	\$ 37,071,555	\$ 10,368,092
	DR	235,631	136,907	2,195,742	\$ 5,037,830	\$ 544,955
	VP	248,490	42,168	2,226,621	\$ 1,452,812	\$ 1,165,992
2009	FR	13,232,881	460,968	5,360,851	\$ 38,827,155	\$ 9,440,006
	DR	231,113	140,059	2,584,241	\$ 6,370,142	\$ 656,224
	VP	321,045	55,590	2,949,075	\$ 1,674,341	\$ 1,288,444

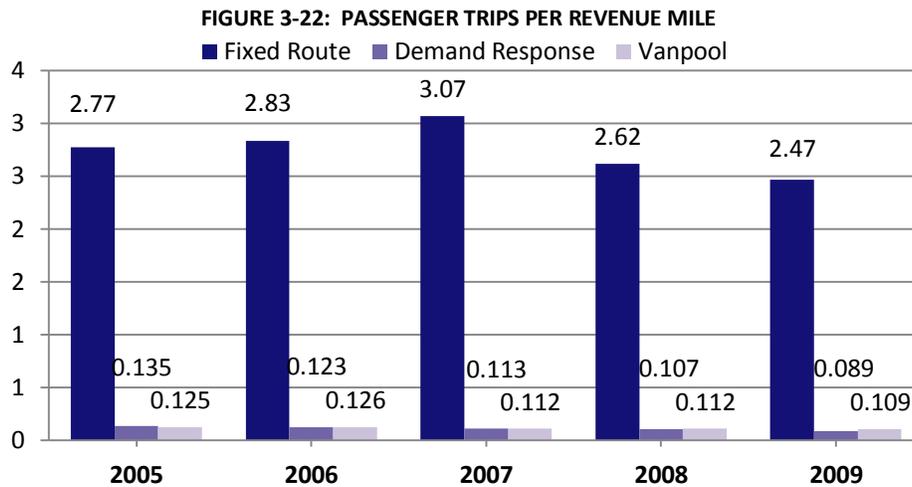
SERVICE EFFECTIVENESS

Service effectiveness is measured by both the ratio of passenger trips per revenue hour and the ratio of passenger trips per revenue mile.

**Passenger Trips per Revenue Hour:** Figure 3-21 shows a side-by-side comparison of passengers per revenue hour for GRTC fixed-route, demand response, and vanpool services. From 2005 to 2007, passenger trips per revenue hour for fixed-route service increased by 13.4 percent. However, from 2007 to 2009, the ratio decreased nearly 18 percent. Fixed-route ridership increased 18.6 percent between 2005 and 2007 but decreased 10.1 percent from 2007 to 2009. Except for 2007, fixed-route revenue hours increased every year and rose 14.6 percent between 2005 and 2007. Demand response passenger trips per hour have decreased every year between 2005 and 2009 with a decrease of 26 percent since 2005. GRTC’s vanpool trips per revenue hour had both increases and decreases from 2005 to 2009 but saw an average decrease of 7.6 percent.



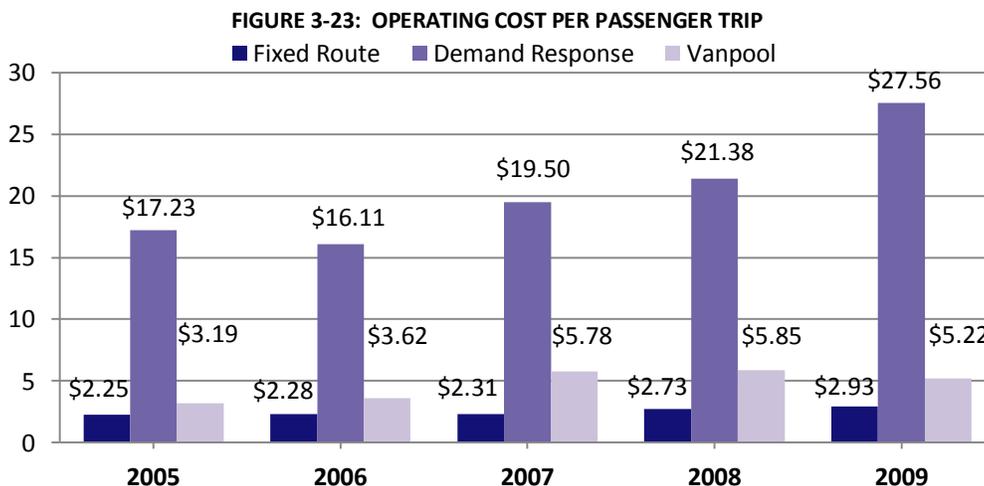
**Passenger Trips per Revenue Mile:** Figure 3-22 presents a side-by-side comparison of passenger trips per revenue mile for GRTC services. The number of fixed-route trips per revenue mile mirrored fixed-route passenger trips per revenue hour. Between 2005 and 2007, fixed-route trips per revenue mile increased nearly 11 percent, but between 2007 and 2009, this effectiveness measure decreased 19.6 percent. Fixed-route revenue miles increased every year between 2005 and 2009 for a total of 19.6 percent. A decrease in ridership likely influenced the drop in trips per revenue mile as it did the trips per revenue hour. Demand response trips per revenue mile decreased every year during this time with an overall decrease of 33.6 percent. Vanpool trips per revenue mile had similar ups and downs with an overall decrease of 12.9 percent from 2005 to 2009. Vanpool ridership, revenue hours and miles have more than doubled from 2005 to 2009, and vanpool revenue miles are more than eight times higher than number of trips.



### COST EFFECTIVENESS

Cost effectiveness measures include operating cost per passenger trip, subsidy per passenger trip and farebox recovery ratio.

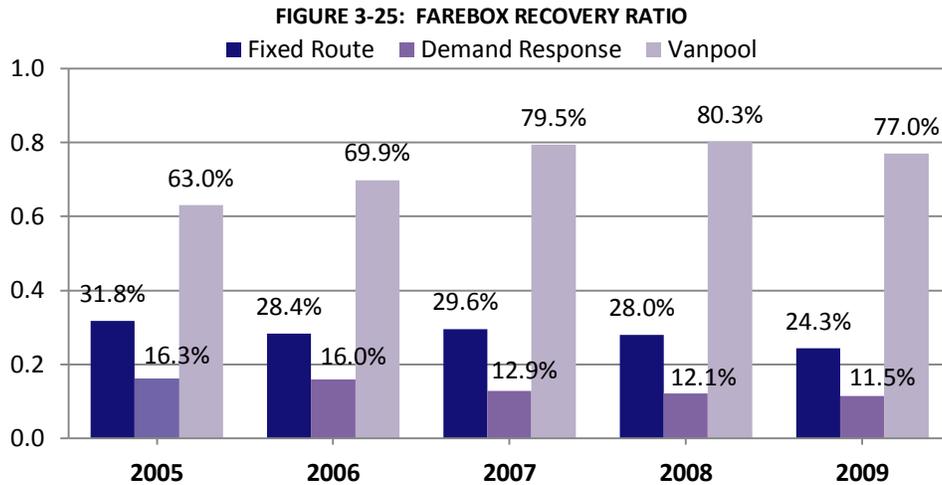
**Operating Cost per Passenger Trip:** The ratio of operating costs per passenger trip reveals how effectively the agency is providing the service. As shown in **Figure 3-23**, GRTC’s fixed-route operating cost per passenger trip increased by 30.6 percent, from \$2.25 to \$2.93 between 2005 and 2009. Although costs have increased, a steady increase in ridership kept this ratio relatively stable from 2005 to 2007. Between 2007 and 2009, while fixed-route ridership decreased 10.1 percent, the cost per passenger trip increased by 27 percent. From 2005 to 2009, fixed-route operating costs increased 39.2 percent. Demand response cost per passenger trip has increased almost every year between 2005 and 2009, from \$17.23 to \$27.56. This is a 60 percent increase, with the largest increases in the past three years. Vanpool costs per trip saw a peak in 2007 with a total increase of 63.3 percent. Operating cost increases for demand response service from 2005 to 2009 was 87.6 percent and nearly 250 percent for vanpool service.



**Subsidy per Passenger Trip:** This measures the true cost of a passenger trip to GRTC. This is the amount per passenger for which GRTC must seek alternate funding from national, state or local sources. The subsidy is estimated as the operating cost minus the fare revenue, as reported to the NTD. The subsidy per passenger trip for fixed-route service saw increases every year but 2007 and had an overall increase of nearly 70 cents or 45 percent. Demand response subsidy per trip from 2005 to 2009 rose nearly \$10 or 67 percent to \$24.72 per trip in FY2009. Vanpool service during the same period had variable increases and decreases with a total 1.8 increase. **Figure 3-24** shows a comparison of the subsidy per passenger trip estimates for GRTC services from 2005 to 2009.



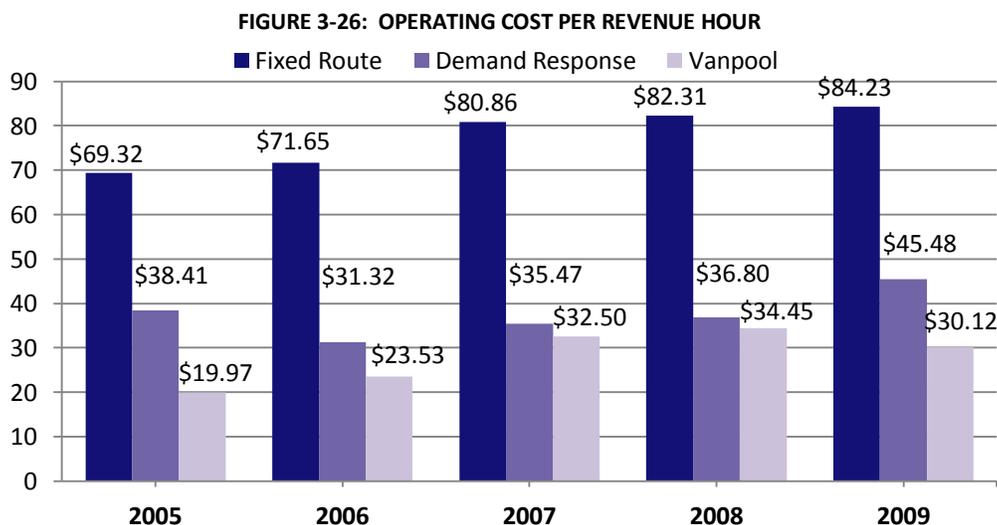
**Farebox Recovery Ratio:** The farebox recovery ratio provides further insight on how much of the operating costs are covered by the fares collected. GRTC’s performance standards identify a systemwide farebox recovery ratio goal of 28 percent, and a “successful” route to be over 24 percent. Over the past five years, GRTC’s fixed-route farebox recovery ratio declined from a high of 32 percent in FY2005 to a low of 24 percent, as shown in **Figure 3-25**. This is within the parameters identified for successful routes in **Chapter 2** of this TDP. A fare increase in 2010 will likely result in an improvement in the farebox recovery ratio. Demand response service has also seen a decline in farebox recovery from a high of 16.3 percent in FY2005 to a low of 11.5 percent in FY2009. Vanpool farebox recovery has improved to 77 percent in FY2009.



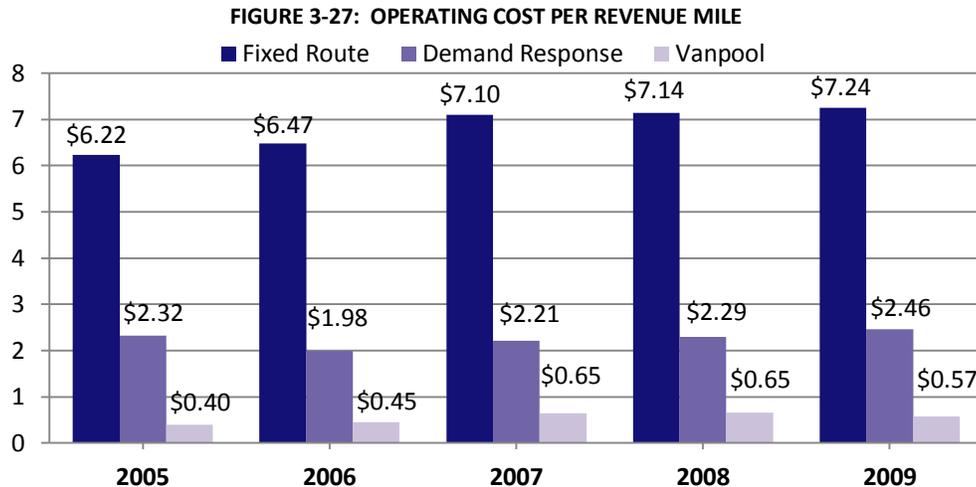
**SERVICE EFFICIENCY**

The ratios of operating costs per revenue hour and revenue mile provide an overview of how efficiently the agency is operating. **Figure 3-26** shows the operating costs per revenue hour for all GRTC services for the years 2005 to 2009, and **Figure 3-27** shows operating costs per revenue mile for all services.

**Operating Cost per Revenue Hour:** From 2005 to 2007, the cost per revenue hour for fixed-route service increased 16.6 percent and overall 21.5 percent. In 2009, the cost per revenue hour was \$84.23. Fixed-route operating costs from 2005 to 2007 increased 22 percent and 39.2 percent between 2005 and 2009. Fixed-route revenue hours did not increase as briskly—4.6 percent for 2005 through 2007 and 14.6 percent from 2005 to 2009—leading to increasing costs per hour. Demand response operating cost per hour had an 18.4 percent decrease in 2007 but increased every year onward for a total increase of 18.4 percent from 2005 to 2009. Vanpool operating cost per revenue hour increased every year except for in 2009 for a total increase of 51 percent during this period. As stated previously, operating costs for vanpool operations rose 250 percent from 2005 to 2009 with the largest increases from 2005 to 2008.



**Operating Costs per Revenue Mile:** Figure 3-27 shows operating costs per revenue mile, which exhibited similar trends as costs per hour. For fixed-route service, cost per revenue mile followed nearly lockstep per year and had a total increase of 16.4 percent. Demand response operating cost per mile was also very similar with a total increase of 6.3 percent. Revenue miles for demand response service rose 76.6 percent from 2005 to 2009. Vanpool operating cost per mile had similar peaks and valleys as cost per hour with a 17 cent or 42.1 percent increase from 2005 to 2009. Vanpool revenue miles have increased 145 percent during the past five years.



### 3.4 PEER SYSTEM REVIEW

The following section summarizes key findings from a peer review of GRTC’s system compared to peer transit agencies. The peer analysis includes six sections:

- Section 1 provides an overview of the Peer Selection Process;
- Section 2 describes the process used to select the GRTC peer transit systems;
- Section 3 provides an overview of the peer systems’ service area characteristics, services provided, fare structure, revenue hours and miles, passenger trips, and O&M and capital budgets;
- Section 4 provides detailed comparisons of service productivity measures, specifically vehicle utilization, service supply, service productivity, cost efficiency, and vehicle maintenance performance;
- Section 5 analyzes financial characteristics, highlighting the revenue sources used by GRTC and its peers to fund O&M and capital costs; and
- Section 6 summarizes the key findings of the peer analysis.

The complete peer analysis is provided in **Appendix B**. This section provides a summary of the key findings identified in the analysis.

### PEER SELECTION PROCESS

This peer analysis identifies peer systems that have similar operational size, service area size, and service area population. While the peer analysis does not capture all of the unique characteristics found in Richmond, it does provide a basis for comparison to evaluate the performance of the system. A two-step peer selection process was used. Primary screening criteria included the service area size, service area population, service area population density, peak vehicles (bus and demand response), revenue miles (bus and demand response), revenue hours (bus and demand response), and passenger trips (bus and demand response). Secondary screening criteria focused on unique characteristics of Richmond that may be applied to the peers. These criteria included capital cities with similar climate characteristics and population densities, and agencies that operate both demand response and fixed-route bus service.

Numerous transit systems were reviewed to determine the best peer group for GRTC. For this analysis, eight systems were chosen for the final peer list, as shown in **Table 3-10**. Cities with transit systems that were identified as potential peers but not chosen for the final analysis include Albany, NY; Hartford, CT; Austin, TX; and Lansing, MI.

**TABLE 3-10: FINAL PEER LIST**

Agency Name	City	Service Area Population	Service Area Size (sq. mi.)	Population Density	Peak Vehicles		
					Total	Bus	DR
Indianapolis and Marion County Public Transportation (IndyGo)	Indianapolis, IN	791,926	373	2,123	195	127	68
Hillsborough Area Regional Transit (HART)	Tampa, FL	821,306	243	3,380	189	159	30
Memphis Area Transit Authority (MATA)	Memphis, TN	888,627	288	3,086	179	135	44
Metro Transit System (Metro)	Madison, WI	245,181	72	3,405	183	167	16
City of Tucson (Sun Tran)	Tucson, AZ	544,000	230	2,365	269	170	99
Charlotte Area Transit System (CATS)	Charlotte, NC	758,927	445	1,705	357	286	71
Greater Dayton Regional Transit Authority (GDRTA)	Dayton, OH	559,062	274	2,040	177	95	82
Jacksonville Transportation Authority (JTA)	Jacksonville, FL	827,453	242	3,419	277	182	95

## PEER REVIEW KEY FINDINGS

The peer analysis provides performance measures compared across eight peer systems that can be used by GRTC to gauge where there may be deficiencies and where improvements could be warranted. Key findings from this analysis are summarized below.

- *Vehicle Utilization:* GRTC has a fixed-route fleet that is nine percent smaller than the peer average and uses 13 percent fewer peak fixed-route vehicles. GRTC’s demand response fleet is nearly ten percent larger than the peer average, but uses only one more peak demand response vehicle (63 versus 62). For revenue hours per peak vehicle, GRTC is slightly above the peer average for fixed-route service and 19 percent below the peer average for demand response service. This trend is reversed with respect to revenue miles per peak vehicle with GRTC falling 18 percent below the peer average for fixed-route service and slightly above the peer average for demand response service.
- *Service Supplied:* GRTC has higher than average revenue hours and miles per service area population. GRTC’s revenue hours and miles per square mile are similar to the peer averages at three percent above and six percent below, respectively. This indicates that GRTC is providing adequate service within its existing service area as compared to its peers.
- *Service Productivity:* GRTC has higher than average passenger trips per service area population (by 51 percent), per revenue hour (by 14 percent), and per revenue mile (by 27 percent). For demand response service only, GRTC was slightly below the peer average for passenger trips per revenue hour and mile (by six percent and 18 percent, respectively).
- *Cost Efficiency:* GRTC was more efficient than the peer average in terms of operating cost per passenger trip (two percent), per revenue hour (14 percent), and per revenue mile (six percent).

## 3.5 ONBOARD SURVEY

An on-board survey of GRTC passengers was conducted in the fall of 2009. The survey was initiated to collect existing transit travel pattern data to serve as the basis for developing ridership forecasts for the Broad Street Corridor Rapid Transit Study. The information collected from the survey is also useful for GRTC’s Transit Development Plan (TDP). The survey is recent and meets state requirements for a TDP; therefore, a new rider survey specifically for the TDP was not warranted. This section of the TDP summarizes the methodology and key findings from the onboard survey. **Appendix C** provides a thorough analysis of the routes.

Over 50 percent of GRTC’s fixed-route service was surveyed, including local, express, and VCU routes. A total of 4,493 surveys were completed and entered into the master database. This response well exceeded the initial goal of 3,000 surveys and represents approximately 28 percent of the riders present on surveyed routes. Expansion factors were applied to the survey results to represent total system ridership in a manner that attempts to eliminate biases in the responses. The summary of results presented below is based on the expanded responses with blank responses excluded.

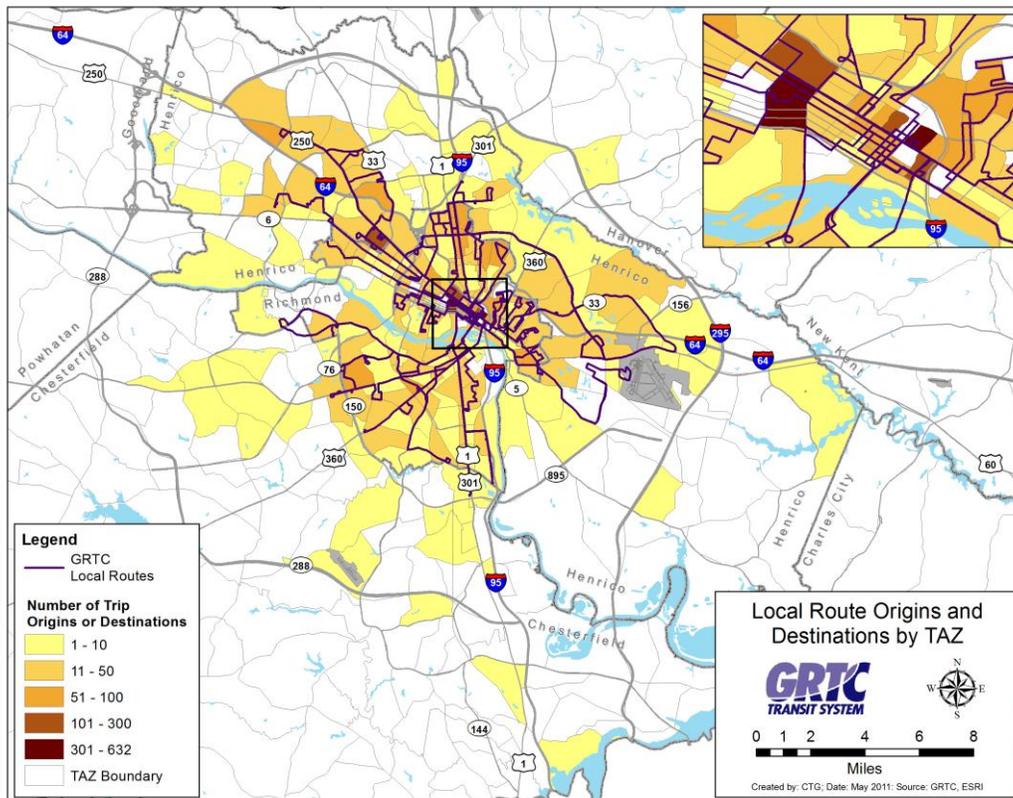
Section 1 of the survey asked riders to provide information about their one-way trip, including origin and destination, mode of access to and from bus stops, whether their trip involved any transfers, and how often they ride GRTC. Results from Section 1 are summarized as follows:

- Overall, most trips began and ended at work or home. On VCU routes, most trips began and ended at college/university.
- Most riders walk to their first bus stop (81.2%) and from their last bus stop to their destination (87.3%). Express route riders are most likely to drive and park a car to access the bus.
- Overall, 18.4 percent of riders transferred from another route and 18.5 percent transferred to another route. Approximately 98 percent of these transfers occurred on local routes, and Route 6 was indicated most often as the route from and to which passengers transferred.
- GRTC has a large population of loyal riders, as evidenced by the 71.4 percent of riders who use GRTC service four or more days per week.

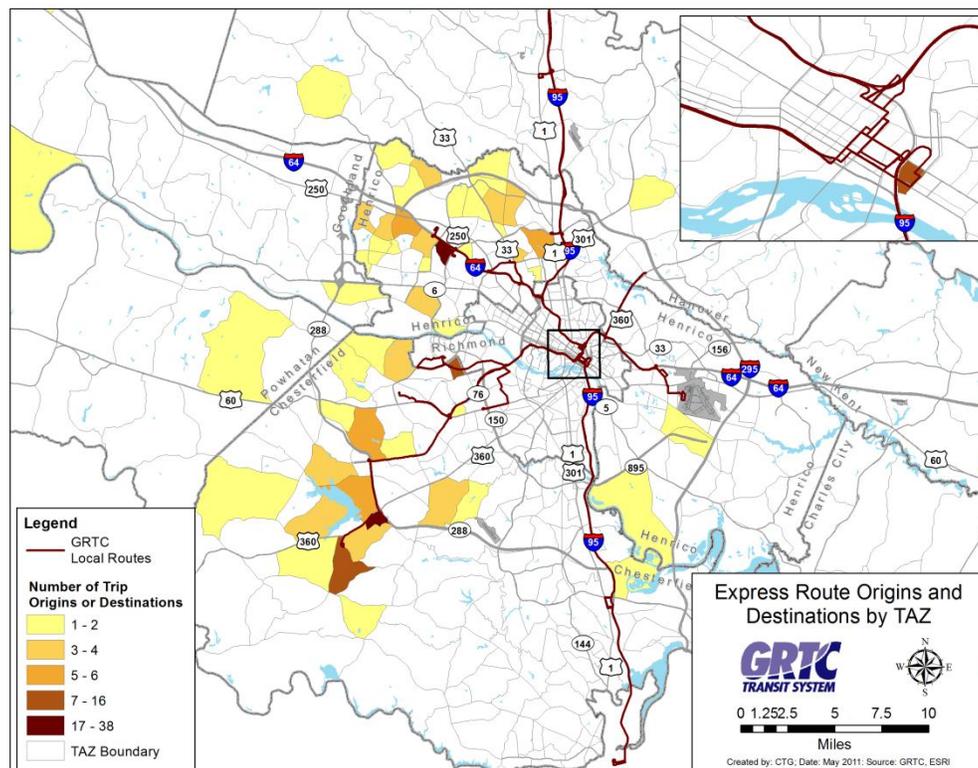
Survey respondents were asked their boarding, alighting, origin and destination addresses, which were geocoded using the online geocoding website [www.batchgeocode.com](http://www.batchgeocode.com). Of the 4,493 surveys that were entered into the survey database, geocodable locations were obtained for 4,277 trip origins (95.2% of total) and 4,097 trip destinations (91.2% of total). The origins and destinations were grouped by TAZ and mapped to provide a graphic representation of areas that have the most origins and destination for transit trips. **Figures 3-28, 3-29 and 3-30** present the total number of origins and destinations by TAZ for local, express, and VCU routes, respectively.

- As shown in **Figure 3-28**, local route origins and destinations are spread throughout the City of Richmond with the highest numbers concentrated in the downtown area. There are many TAZs in the northern and eastern portions of Chesterfield County where surveyed GRTC riders began or ended their trips, but where no current GRTC routes are provided. This indicates there is a market for transit in these areas where riders have to find a way into Richmond to access GRTC routes. Similarly, there are several TAZs in western Henrico County where surveyed GRTC riders began or ended their trips, but where no current GRTC routes are provided.
- **Figure 3-29** shows that most of the surveyed express route riders began their trips in the western portions of Henrico and Chesterfield Counties and traveled to Downtown Richmond. Express routes were surveyed in the AM only, but it is assumed the origins and destinations would be reversed in the PM.
- As would be expected, the vast majority of VCU route riders began and ended their trips in the TAZs around the VCU campus, as shown in **Figure 3-30**.

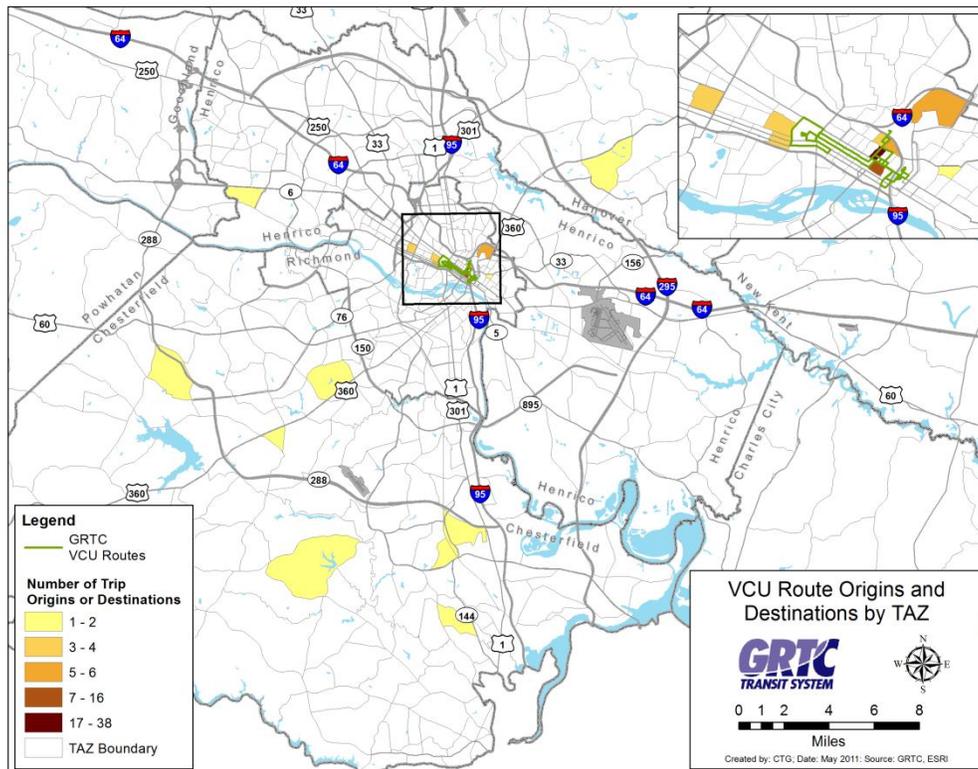
**FIGURE 3-28: ON-BOARD SURVEY LOCAL ROUTE ORIGINS AND DESTINATIONS BY TAZ**



**FIGURE 3-29: ON-BOARD SURVEY EXPRESS ROUTE ORIGINS AND DESTINATIONS BY TAZ**



**FIGURE 3-30: ON-BOARD SURVEY VCU ORIGINS AND DESTINATIONS BY TAZ**



Section II of the survey asked riders to provide demographic information, including the number of vehicles in their household, age, gender, annual household income, and whether they have a valid driver’s license. Results from Section II are summarized as follows:

- Nearly half of all GRTC riders do not have access to a vehicle. Most of these riders use local routes; only 4.1 percent of express riders have no access to a vehicle.
- Overall, most (87.7%) GRTC riders are under age 55 with 30.6 percent between the ages of 16 and 24. Express route riders are generally older while VCU riders are generally younger. Local route riders are more evenly distributed among the age groups.
- Half of all GRTC riders have a valid driver’s license. Those without a driver’s license generally ride local routes. Over 90 percent of express and VCU riders have a valid driver’s license.
- Female riders make up 60 percent of GRTC riders.
- Overall, 41 percent of GRTC riders have annual household incomes of less than \$15,000. Riders on express routes are generally at the higher end of the income range, while riders on local and VCU routes are generally at the lower end of the range.

## 3.6 PUBLIC OUTREACH EFFORTS

Public outreach efforts for this TDP include group presentations and individual interviews with key stakeholders throughout the region. The following summarizes the outreach efforts utilized to solicit input from the community about transit service and facility needs.

### GRTC STAFF MEETINGS

The consultant team conducted a project kickoff meeting with GRTC staff to identify priorities for the TDP. Representatives from GRTC and CARE/C-VAN were in attendance. A second staff meeting to further glean input on needs was held in May. In addition, GRTC’s planning department attended a project advisory committee meeting in May.

### PROJECT ADVISORY COMMITTEE

A project advisory committee was formed with representatives from City of Richmond (Viktoria Badger), VCU (Paul Walker), and Henrico County (Todd Eure), and an advocate for persons with disabilities (Ed Turner). A series of three meetings were scheduled for the group to meet. The first meeting on April 7 introduced the members to the TDP process and began identifying needs and areas of focus for the TDP. A second meeting on May 18 presented findings from the first three chapters of analysis and further refined the needs and priorities for the six-year TDP. A third meeting at the end of the process in August presented the draft TDP findings to the group.

### OUTREACH PRESENTATIONS

The consultant team held a series of outreach presentations in May to present the purpose of the TDP and gather input on service and facility needs from key stakeholder groups. These presentations included the GRTC Board of Directors meeting on May 17, 2011; the CARE Advisory Committee on May 17, 2011; and the Richmond Area Metropolitan Planning Organization (RAMPO) Technical Advisory Committee on May 19, 2011. This group includes representatives from municipalities throughout the region including Town of Ashland, Charles City County, Chesterfield County, Goochland County, Hanover County, Henrico County, New Kent County, Powhatan County, City of Richmond, Capital Region Airport Commission, GRTC, Richmond Metropolitan Authority, Richmond Regional PDC, RideFinders, Inc., VDRPT, and VDOT.

### STAKEHOLDER INTERVIEWS

In addition to committee presentations, the public outreach efforts included individual interviews with various representatives from advocacy groups, universities, employers and jurisdictions throughout the Richmond Region. Stakeholder Interviews were held with:

- Nora Amos – Town of Ashland
- Thomas Hollis – J Sargeant Reynolds
- Fred Taylor - John Tyler Community College
- Kim Scheeler - Chamber of Commerce
- Barb Smith – Transportation Department, Chesterfield County
- Dawn Missory and Frank Vance – Mental Health Support Services, Chesterfield County
- Gloria Myers - Better Housing Coalition

- Robin Metcalf - The Choice Group

#### SUMMARY OF OUTREACH EFFORTS

The following summarizes key findings from the outreach efforts with all of the stakeholders. **Appendix D** provides notes from each individual interview.

#### GRTC LOCAL/EXPRESS/VCU SERVICE

Stakeholders expressed a need for later service and extended weekend service to accommodate work schedules that do not typically fall in the 9 to 5 range. CARE stakeholders expressed a desire for more frequent service. Stakeholders also expressed a desire for regular clock headways. Local fixed-route service needs include cross connector routes that do not travel into downtown. Additionally, new service options, such as deviated fixed-route, should be considered for areas that may not have the density for fixed-route service, but show a need for transit. Express service to Chesterfield is an important service, and the need still exists for service to Ashland and Fredericksburg. Areas identified for expanded service included Henrico County toward Short Pump and Innsbrook; Chesterfield County, and Hanover County. Express service to VCU was also identified as a need. Stakeholders also expressed an interest in making GRTC a regional service.

#### CARE/C-VAN SERVICE

CARE/C-VAN stakeholders expressed a need for later service. Expanded areas in need of service include Chesterfield County and Hanover County. CARE/C-VAN is a vital service to the community. A need for better more efficient scheduling was a common concern. Additionally, stakeholders expressed a need for easier access to customer service representatives and dispatch with better communication for those calling in to schedule a ride or check the status of their pickup. On-time performance was also a concern, as riders rely on service to reach their job and medical treatments that have strict time requirements. Finally, stakeholders expressed a need for more flexibility in making and maintaining regularly scheduled trips.

#### FLEET & FACILITIES

Stakeholders expressed the need for a downtown transfer center to better manage buses coming into downtown. Additional transfer hubs should be identified outside of downtown to allow cross county connections. A program to change GRTC's entire fleet of buses to Compressed Natural Gas (CNG) will include the purchase of new vehicles throughout the timeframe of the TDP. This will require modifications to the existing GRTC facility. Finally, stakeholders continue to support the need for the Broad Street BRT.

#### TRANSFER LOCATIONS

Stakeholders expressed a need for bus route and schedule information to be included on all bus stop signs. GRTC will be placing real time bus information at major bus stops throughout the service area during the timeframe of this TDP. Additionally, park-and-ride facilities are needed New Kent County and in Chester, where the current park-and-ride is located on the John Tyler Community College campus.

#### SCHEDULES & INFORMATION

Stakeholders expressed a desire to have easier to read schedules and system maps. A need for various transit passes was expressed, including a student pass for students at the various colleges and universities throughout the service area. Stakeholders also expressed the need to partner with businesses and other community representatives to promote riding transit.

#### TECHNOLOGY

Stakeholders expressed the need for GRTC to continue to maximize the use of technology to run more efficiently. Implementing real time technology for customers to access using smart phones was mentioned as a need.

### 3.7 FACILITIES AND EQUIPMENT

#### FACILITIES

As described in **Chapter 1**, GRTC moved into a new corporate headquarters facility in 2010, which they own, at 301 East Belt Boulevard in Richmond. The 12-acre site accommodates outdoor bus storage, a three-story 26,600-square foot administration building, and an adjacent two-story 100,600-square foot maintenance building. The maintenance building includes fueling lanes, automatic bus washers, maintenance bays, and a body shop. The facility has a state of the art data center to transfer and receive data from the GRTC fleet. GRTC leases a facility located at 5115 Commerce Road in Richmond for its paratransit operations. GRTC is working consolidate all operations at the new corporate headquarters facility by the fall of 2011.

Currently, GRTC does not have a transfer center in Downtown Richmond. Traffic congestion and multiple transfer locations throughout the downtown area result in bottlenecks and travel time delays. GRTC has been working with the City of Richmond and DRPT to identify a viable transfer center for the system.

The Broad Street BRT corridor would bring Bus Rapid Transit (BRT) on Broad Street from Willow Lawn Mall to Downtown Richmond and Rockett’s Landing. Included in the study are various transfer points along the corridor. This project is anticipated to begin during the timeframe of this TDP.

GRTC currently has stops at 11 park-and-ride lots throughout the service area; however, they do not own or lease any of these lots. The lots are either privately owned and shared, or publicly owned by VDOT or a municipality.

#### FLEET

GRTC’s fixed-route fleet includes 166 vehicles – 151 standard buses, seven cutaway buses and eight mini-buses, as described in **Chapter 1**. The majority of the fixed-route fleet consists of 40-foot diesel buses. GRTC also has eight vehicles (all 35-foot buses) in contingency status. Six fixed-route buses (all 40’) are scheduled for replacement in FY2012. GRTC’s paratransit and special transportation fleet consists of 75 cutaway buses, each with a seating capacity of 11 or 12 passengers. Twenty of GRTC’s special transportation vehicles are scheduled for replacement in FY2012. GRTC also maintains a non-revenue fleet of 28 vehicles, including sedans, sport utility vehicles (SUV), minivans, light trucks and

heavy trucks. These vehicles are used for administrative/operations staff support and are not used to provide transit service. GRTC is currently considering replacing its entire revenue fleet with CNG fuel vehicles. This would impact the vehicle replacement schedule during the timeframe of this TDP.

**Table 3-11** lists the spare ratio for the GRTC fleet. Both the fixed-route and vanpool services have seen nearly 10 percent increases in their spare ratios over the past 5 years. The demand response spare ratio has seen a more than 15 percent decrease in its spare ratio during the same time.

**TABLE 3-11: SPARE RATIO OF GRTC FLEET BY YEAR**

Year	Fixed Route	Demand Response	Vanpool
<b>2005</b>	17%	35%	5%
<b>2006</b>	22%	20%	9%
<b>2007</b>	25%	18%	9%
<b>2008</b>	23%	10%	7%
<b>2009</b>	26%	19%	14%

The useful service life for GRTC buses is 12 years, 10 years for mini-buses, and 4-5 years for cutaways and support vehicles. 120 fixed-route revenue vehicles will be due for replacement during the six-year TDP timeframe from FY2012 to FY2017. GRTC’s entire paratransit fleet will be due for replacement during the timeframe of the TDP. There are 40 40’ vehicles in GRTC’s regular fleet due for replacement in FY2012. The fleet age would drop from seven years to 4.7 years with this replacement. **Figure 3-31 and 3-32** illustrate the years in service and expected remaining years of service for GRTC’s fixed-route service vehicles, while **Figure 3-33** shows the same information for GRTC’s special service vehicles.

FIGURE 3-31: USEFUL LIFE OF GRTC REGULAR SERVICE VEHICLES

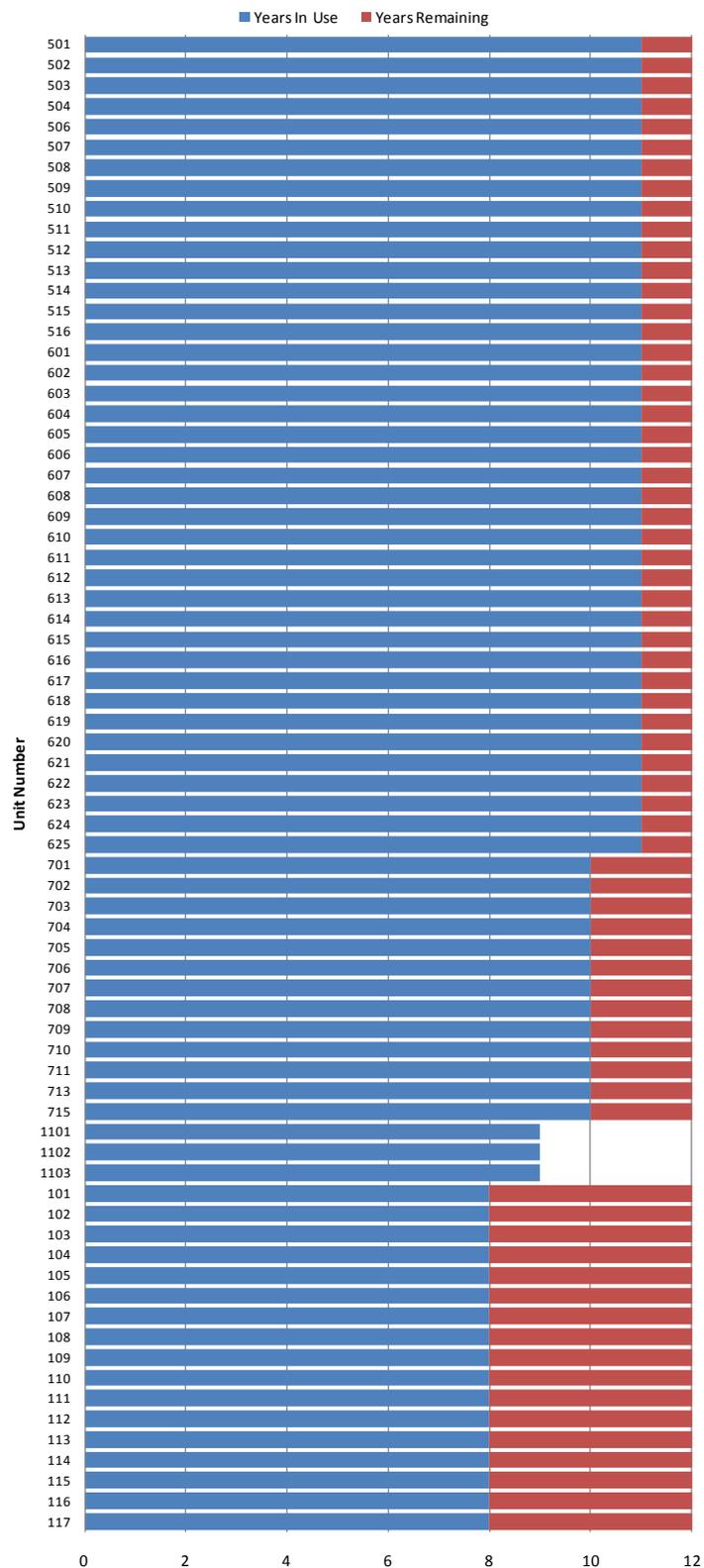
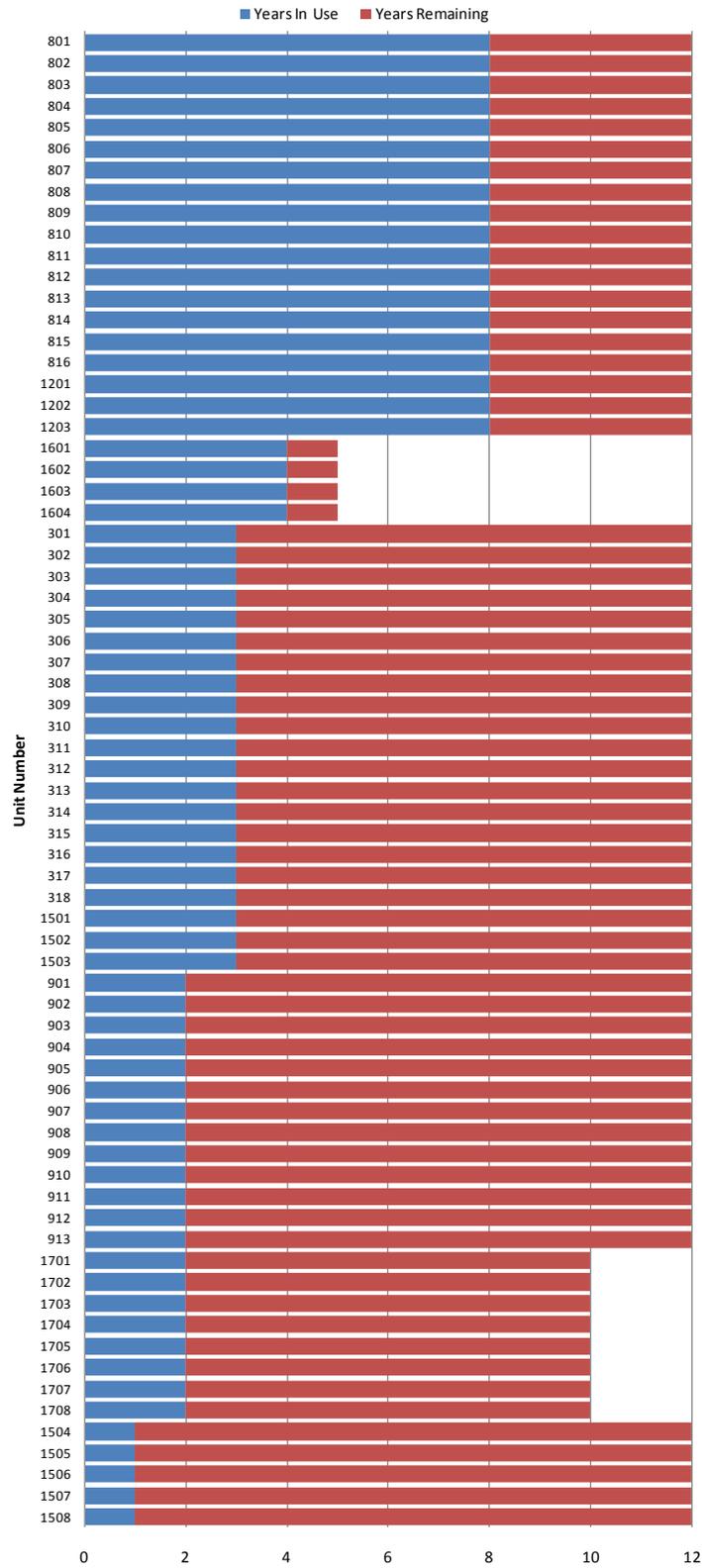
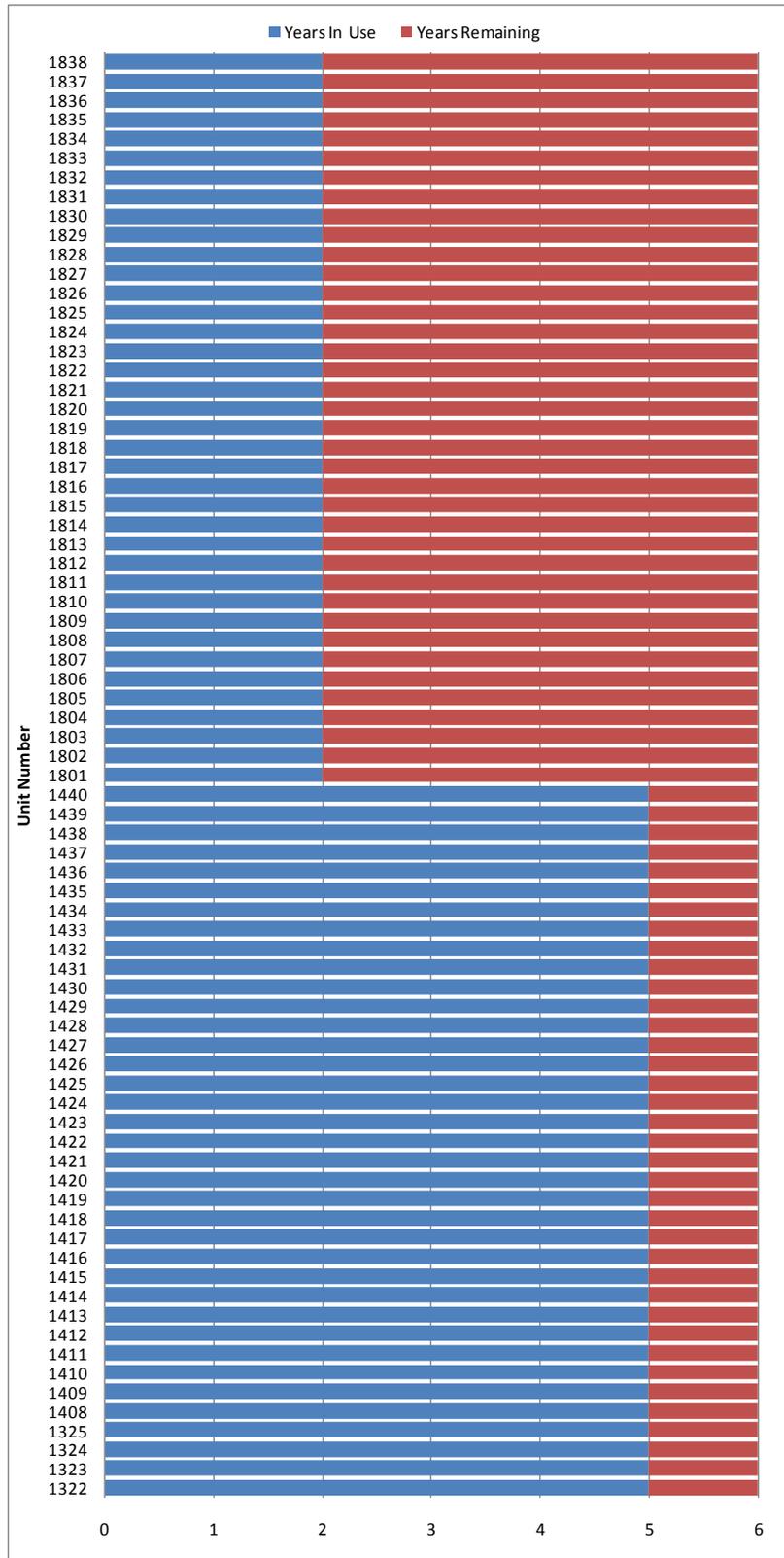


FIGURE 3-32: USEFUL LIFE OF GRTC REGULAR SERVICE VEHICLES (CONTINUED)



**FIGURE 3-33: USEFUL LIFE OF GRTC SPECIAL SERVICE VEHICLES**



### 3.8 INTELLIGENT TRANSPORTATION SYSTEMS

GRTC recently completed its Advanced Communications Project with included ITS solutions including: Computer Aided Dispatch/Automatic Vehicle Locators (CAD/AVL), Advanced Vehicle Monitoring (AVM), Passenger Counters (APC), Voice Annunciation, Internal Visual Signs, and stop level bus arrival signs. The CARE/C-VAN service will be implementing new technology that will allow for better trip scheduling and routing.

GRTC's new facility includes a data center that supports Wide Area Application Services for data optimizations to its satellite facilities and a wireless LAN controller to transfer and receive data from the GRTC fleet.

### 3.9 TITLE VI REPORT AND FEDERAL TRANSIT ADMINISTRATION TRIENNIAL REVIEW

#### TITLE VI REPORT

GRTC's last program update was submitted March 9, 2011. The next review is due April 8, 2014 with document submission to FTA due the month prior.

GRTC conducted an assessment of its level of service and quality of service from FY2008 to FY2009. To gauge level of service provided to its customers, GRTC examined five transit indicators adopted by FTA: vehicle load, vehicle assignments, vehicle headways, distribution of transit amenities, and transit access. GRTC fixed-route service covers the City of Richmond and Henrico County with a total population of 342,810. The total minority population in this area is 73.3 percent of the total, thus the threshold for a minority area is any area above this percentage. Routes serving such areas were examined in this analysis.

Quality of service was measured through an origin and destination analysis as well as a rider survey conducted by GRTC staff. Quality of service criteria includes distance to destination, number of transfers, and total cost of trip. Distance is measured by number of crossed sectors, with an average of 1.9. The distance traveled for minority origins is 1.8, while distance traveled for non-minority origins is 2.0. The average trip cost from minority origins is \$1.31 and \$1.32 for non-minority origins. On average, 42 percent of trips from minority origins require a transfer while 37 percent of non-minority origins require one. GRTC staff did not find a significant difference between minority and non-minority outcomes. The rider survey collected rider satisfaction in eight aspects of service: cleanliness, temperature, on-time performance/reliability, schedule, driver friendliness/helpfulness, customer service via phone and web, customer notices/announcements, and cost of bus fare. GRTC staff found responses were favorable overall with small differences between minority and non-minority responses.

The following is a summary of GRTC's level of service findings. **Appendix E** includes GRTC's current Title VI report at the time this TDP was written.

**Vehicle Load:** Vehicle loads were examined during AM and PM peak, midday, and night periods as well as Saturday and Sunday service periods. GRTC found during the nine-month period of analysis no route exceeded its vehicle load standards.

**Vehicle Assignments:** GRTC assigns vehicles based on rider volume, street size restrictions, and vehicle age. GRTC determined the average fleet age was 7.4 years, the average vehicle age for vehicles assigned to the non-minority Route 16 was 11.1 years and the average vehicle age assigned to minority routes was 6.9 years. GRTC found no areas of concern for vehicle assignments.

**Vehicle Headways:** GRTC routes have headways that conform to time of day, ridership and peak period times. GRTC found Routes 11, 13, and 19 do not conform to its headway standards due to low ridership but found no areas of concern for Title VI reasons.

**Distribution of Transit Amenities:** GRTC has placement guidelines for shelters, benches, and trash cans. GRTC endeavors to place benches and trash cans at stops with more than 100 weekly boardings, and shelters at stops with more than 400 weekly boardings. GRTC staff found that of its bench, shelter and trash can inventory, the majority (greater than 60%) are located in minority areas and as such found no areas of concern for Title VI reasons.

**Transit Access:** GRTC staff analyzed its provision of transit by distance to service and by population density and employment density; areas of higher density should be closer to transit. GRTC staff found no areas of concern with regards to Title VI reasons.

#### FEDERAL TRANSIT ADMINISTRATION’S TRIENNIAL REVIEW

GRTC completed a Triennial Review in FY2010, with all findings closed in August 2010. The Triennial Review covered 24 compliance areas. No deficiencies were found in 20 of 24 areas. Deficiencies were found in four areas: Technical, Satisfactory Continuing Control, Maintenance, and Half Fare Program. GRTC posted corrective language regarding the Half Fare program on its website and assured FTA that all public information for the Half Fare Program would be changed with the next reprinting and publishing to include language clarifying the Half Fare Program for Medicare cardholders. Prior to the final report, GRTC provided documentation that closed findings in Technical and Satisfactory Continuing Control. Corrective documentation for Maintenance was provided in October 2010 and closed the finding. The Triennial Review Final Report and Closeout Letter can be found in **Appendix F**.

### 3.10 SERVICE AREA COVERAGE

This section describes the service coverage GRTC provides to residents, workers and visitors throughout the region using population, household and employment estimates provided by the Richmond Area Metropolitan Planning Organization (RAMPO) for 2008 and 2035 based on Traffic Analysis Zones (TAZs). Service coverage includes access to local fixed-route service as well as density surrounding the transit service. While traditionally ¼ mile radius is considered accessible for someone traveling by foot to reach a bus stop, GRTC is required provide paratransit service within a ¾ mile buffer of fixed-route transit

service. Currently, GRTC goes beyond these guidelines by providing demand response paratransit service to all of Henrico County and City of Richmond, as described earlier in this chapter.

**ACCESS TO SERVICE: POPULATION, HOUSEHOLDS AND EMPLOYMENT**

Population, household and employment estimates for 2008 and 2035 by TAZ from RAMPO were used to estimate the number of residents, households and employees that live and work within a ¼ mile walk radius and ¾ mile demand response radius of GRTC’s regular fixed-route service. While GRTC has service in Richmond City and Henrico County, with express routes serving Henrico and Chesterfield Counties, GRTC’s service area for local fixed-routes is primarily in City of Richmond and Henrico County. The metropolitan region also includes Charles City, Goochland, Hanover, New Kent and Powhatan, as shown in **Table 3-12**. In 2008, GRTC’s service area (City of Richmond and Henrico County) was estimated to include 51 percent of the region’s total population, 54 percent of the total households and 64 percent of the total employment, as shown in **Table 3-12**. Although these totals are projected to increase in 2035 by 62 percent, 77 percent and 60 percent, respectively; Henrico County and City of Richmond are projected to decrease as a percentage of the region to 47 percent of the population, 51 percent of the total households and 59 percent of the total employment. Areas with the most growth include New Kent, Powhatan, and Goochland Counties. **Table 3-13** shows the estimated population, households and employment within GRTC’s ¼ mile and ¾ mile local fixed-route service buffer.

**TABLE 3-12: RICHMOND REGION POPULATION, HOUSEHOLDS AND EMPLOYMENT ESTIMATES FOR 2008 AND 2035**

MPO Area	2008 Pop.	2035 Pop.	% Change	2008 HH	2035 HH	% Change	2008 Emp.	2035 Emp.	% Change
<b>Richmond City</b>	213,313	251,954	18%	89,763	108,198	21%	148,380	172,858	16%
<b>Henrico</b>	305,577	438,326	43%	122,990	191,850	56%	181,906	260,926	43%
<b>Chesterfield</b>	313,888	459,801	46%	115,632	172,711	49%	113,428	166,160	46%
<b>Charles City</b>	7,212	9,938	38%	2,897	4,351	50%	1,550	2,136	38%
<b>Goochland</b>	20,956	38,706	85%	9,264	16,975	83%	14,633	27,125	85%
<b>Hanover</b>	102,015	174,125	71%	36,244	61,290	69%	50,290	85,406	70%
<b>New Kent</b>	17,825	35,156	97%	6,965	13,714	97%	3,911	7,714	97%
<b>Powhatan</b>	28,006	53,851	92%	9,858	19,821	101%	5,562	10,693	92%
<b>MPO Region Total</b>	<b>1,008,792</b>	<b>1,461,857</b>	<b>45%</b>	<b>393,613</b>	<b>588,910</b>	<b>50%</b>	<b>519,660</b>	<b>733,018</b>	<b>41%</b>

**TABLE 3-13: GRTC SERVICE AREA POPULATION, HOUSEHOLDS AND EMPLOYMENT ESTIMATES FOR 2008 AND 2035**

GRTC Service Area	2008 Pop.	2035 Pop.	% Change	2008 HH	2035 HH	% Change	2008 Emp.	2035 Emp.	% Change
Richmond City	213,313	251,954	18%	89,763	108,198	21%	148,380	172,858	16%
Henrico	305,577	438,326	43%	122,990	191,850	56%	181,906	260,926	43%
<b>Total GRTC</b>	<b>518,890</b>	<b>690,280</b>	<b>62%</b>	<b>212,753</b>	<b>300,048</b>	<b>77%</b>	<b>330,286</b>	<b>433,784</b>	<b>60%</b>
<i>% of MPO Region</i>	<i>51%</i>	<i>47%</i>		<i>54%</i>	<i>51%</i>		<i>64%</i>	<i>59%</i>	

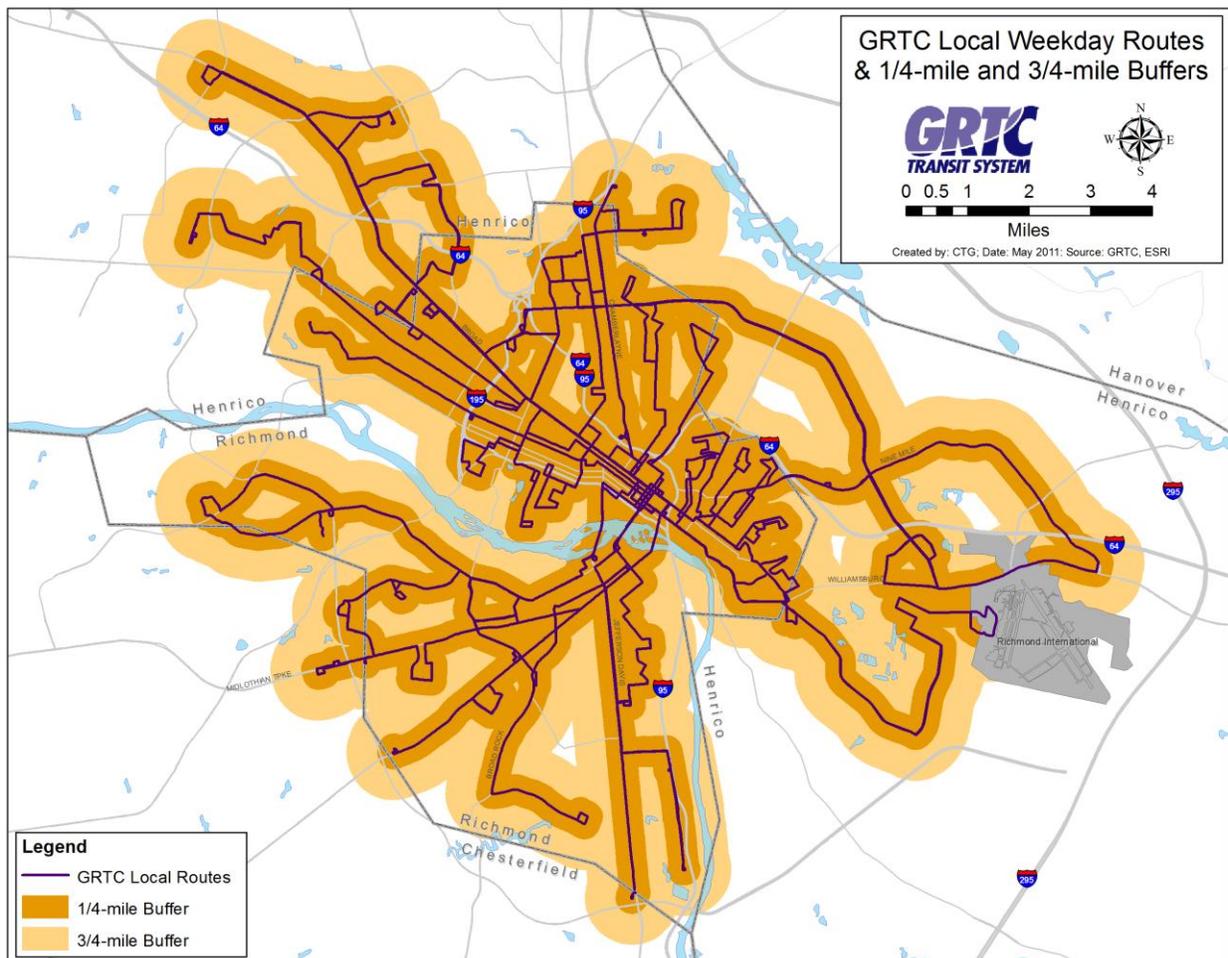
**Figures 3-34 through 3-36** show GRTC’s weekday, Saturday and Sunday service area within ¼ and ¾ mile buffers on either side of the local fixed-route service. This is calculated by taking the percentage of the TAZ that falls within the buffer area and multiplying it by the total TAZ population, household and employment. As shown in **Table 3-14**, 45 percent of the population is within a ¼ mile walking distance to a local GRTC route, and 69 percent are within the ¾ mile paratransit radius. In 2035, these percentage will be 42 percent and 65 percent, indicating that population is projected to grow in areas of Henrico and City of Richmond not currently served by GRTC. In 2008, 56 percent of Henrico County and City of Richmond employment is within ¼ mile walking distance, and 79 percent is within ¾ mile. These percentages are projected to decline by 53 percent and 76 percent, respectively. On Saturday and

Sunday, GRTC operates fewer fixed bus routes, and thus, a smaller percentage of the population and employment are covered. Saturday service is walkable within ¼ mile to 35 percent of the population and 43 percent of the jobs in 2008, as shown in **Table 3-15**. This is projected to decline to 31 percent of the population and 40 percent of the jobs in 2035. Sunday service is walkable to 34 percent of the population and 40 percent of the employment, as shown in **Table 3-16**. Demand response service within ¼ mile is accessible to 47 percent of the population and 56 percent of the employment on both Saturday and Sunday.

**TABLE 3-14: WEEKDAY LOCAL FIXED ROUTE POPULATION, HOUSEHOLDS AND EMPLOYMENT WITHIN ¼ AND ¾ MILES**

Buffer	2008 Pop.	% Total	2035 Pop.	% Total	2008 HH	% Total	2035 HH	% Total	2008 Emp.	% Total	2035 Emp.	% Total
1/4 Mile	235,826	45%	290,671	42%	98,250	46%	126,014	42%	183,470	56%	229,203	53%
3/4 Mile	355,473	69%	445,365	65%	147,099	69%	192,185	64%	259,286	79%	330,566	76%

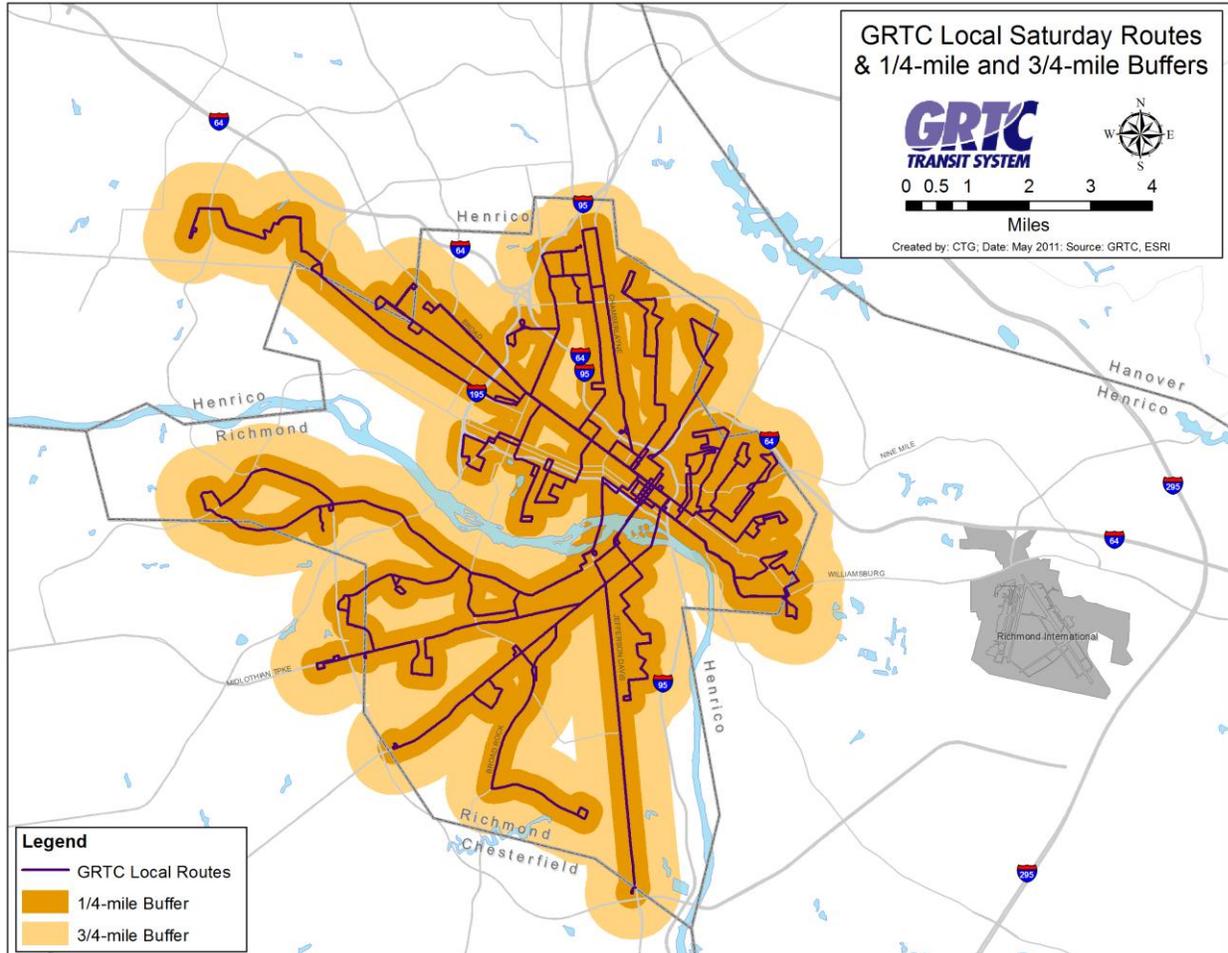
**FIGURE 3-34: GRTC 1/3 AND ¾ MILE WEEKDAY LOCAL SERVICE BUFFERS**



**TABLE 3-15: SATURDAY LOCAL FIXED ROUTE POPULATION, HOUSEHOLDS AND EMPLOYMENT WITHIN ¼ MILE AND ¾ MILE BUFFER**

Buffer	2008 Pop.	% Total	2035 Pop.	% Total	2008 HH	% Total	2035 HH	% Total	2008 Emp.	% Total	2035 Emp.	% Total
1/4 Mile	179,216	35%	216,601	31%	75,113	35%	94,011	31%	142,649	43%	173,209	40%
3/4 Mile	262,658	51%	324,940	47%	110,076	52%	140,658	47%	195,627	59%	242,902	56%

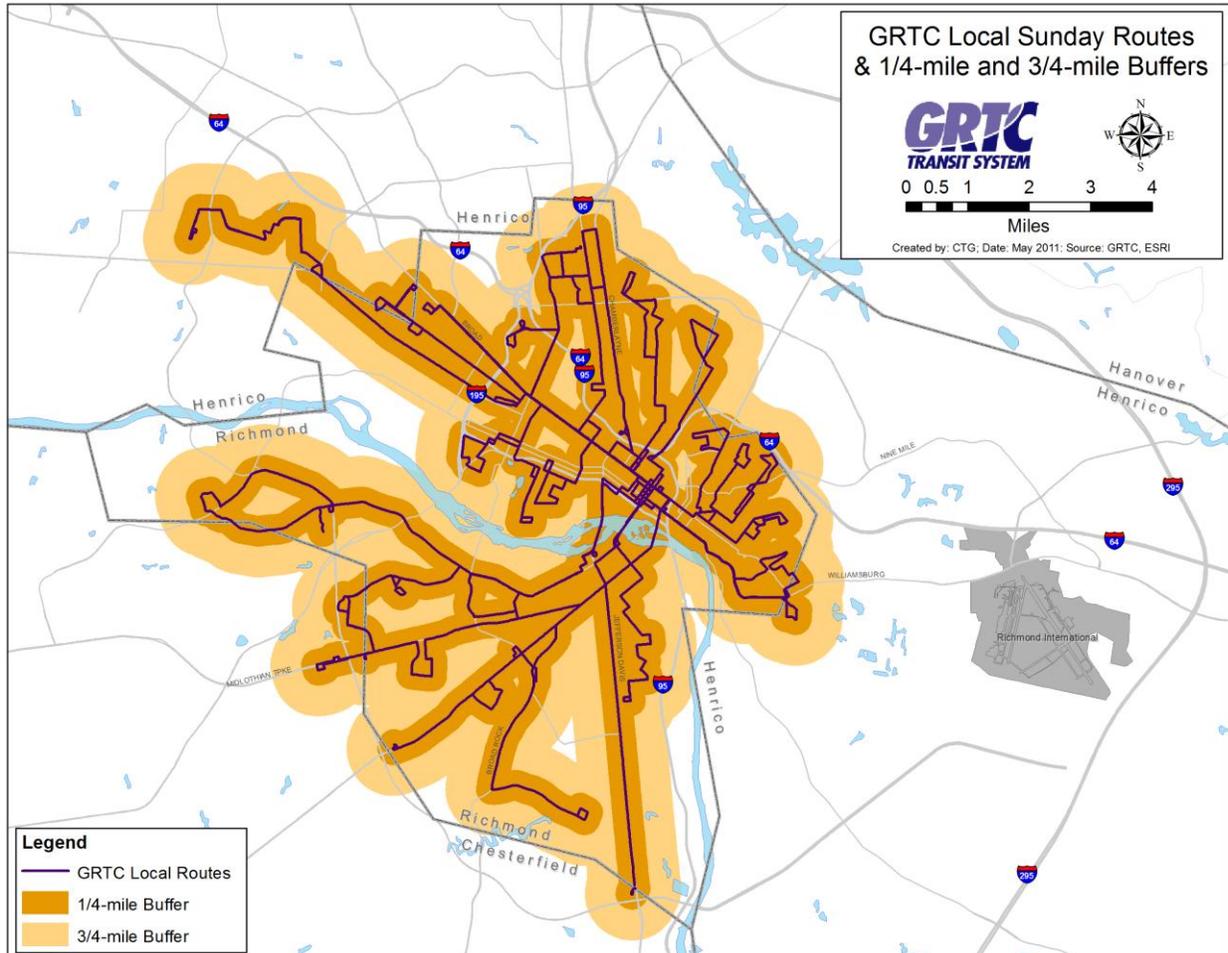
**FIGURE 3-35: GRTC SATURDAY LOCAL FIXED ROUTE ¼ MILE AND ¾ MILE SERVICE BUFFER**



**TABLE 3-16: SUNDAY LOCAL FIXED ROUTE POPULATION, HOUSEHOLDS AND EMPLOYMENT WITHIN ¼ AND ¾ MILE BUFFER**

Buffer	2008 Pop.	% Total	2035 Pop.	% Total	2008 HH	% Total	2035 HH	% Total	2008 Emp.	% Total	2035 Emp.	% Total
1/4 Mile	178,615	34%	215,883	31%	74,941	35%	93,778	31%	142,447	43%	172,974	40%
3/4 Mile	262,658	51%	324,940	47%	110,076	52%	140,658	47%	195,627	59%	242,902	56%

**FIGURE 3-36: SUNDAY LOCAL FIXED ROUTE ¼ & ¾ MILE S SERVICE BUFFER**



**PROPENSITY FOR TRANSIT**

For transit to be successful there needs to be “mass” or density. Fixed-route transit services are generally more successful in areas with high household and employment densities. Thus, one means of evaluating transit is to identify areas served that have attained at least the minimum densities, or thresholds, sufficient to support fixed-route transit service. Using density thresholds, transit propensity is estimated for 2008 and 2035 using population, household and employment data for each TAZ provided by RAMPO.

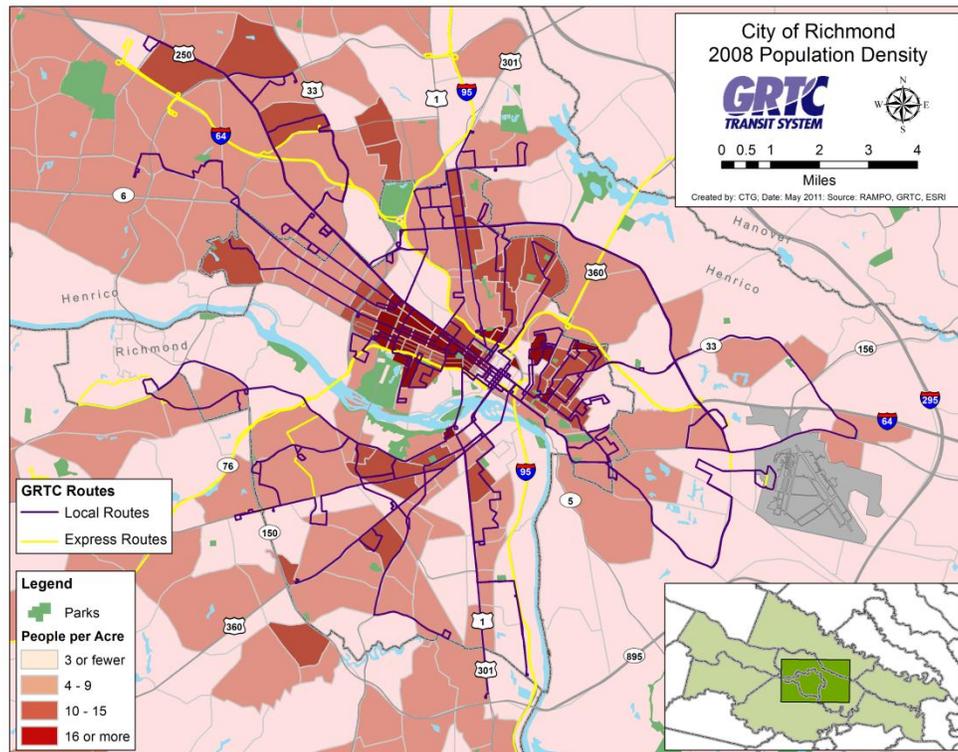
The methodology for this approach is derived from the Transit Cooperative Research Program’s (TCRP) *Transit Capacity and Quality of Service Manual – 2nd edition* (2003), which identifies a density of three households per acre and/or four jobs per acre as the thresholds to qualify as a transit-supportive environment. **Figures 3-37 through 3-48** display 2008 and 2035 population, household, and employment densities for the GRTC service area and the greater Richmond area.

**Persons per Acre:** As shown in **Figures 3-37 and 3-38**, the City of Richmond has several areas with a high concentration of population density, most of which are served by GRTC transit service. Pockets of population growth from 2008 to 2035 can be seen along major corridors in the Southside, and near Rockett's Landing area on the East End. Regionally, as shown in **Figures 3-39 and 3-40**, population densities continue to increase in all directions, with pockets of density in Henrico County near the Goochland county line and on the Southside. These areas are not currently served by transit.

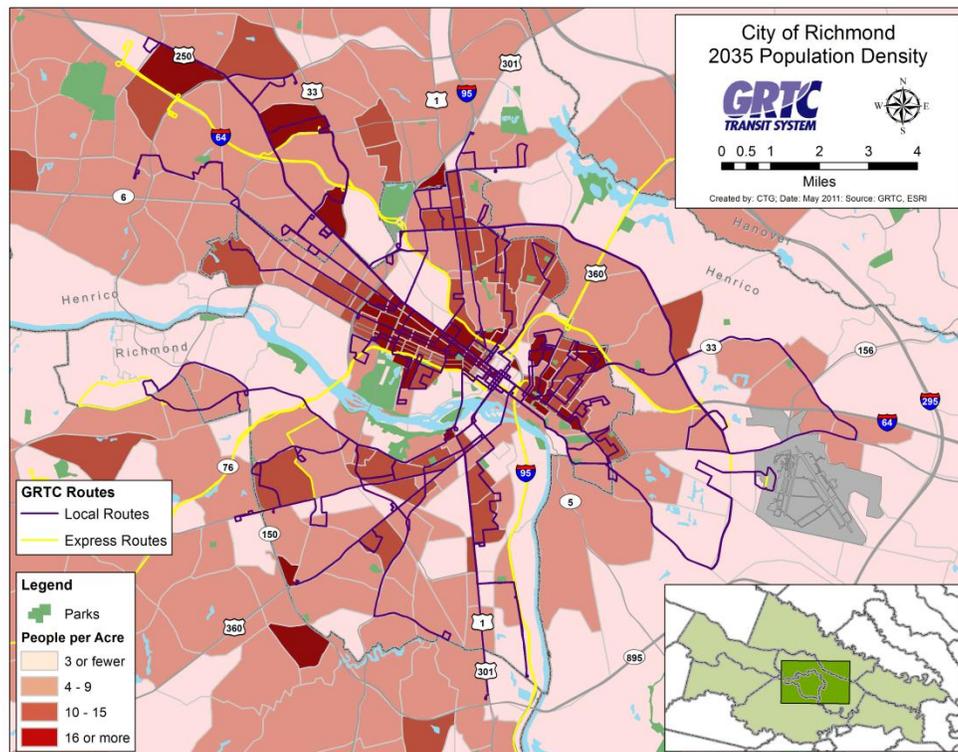
**Households per Acre:** In the GRTC service area, much of the transit supportive household densities continue to be in and around the City of Richmond and west along Broad in 2035, as shown in **Figures 3-41 and 3-42**. Much of the household growth extends northwest along Broad toward Short Pump, north along Route 1 toward Ashland, various locations in the Southside, and along Williamsburg Highway near the East End. Regionally, **Figures 3-43 and 3-44**, transit supportive household densities are primarily in Henrico County near Innsbrook and Short Pump and in Chesterfield County, in the vicinity of Iron Bridge Road, south of Chippenham Parkway and near Chesterfield Town Center at Huguenot and Midlothian Turnpike by 2035. An additional area with transit supportive household densities is projected by 2035 in Chester, near Hundred Road and Chester Road. These areas do not currently have access to transit.

**Employment per Acre:** Employment growth in the GRTC service area in 2035 is concentrated in the northwestern parts of Henrico County as shown in **Figures 3-45 and 3-46**, which is outside of GRTC's current service. Regionally, employment continues to expand north and northwest from Richmond and Henrico County along the I-64 corridor as shown in **Figures 3-47 and 3-48**.

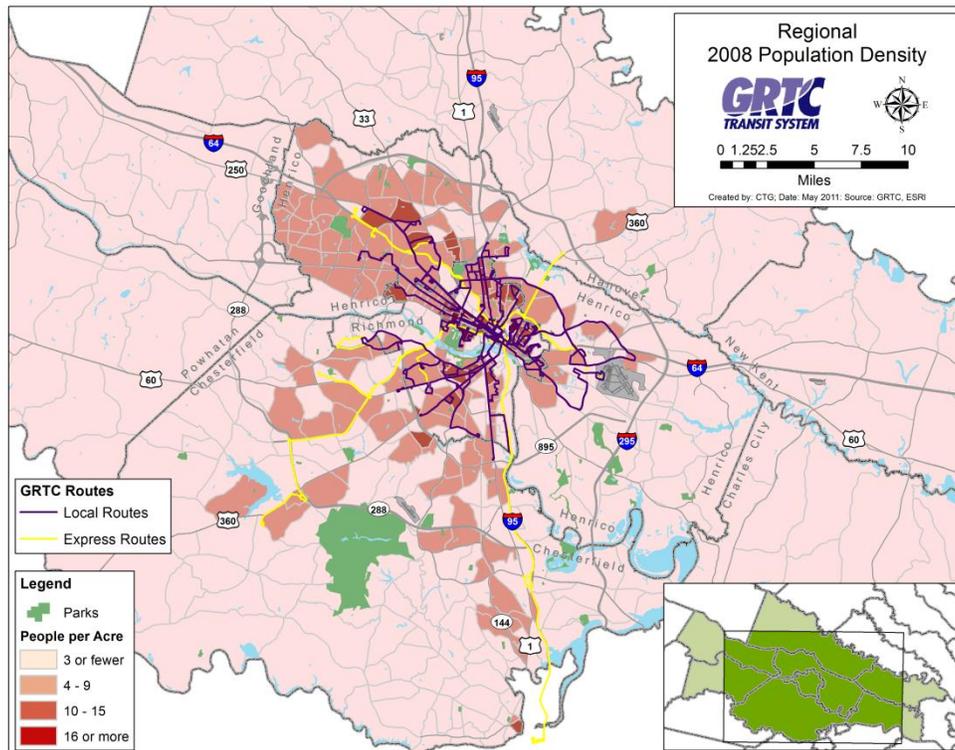
**FIGURE 3-37: 2008 PERSONS PER ACRE - CITY OF RICHMOND**



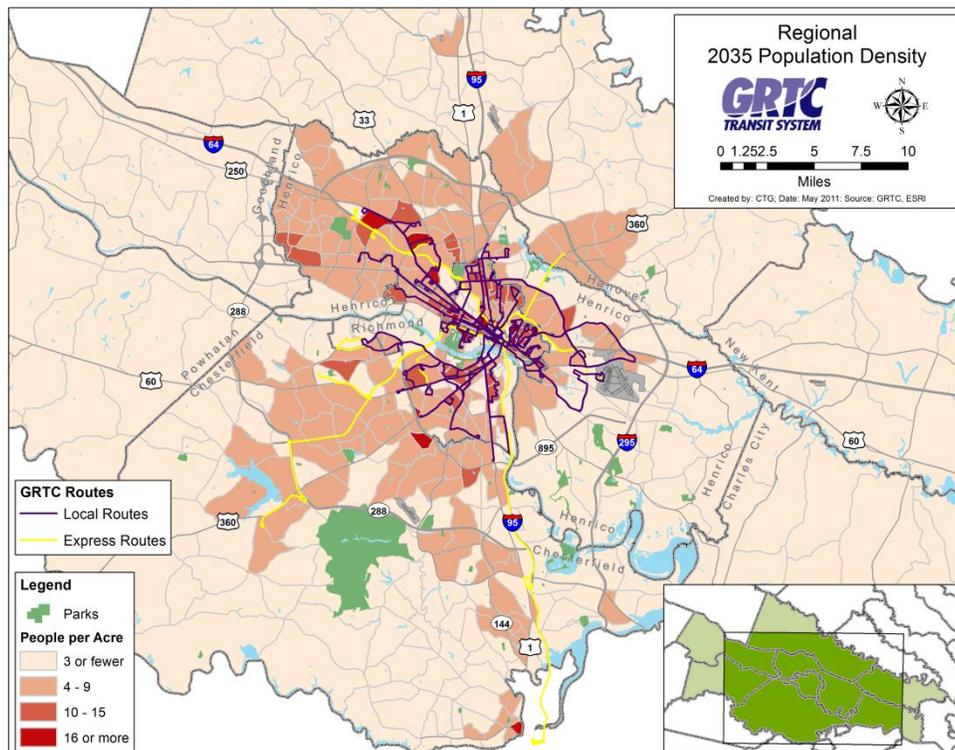
**FIGURE 3-38: 2035 PERSONS PER ACRE – CITY OF RICHMOND**



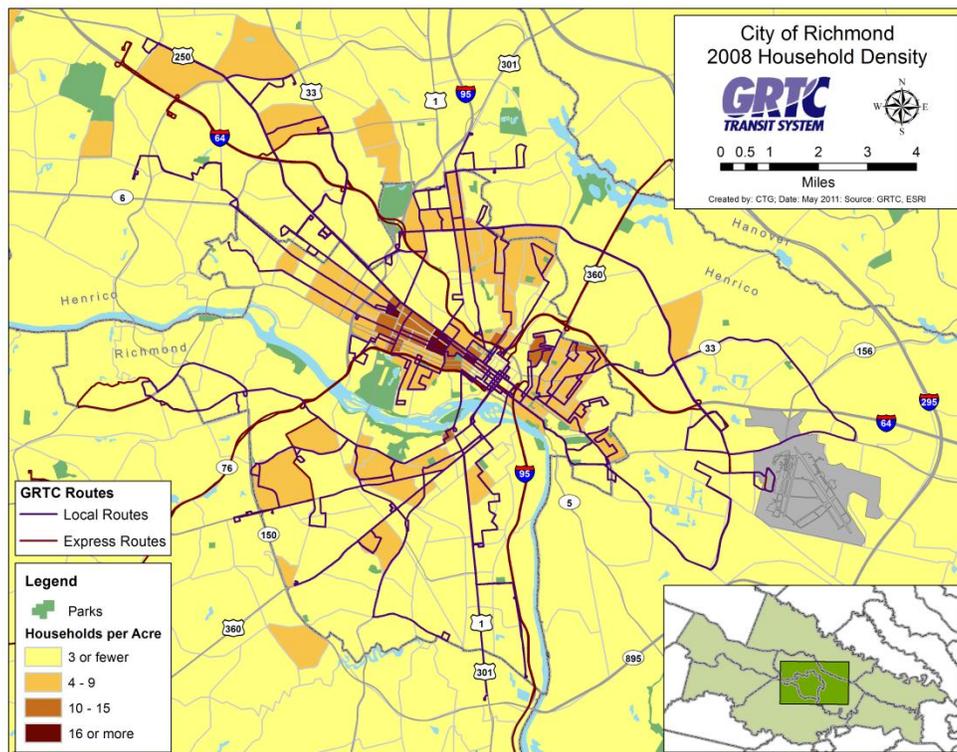
**FIGURE 3-39: 2008 PERSONS PER ACRE - RICHMOND REGION**



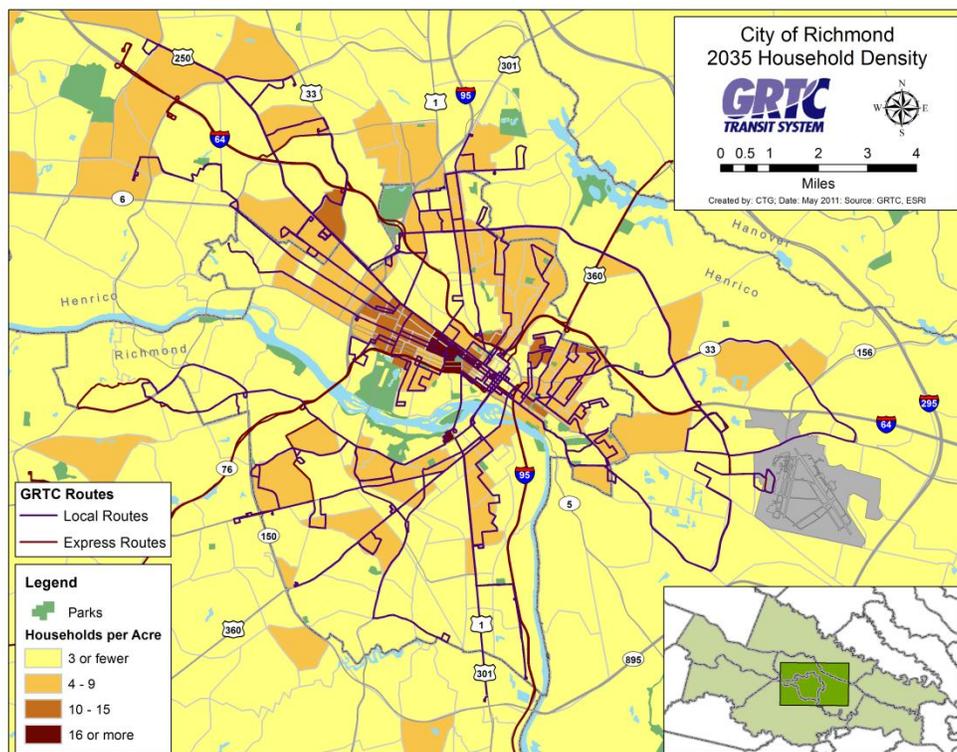
**FIGURE 3-40: 2035 PERSONS PER ACRE - RICHMOND REGION**



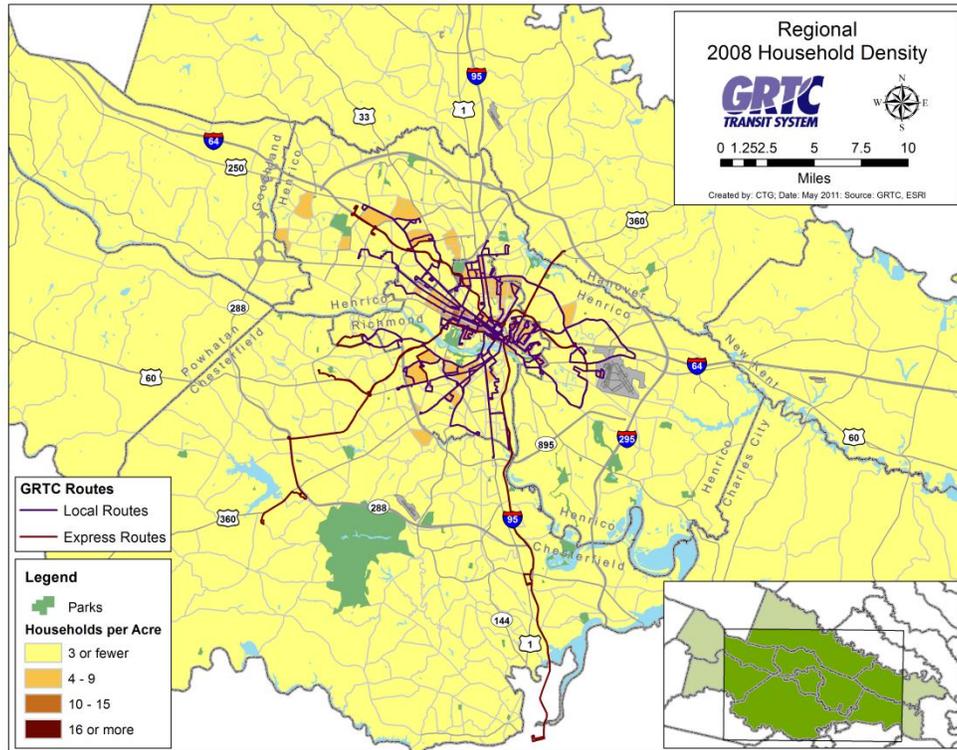
**FIGURE 3-41: 2008 HOUSEHOLDS PER ACRE - CITY OF RICHMOND**



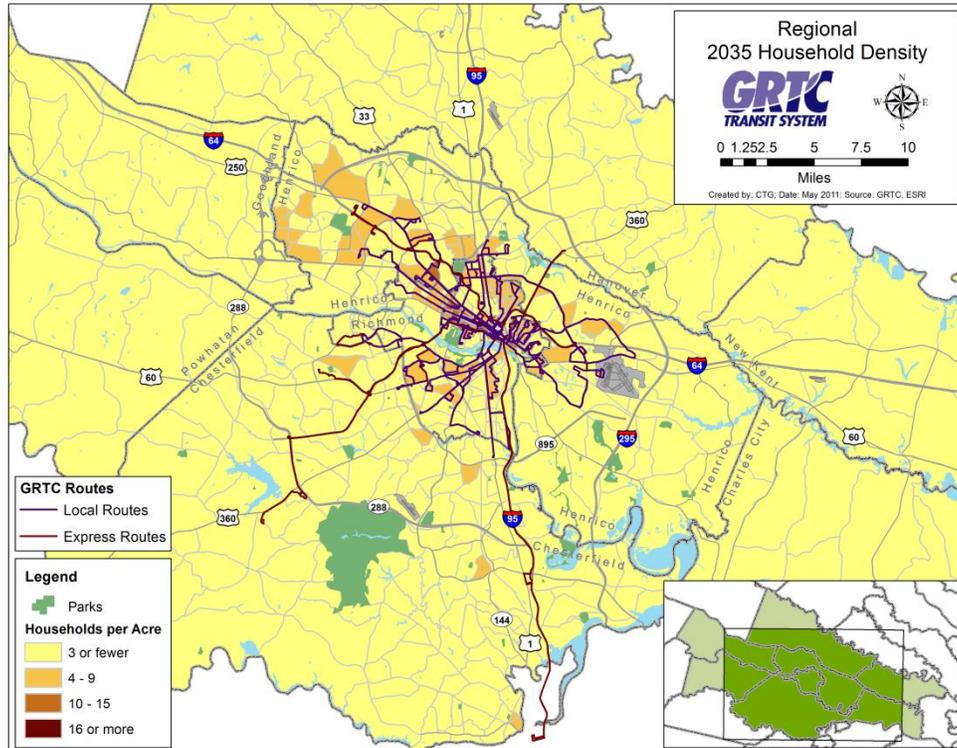
**FIGURE 3-42: 2035 HOUSEHOLDS PER ACRE – CITY OF RICHMOND**



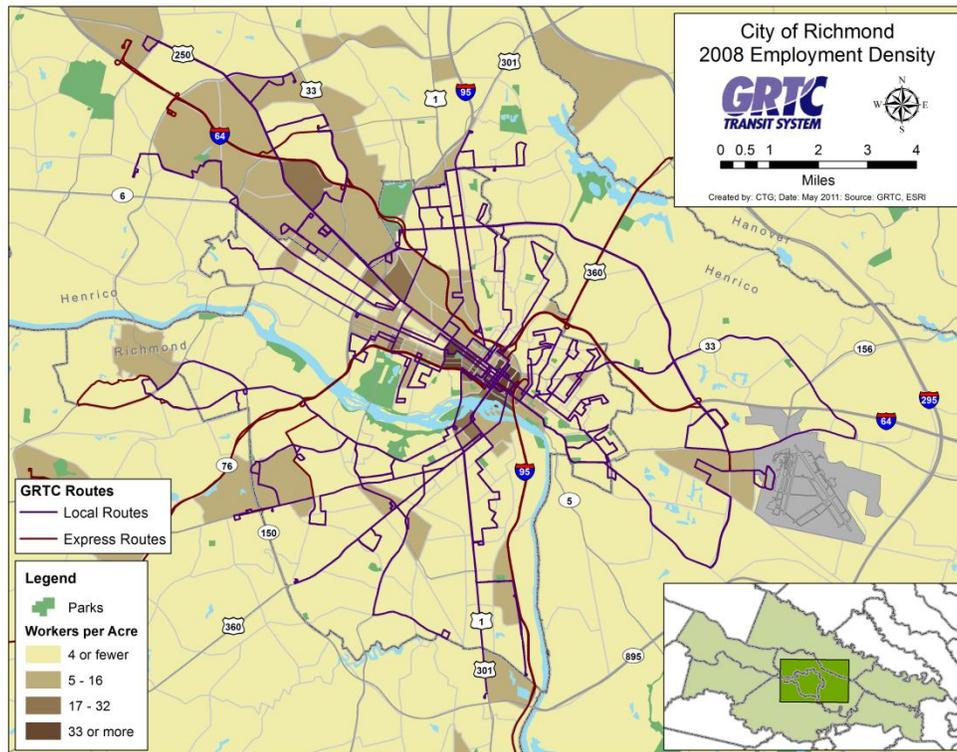
**FIGURE 3-43: 2008 HOUSEHOLDS PER ACRE - RICHMOND REGION**



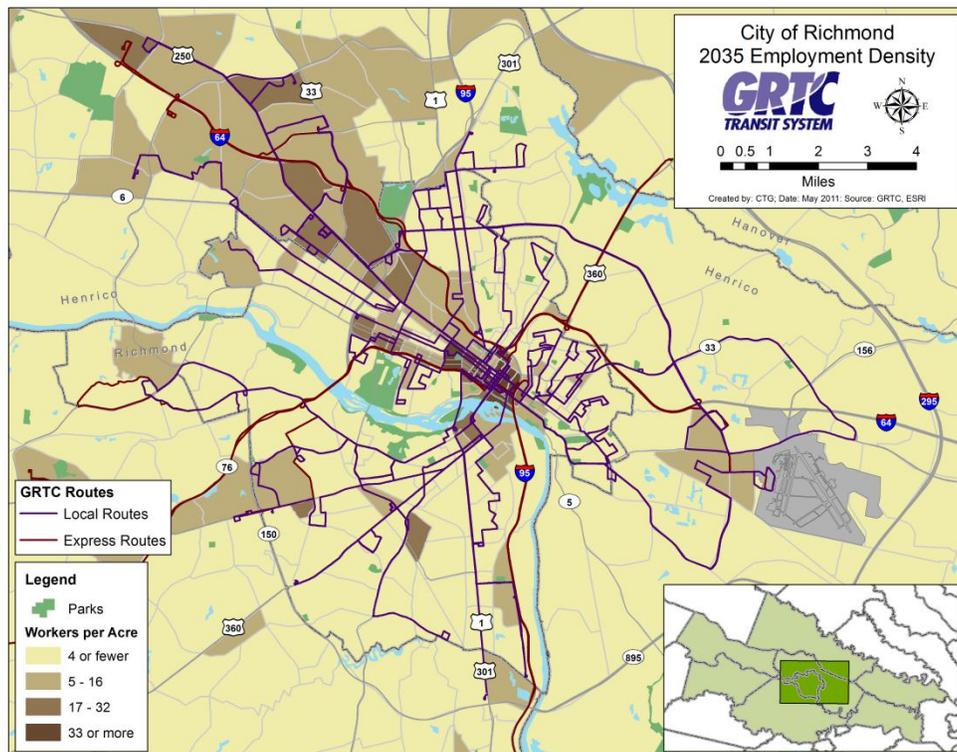
**FIGURE 3-44: 2035 HOUSEHOLDS PER ACRE - RICHMOND REGION**



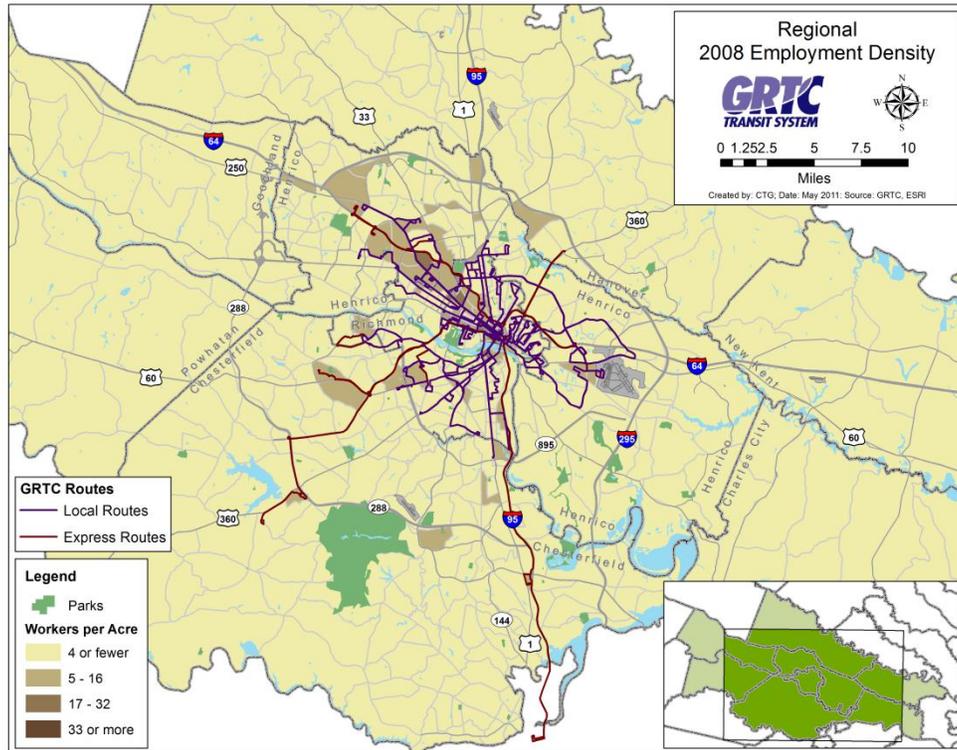
**FIGURE 3-45: 2008 EMPLOYMENT PER ACRE - CITY OF RICHMOND**



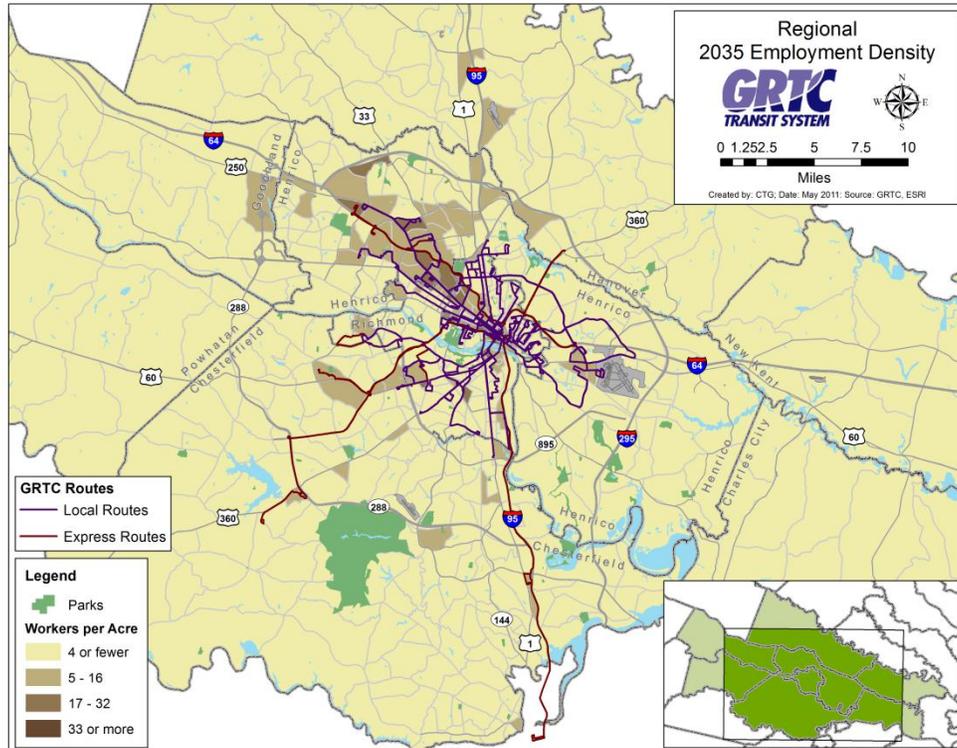
**FIGURE 3-46: 2035 EMPLOYMENT DENSITY - CITY OF RICHMOND**



**FIGURE 3-47: 2008 EMPLOYMENT PER ACRE - RICHMOND REGION**



**FIGURE 3-48: 2035 EMPLOYMENT PER ACRE - RICHMOND REGION**



## SOCIOECONOMIC CHARACTERISTICS

Additional socioeconomic characteristics provide measures of transit supportive areas. Areas with dense populations of households with no access to a vehicle and households below poverty may indicate areas that would be supportive of transit. Additionally, areas with clusters of populations age 65 and over and college student populations age (18 to 21) can provide insight as to locations where specialized transit services may be warranted. Finally, dense areas of persons with disabilities can help GRTC to identify areas that may be underserved. Minority populations are also identified in this analysis to comply with Title VI requirements and to identify areas with minorities may be underserved by transit. Socioeconomic characteristics are provided at a block group level from the US Census Bureau's American Community Survey (ACS). The most current data available is the five-year running average collected from January 2005 to December 2009 for households with no access to a vehicle, households below poverty, populations age 65 and up and populations age 18 to 21. Disability information is collected by the ACS; however, a change in the question in 2008 has resulted in the 2005-2009 ACS disability data being unavailable, and earlier years collected are only available at the tract level. The most current disability information available at the block group level is from the 2000 census. Thus, population of persons with one or more disability is not included in this section.

**Population Age 18-21:** With several major universities and colleges, including VCU, the opportunity to capture college aged riders may exist. As shown in **Figure 3-49**, a large concentration of persons aged 18 to 21 are located around the VCU campus. A second concentration is located by the University of Richmond and Virginia Union University. This analysis also indicates that community college students at J. Sargeant Reynolds and John Tyler are dispersed throughout the region and do not live within walking distance to the campuses.

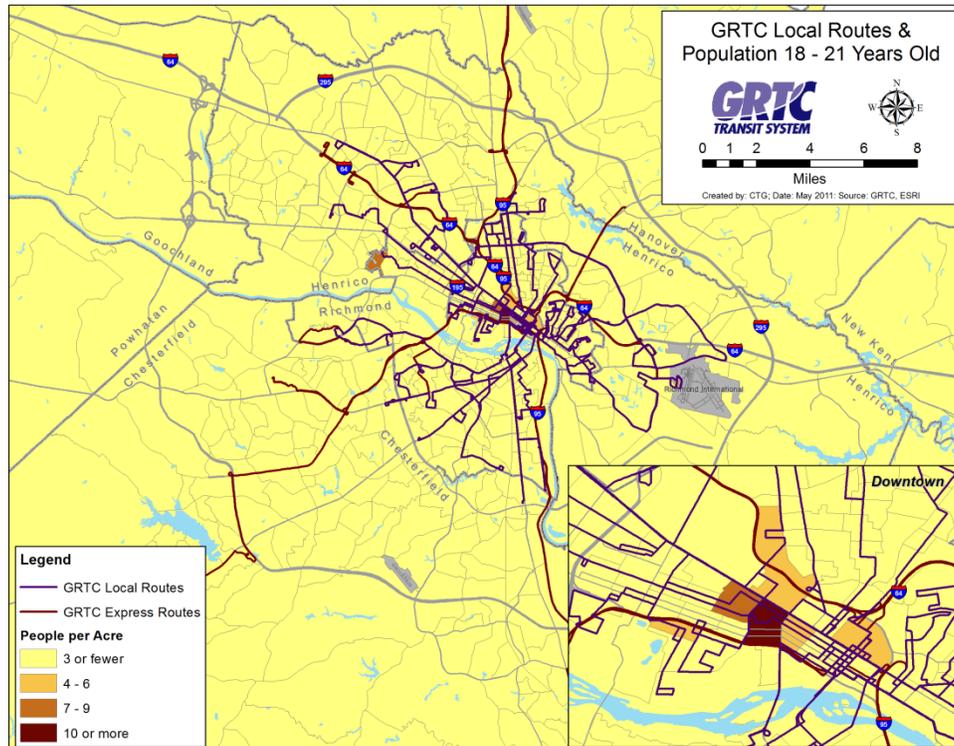
**Population Age 65 and Over:** Concentrations of persons age 65 and over may identify areas with a demand for fixed-route or demand response transit. **Figure 3-50** shows concentrations of persons age 65 and over in Henrico County north and west of the City of Richmond. These areas are served by CARE; however, not by fixed-route service.

**Minority Populations:** Areas with large populations of minorities are located in the City of Richmond, on the Northside and East End, as well as in areas on the Southside. Most of these areas are served by transit. Areas south of the Chesterfield county line near Jefferson Davis Parkway are not served by transit, as shown in **Figure 3-51**.

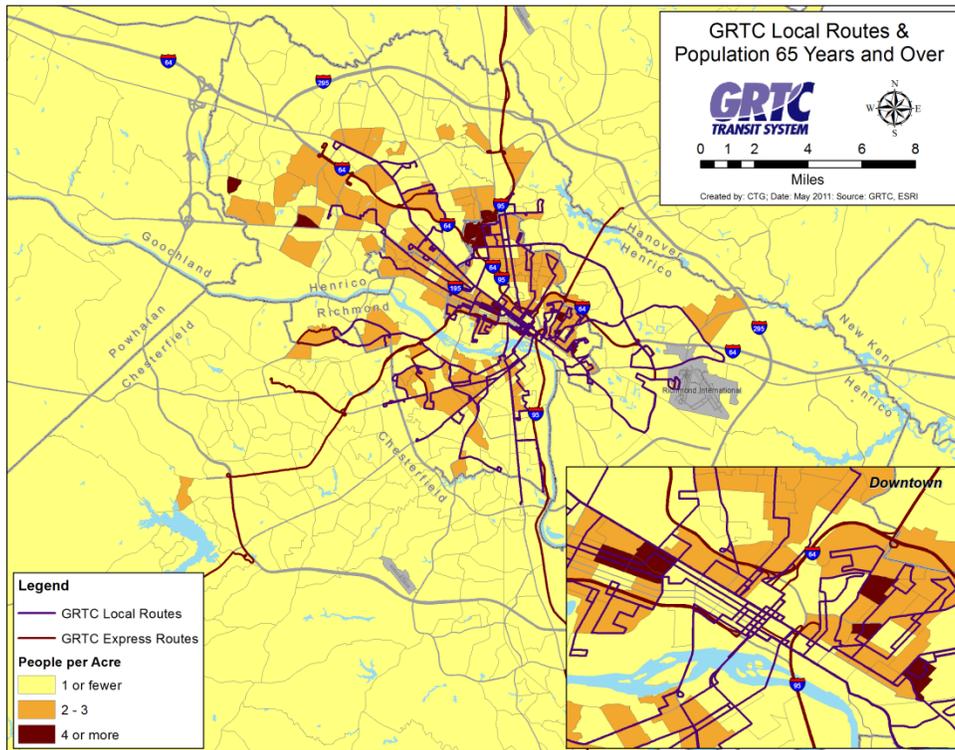
**Household Income Below Poverty:** Areas with a high concentration of households with incomes below poverty are located in the Downtown Richmond area along Broad Street, in the vicinity of the Fan District and directly north of I-64/95. On the Southside, a concentration of households below poverty is located on Belt Boulevard. All of these areas are generally served by transit. Further south, in Chesterfield County, a pocket of households off of Chippenham Parkway near Meadowdale Boulevard includes households with incomes below poverty. This area is not served by transit as shown in **Figure 3-52**.

**No Vehicle Households:** Households with no vehicle are located in similar locations as those households with income below poverty. Most of these locations are near transit. A few other areas begin to emerge with higher densities of no vehicle households, including the area north of the I-64/I-95 split near Bryan Park. A large portion of this block group is park land; thus, the concentration of households with no vehicle is significant. Portions of this block group (east of I-95) are served by transit, as shown in **Figure 3-53**.

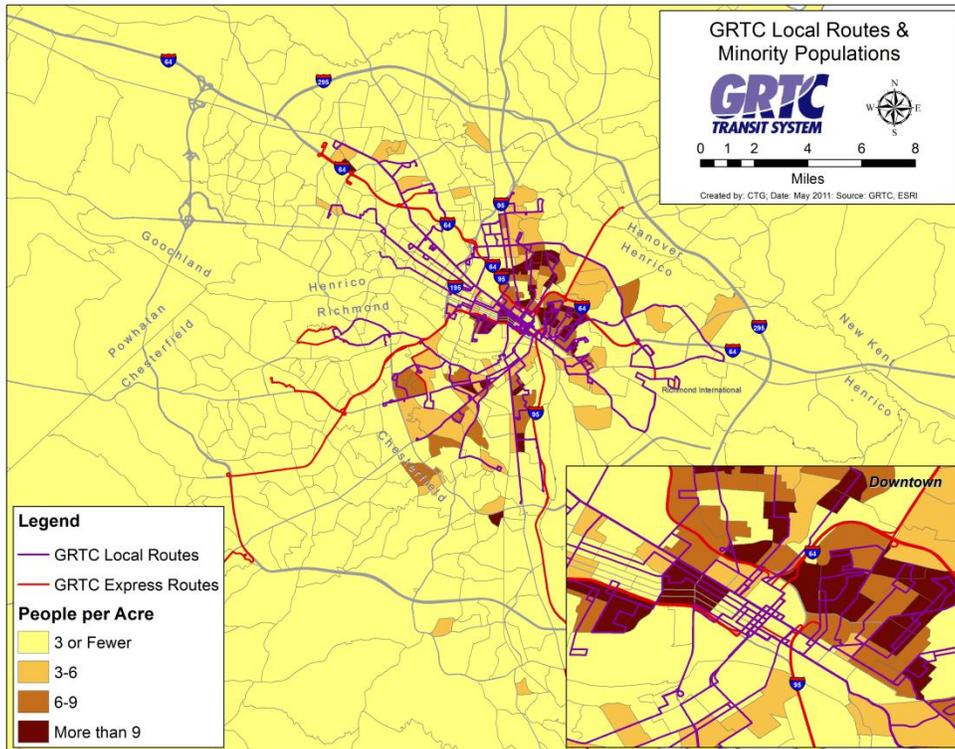
**FIGURE 3-49: POPULATION AGE 18 TO 21 (SOURCE: AMERICAN COMMUNITY SURVEY)**



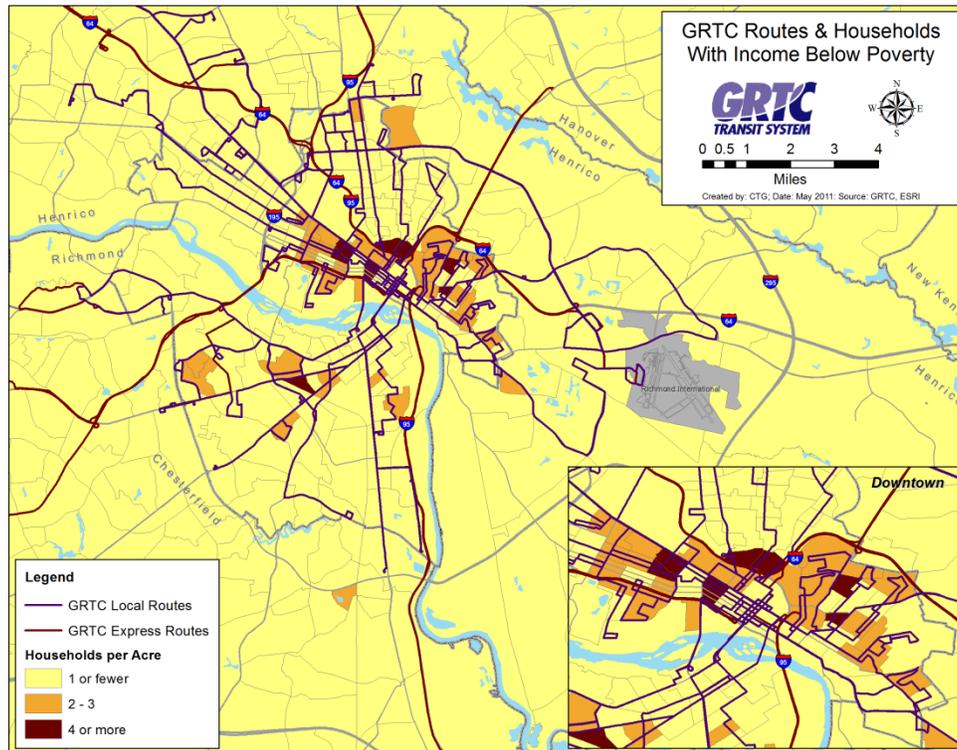
**FIGURE 3-50: POPULATION AGE 65 AND OVER (SOURCE: AMERICAN COMMUNITY SURVEY)**



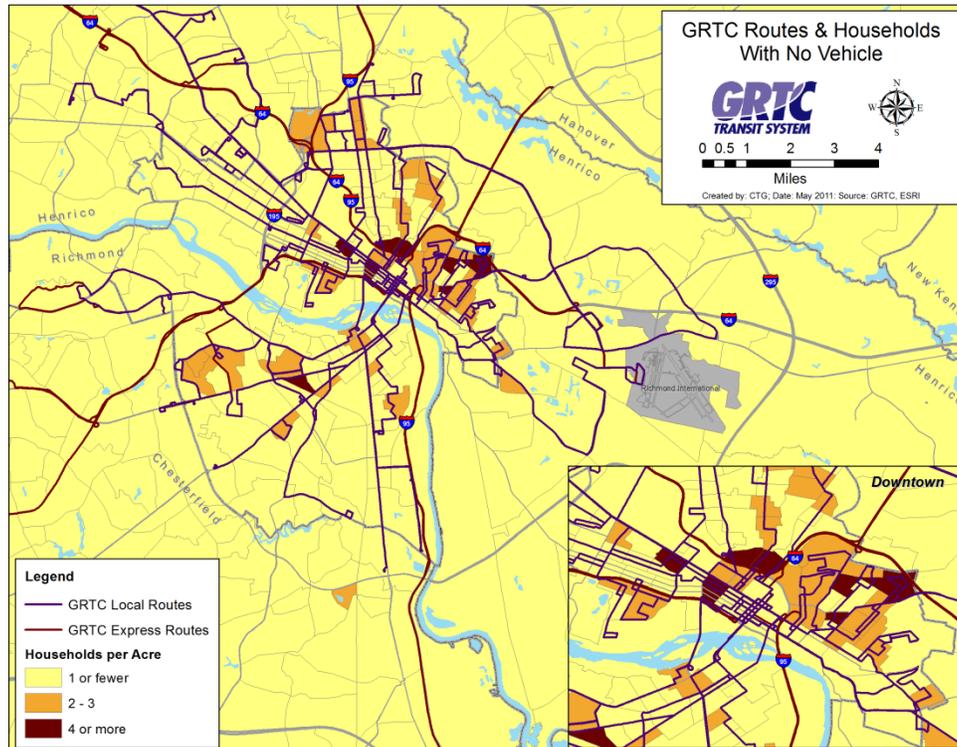
**FIGURE 3-51: MINORITY POPULATIONS (SOURCE: AMERICAN COMMUNITY SURVEY)**



**FIGURE 3-52: HOUSEHOLD INCOME BELOW POVERTY (SOURCE: AMERICAN COMMUNITY SURVEY)**



**FIGURE 3-53: HOUSEHOLDS WITH NO VEHICLE (SOURCE: AMERICAN COMMUNITY SURVEY)**



## LAND USE AND TRANSPORTATION PLANS

The following sections document land use and transportation plans for the major areas of Richmond, Henrico County and Chesterfield County.

### *RICHMOND*

Richmond is comprised of eight planning districts: Broad Rock, East, Far West, Huguenot, Midlothian, Near West, North, and Old South. Downtown is its own district and its land use plan was last adopted in 1997. The eight land use plans as presented in Richmond's 2000-2010 Master Plan, *Master Plan Richmond*, are presented below as **Figures 3-54 to 3-61**.

The Master Plan notes that major changes to the City's land use have not occurred since the adoption of the 1983 Master Plan and much of the City's central land uses have been fairly consistent over the past 50 years. However, much development has occurred outside of the Richmond area due primarily to the availability of land and an extensive transportation network. The City of Richmond is nearly built-out with the majority of vacant parcels located primarily to the southwest. The Master Plan notes that adding more affordable housing, revitalizing commercial corridors and adding public facilities such as parkland and open spaces are top priorities. As such, denser core and corridor areas may be planned in many places in Richmond; however, the Master Plan notes that top priorities guiding its growth are preservation of existing land uses, redevelopment of underperforming areas to accommodate new and compatible uses, the maintenance of downtown as the economic core of the City, and conservation of historic and environmentally-sensitive areas.

Residential is the primary land use throughout the Broad Rock Planning District, though, to the east of the railroad which bisects the District, is one of the largest concentrations of industrial uses in the city due in part to major historic and current transportation networks. As shown in **Figure 3-54**, several large vacant tracts of land are in this District as well as deteriorating commercial areas and corridors. These areas represent opportunities for City growth in the future; however, there are no redevelopment areas designated in this District. Among the number of changes suggested, the land use plan suggests combining some commercial corridors into commercial villages at major intersections (such as Broad Rock and Walmsley Boulevards), adds recreational and conservation areas within the existing industrially-zoned areas in the eastern section of the district, and preserves historically-residential areas in addition to plans for some vacant land to be made into residential subdivisions. Currently, GRTC Routes 62, 67, 72 and 73 serve Broad Rock. Additionally, Route 95 runs through along I-95 on its way to Petersburg.

The East Planning District is one of the oldest areas of Richmond with development patterns dating back 300 years to the City's founding. The District benefits from a compact, small block street grid and diverse mix of land uses within a small area as illustrated in **Figure 3-55**. Numerous historic warehouses have been converted into residential and commercial properties, and the area closest to the riverfront is a large mixed-use district with a range of old and new buildings and a mix of uses. Little vacant land exists in this district—vacant land is either environmentally-challenging, the result of building demolition, or contained within redevelopment areas. However, the East District contains the highest percentage of

vacant housing or deteriorating housing in all of Richmond. Parking is a problem in the lower District and commercial areas face deterioration with substandard levels of investment and competition from suburban counterparts. Industrial uses have been declining over time but the existing industry in the East District is to be preserved for the tax base. The overall land uses in the District are expected to remain approximately the same, with some consolidation of commercial corridors into mixed-use corridors, especially along Nine Mile Road. Current GRTC routes in the East Planning District include Routes 1, 2, 3, 4, 6, 7, 10, 11, and Route 56, which serves Richmond International Airport. Express Routes 21 and 28 traverse the northern boundary while Route 95 enters from the south from Petersburg.

The Far West Planning District is predominantly residential and institutional, housing both the University of Richmond and the Country Club of Virginia, with almost no industrial uses and a commercial corridor at the far north of the District along Broad Street. Some of the City's finest and oldest homes are in this established District and little vacant land exists. Increased commercial development is desired but there is a lack of developable area and higher intensities of commercial uses may have negative impacts to the adjacent residential areas. Additionally, parking and congestion is a problem in many places throughout the District. Further, lack of public open space and lack of access to the scenic area along the James River is a concern as shown in **Figure 3-56**. GRTC Routes 1, 2 and 16 serve the district while Routes 4, 6, 19, 18 and 91 serve the borders of the District.

The Huguenot Planning District comprises the westernmost area of the City, south of the James River as shown in **Figure 3-57**. Huguenot is primarily single-family residential in nature, with three large commercial areas, environmental lands along the river, and much vacant land throughout. Concerns in this District include sprawl, driven by cheaper land and growing congestion within the center of the District, primarily along Forest Hills Avenue, and infill development, which clashes with existing uses and overburdens the existing roadway network. It is desired to limit commercial districts or villages to the Stony Point-Bon Air shopping area, the Stony Point Fashion Park and a commercial district and community commercial area along Forest Hills Avenue at Chippenham Parkway. Current GRTC Routes 70 and 64 serve much of these commercial areas but the Stony Point Fashion Park is not currently served. GRTC did provide service via Route 65 Stony Point Mall; however, low ridership and funding limitations resulted in the termination of this route.

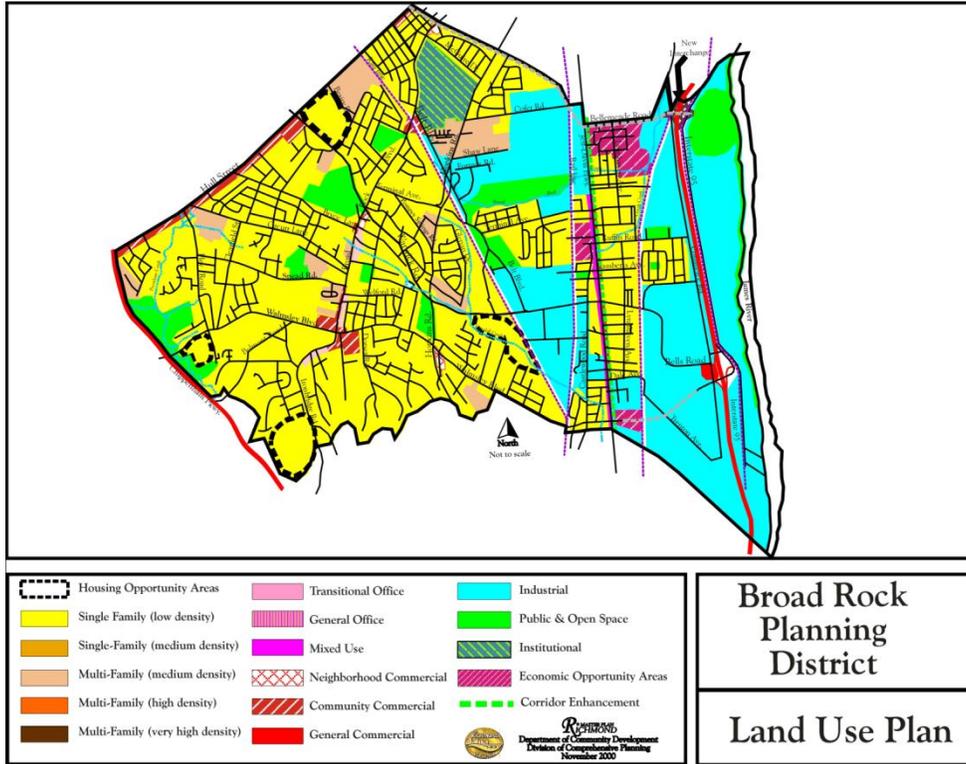
The Midlothian Planning District is southwest of Downtown Richmond and includes a range of uses along major corridors crossing the District. The historically retail-intensive Midlothian Turnpike corridor is currently a transitional corridor with many retail uses having moved further southwest into Chesterfield County, as shown in **Figure 3-58**. Deteriorating buildings and strip malls, incompatible industrial uses, and uncoordinated planning are of chief concern. Land use plans call for the entire Midlothian Turnpike corridor to be a redevelopment area to better provide neighborhood commercial and retail services. Further, Belt Boulevard and Hull Street Road will continue to be commercial corridors under a new mixed-use land use designation. GRTC Routes 63, 71, 101, and Express Route 66 serve areas throughout Midlothian, while Routes 62 and 67 serve the southeastern boundary along Hull Street Road with the Broad Rock Planning District.

The Near West Planning District encompasses an area just west of downtown and within I-195 and I-95/I-64. Like Downtown and the East Planning District, Near West has a diverse land use mix with small blocks and many historic buildings as shown in **Figure 3-59**. Commercial uses are scattered in the residential area between Broad and Main Streets. As such, the land use plan calls for a commercial corridor along both streets to consolidate uses into districts and avoid land use conflicts such as parking, noise and deterioration. Increased commercial intensity is expected along Main and Cary Streets in the future. Further, residential areas within the district are designated as medium density residential and may possibly allow for more residents to reside in the district. Many of GRTC's routes cover this area. They include Routes 1 through 4, 7, 10, 16, 19, 22, and 24. Routes 70, 71, and 91 skirt the top and bottom edges of the District and many express routes utilize the peripheral interstates.

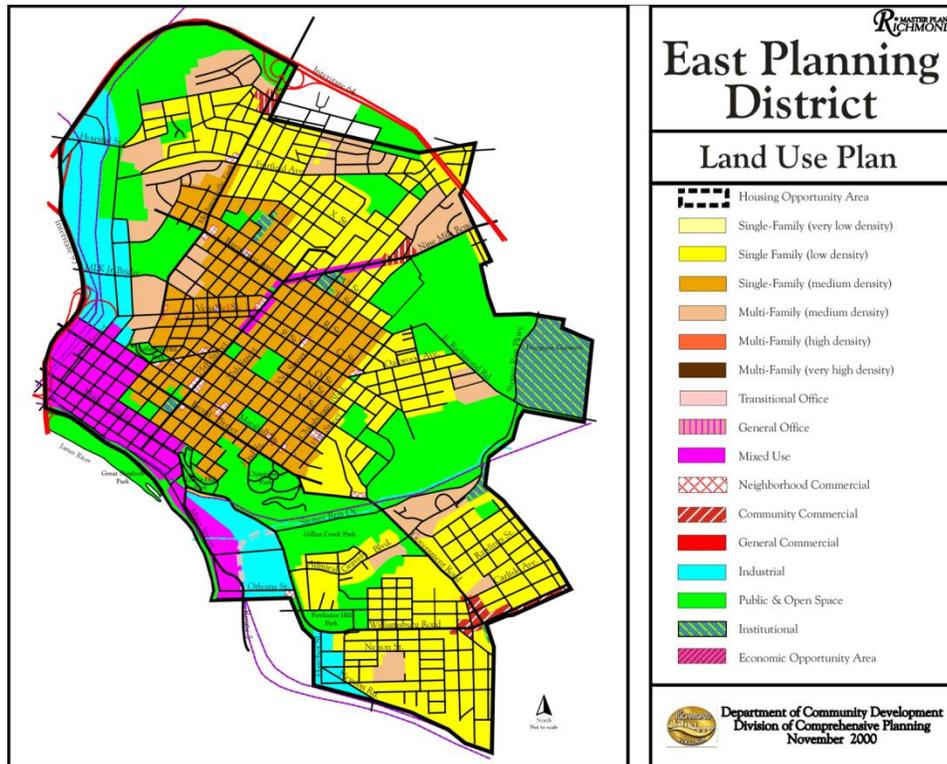
Residential and recreational uses define the North Planning District as shown in **Figure 3-60**. Multi-family apartments line Chamberlayne Avenue along its length through the District. Some commercial districts throughout the neighborhood have been in decline and the land use plan proposes to consolidate scattered commercial sites into commercial corridors, such as at Brookland Park Boulevard at North Avenue and Chamberlayne Avenue at Lombardy Street, and eventually phase out uses over the long-term. Expansion of these corridors into residential areas will not be allowed but improvement, redevelopment and some changes within the current boundaries will be allowed to better serve the adjacent neighborhoods. Many areas to the south and west will increase in residential density and population. GRTC currently serves all areas that are expected to increase in intensity or use but increased service may be needed. Routes 22, 24, 32, 34, 37 and 93 serve the North Planning District. As with the Near West and East Planning Districts, numerous express routes utilize peripheral highways.

The Old South Planning District is one of the oldest areas of Richmond and contains many historic structures and areas, large tracts of industrial land to the east and residential neighborhoods throughout. Hull Street is one of the most heavily travelled corridors in the District and City and will continue to be an important corridor in the future. Portions of the Woodland Park and Manchester neighborhoods will increase in density and use, as shown in **Figure 3-61**. The Old Manchester area is expected to mimic the redevelopment of Shockoe Bottom. The Jefferson Davis Highway corridor is expected to be redeveloped on its northern end into a mixed-use district. Current GRTC routes include 62, 63, 67, 70, 71, 72, 73, 74 and 101. Express Route 95 passes through the eastern portion of the District along I-95.

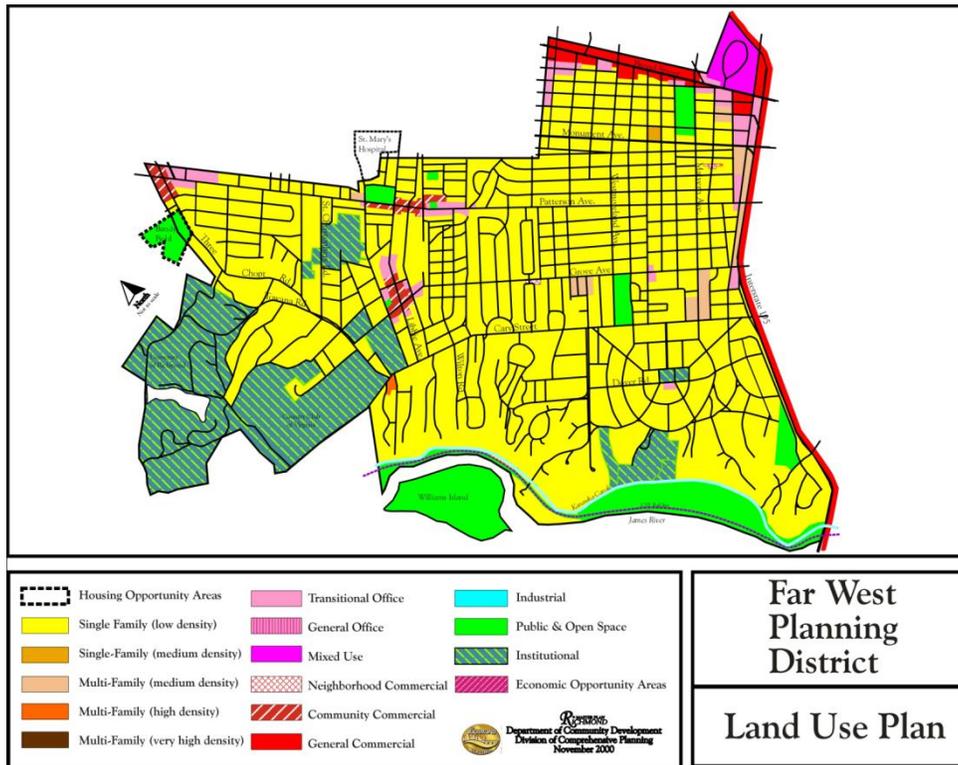
**FIGURE 3-54: BROAD ROCK PLANNING DISTRICT LAND USE PLAN**



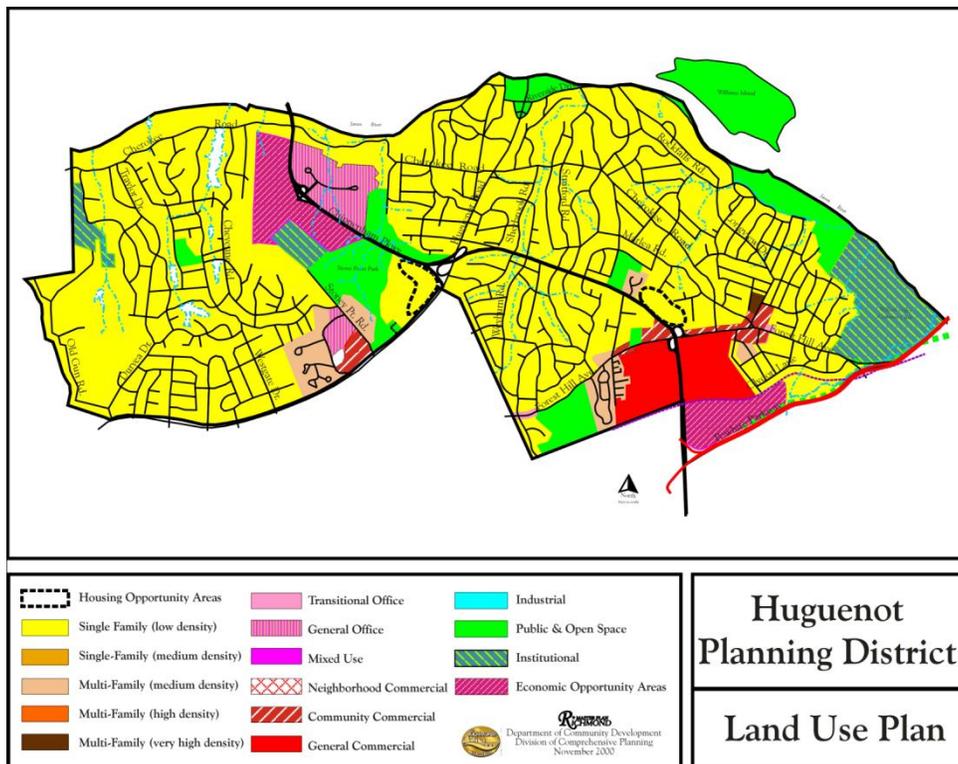
**FIGURE 3-55: EAST PLANNING DISTRICT LAND USE PLAN**



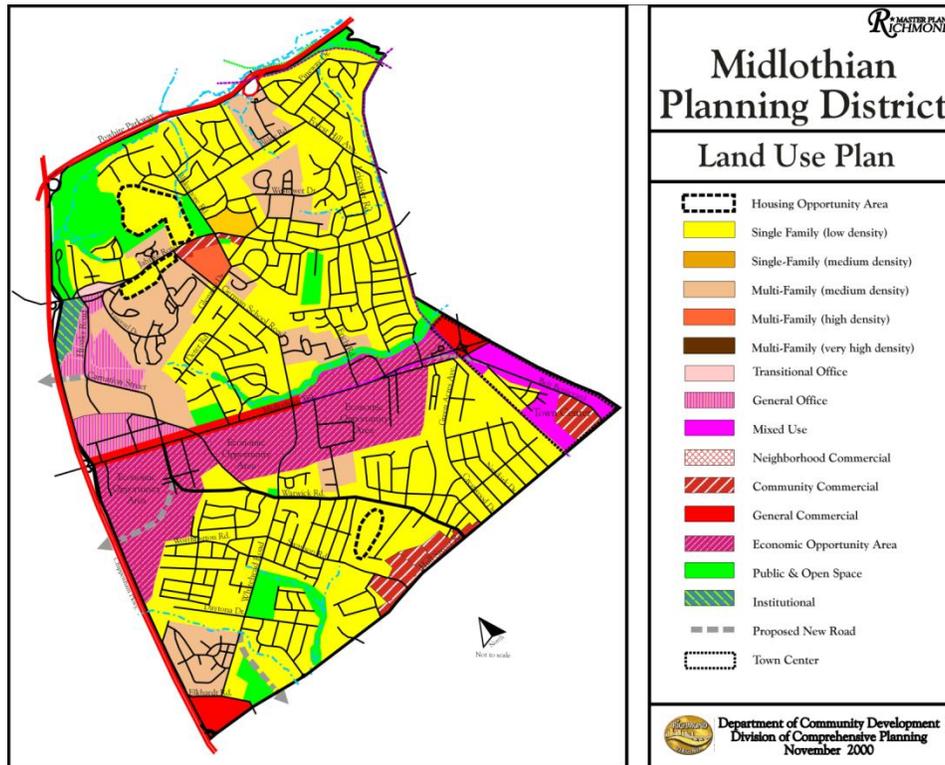
**FIGURE 3-56: FAR WEST PLANNING DISTRICT LAND USE PLAN**



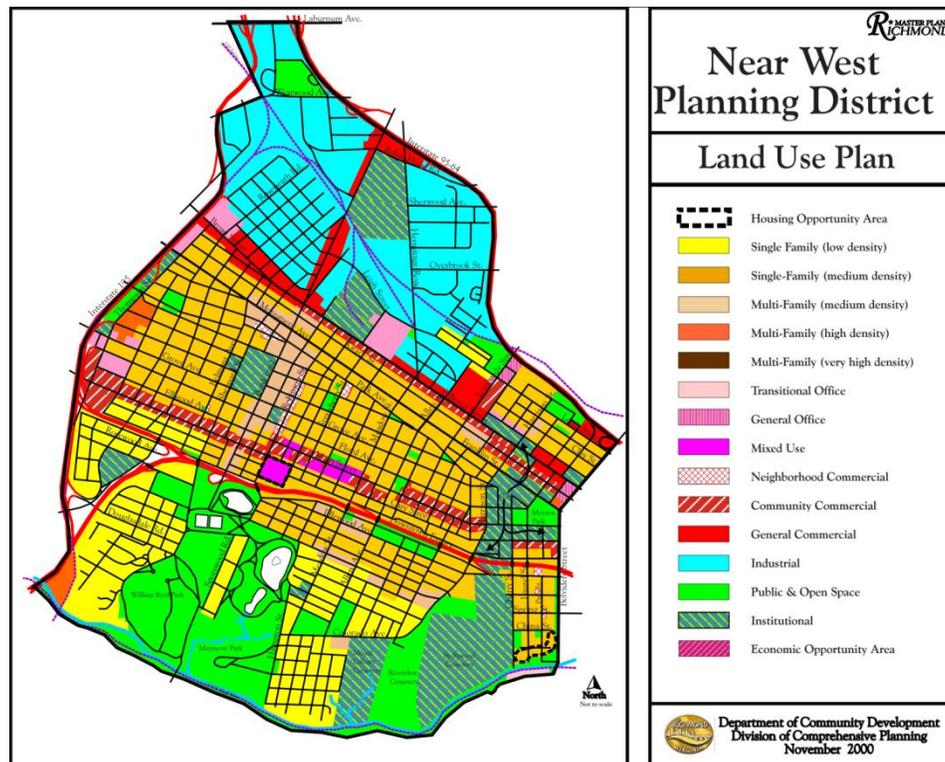
**FIGURE 3-57: HUGUENOT PLANNING DISTRICT LAND USE PLAN**



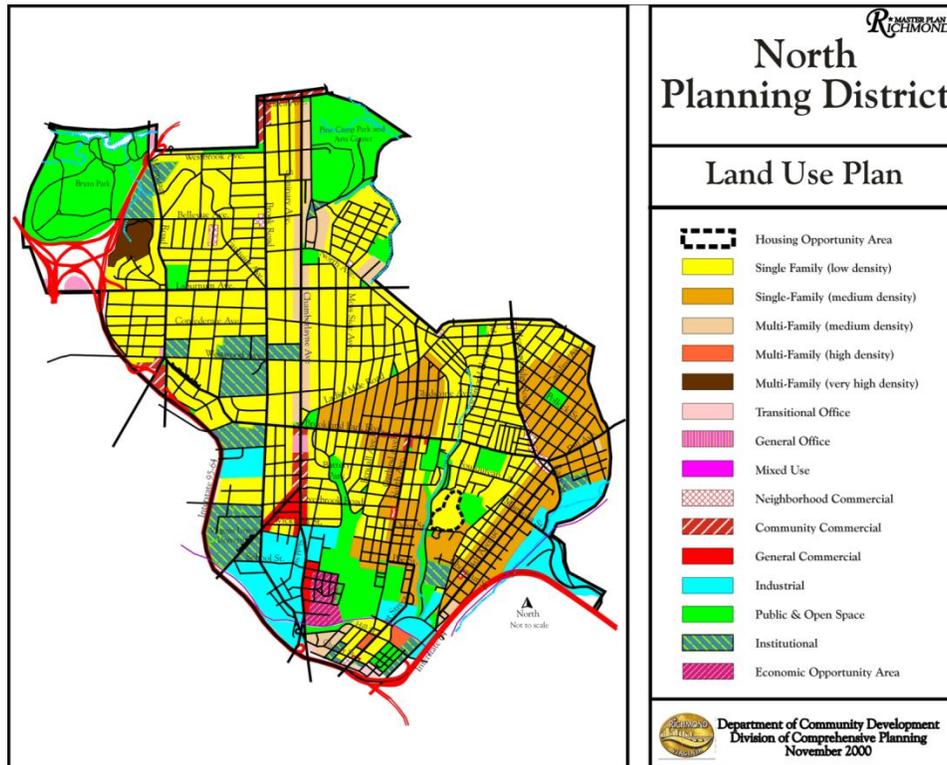
**FIGURE 3-58: MIDLOTHIAN PLANNING DISTRICT LAND USE PLAN**



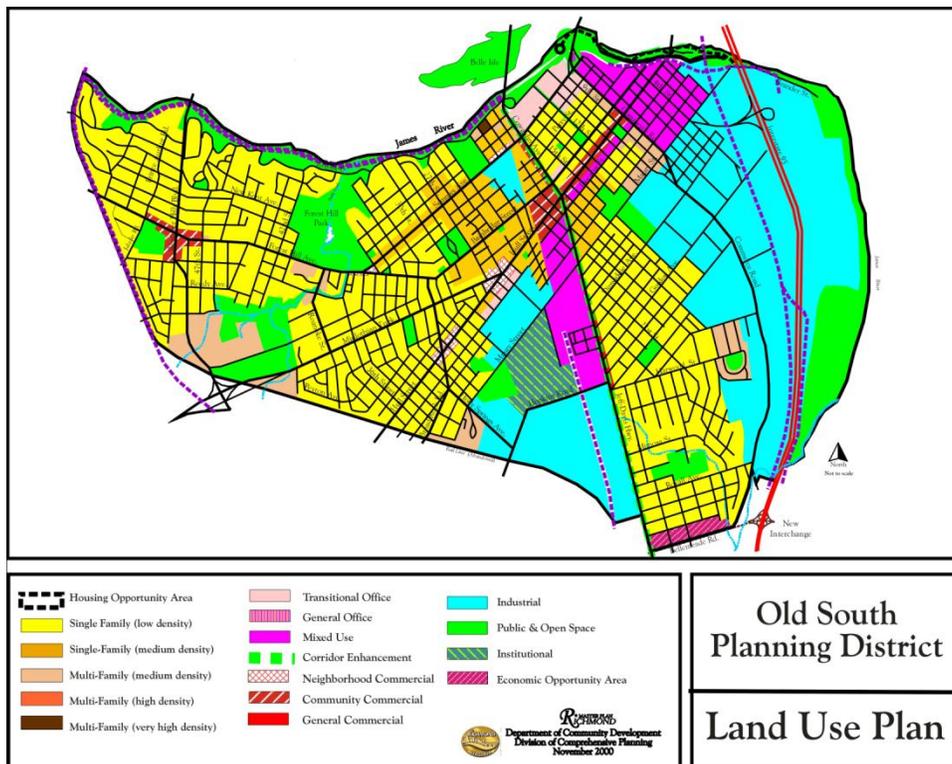
**FIGURE 3-59: NEAR WEST PLANNING DISTRICT LAND USE PLAN**



**FIGURE 3-60: NORTH PLANNING DISTRICT LAND USE PLAN**



**FIGURE 3-61: OLD SOUTH PLANNING DISTRICT LAND USE PLAN**



**Figure 3-62** shows recommended transportation improvements city-wide while **Figures 3-63 through 3-70** illustrate the transportation improvements suggested for each planning district. Regional rail or high speed rail (HSR) is proposed for Richmond along current Amtrak corridors and corridors owned by freight companies, such as the southern corridor owned by CSX. Light rail is proposed along Broad Street from Henrico County into downtown, south on 9<sup>th</sup> Street through Manchester and the Old South District and south on Jefferson Davis Highway. Another conceptual light rail route is proposed along Semmes Avenue and Midlothian Turnpike west to Chesterfield County. Express bus service is proposed along Interstates 95 and 195 and VA-76/Powhite Parkway.

Improvements for Broad Rock suggest bicycle routes along Broad Rock Boulevard, Jefferson Davis Highway and Warwick Road, as shown in **Figure 3-63**. Additionally, light rail is suggested along Jefferson Davis Highway which would progress north through the Old South neighborhood and into Downtown Richmond and south into Chesterfield County. An interchange is suggested for I-95 at Bellemeade Road to improve highway access for this District. Express bus service is suggested along I-95. Regional commuter rail or a HSR corridor along the CSX right-of-way is suggested which would proceed north to the Downtown Richmond Main Street Amtrak station.

Suggestions for the East Planning District, shown in **Figure 3-64**, include interchange improvements on I-95 at Broad Street (14<sup>th</sup> and Broad Streets improvements) and Main Street (reconfiguration of 15<sup>th</sup> Street to access Main Street instead of Franklin Street), bicycle routes through the Shockoe Bottom and downtown areas, along Broad Street/Government Road, Fairfield Avenue, Oliver Hill Way and N 18<sup>th</sup> Street. Further, light rail is suggested along the rail corridor adjacent to Gillies Creek and Stony Run Drive to access Shockoe Bottom and downtown. Regional commuter rail or HSR is suggested to tie into the Amtrak station.

Transportation improvement proposals for the Far West Planning District include light rail along I-195. Bike routes are suggested along Grove Avenue and Patterson Avenue from the District's western boundary to Westmoreland Street, as shown in **Figure 3-65**. Another series of routes will follow Grove to Three Chopt Road to Towana and around the Country Club and along St. Christopher's Road. Proposed operational improvements such as striping dedicated left turn lanes on Broad Street and Three Chopt Road would possibly lead to less congestion and better on-time performance through these corridors. Light rail is proposed along Broad Street which would connect with downtown and Henrico County.

Proposed bike routes that follow the James River along the northern periphery of the Huguenot Planning District and along Forest Hill Avenue are outlined in **Figure 3-66** along with regional commuter and HSR through the southeast part of the District, both of which would tie in to the existing Amtrak station downtown. Interchange improvements are proposed for Powhite Parkway at Forest Hills Avenue (also included in the Midlothian Planning District transportation proposals) and Chippenham Parkway at Huguenot Road. The latter has proposed additional lanes from the interchange south to Forest Hills Avenue. Smoother traffic at these interchanges may benefit current GRTC routes.

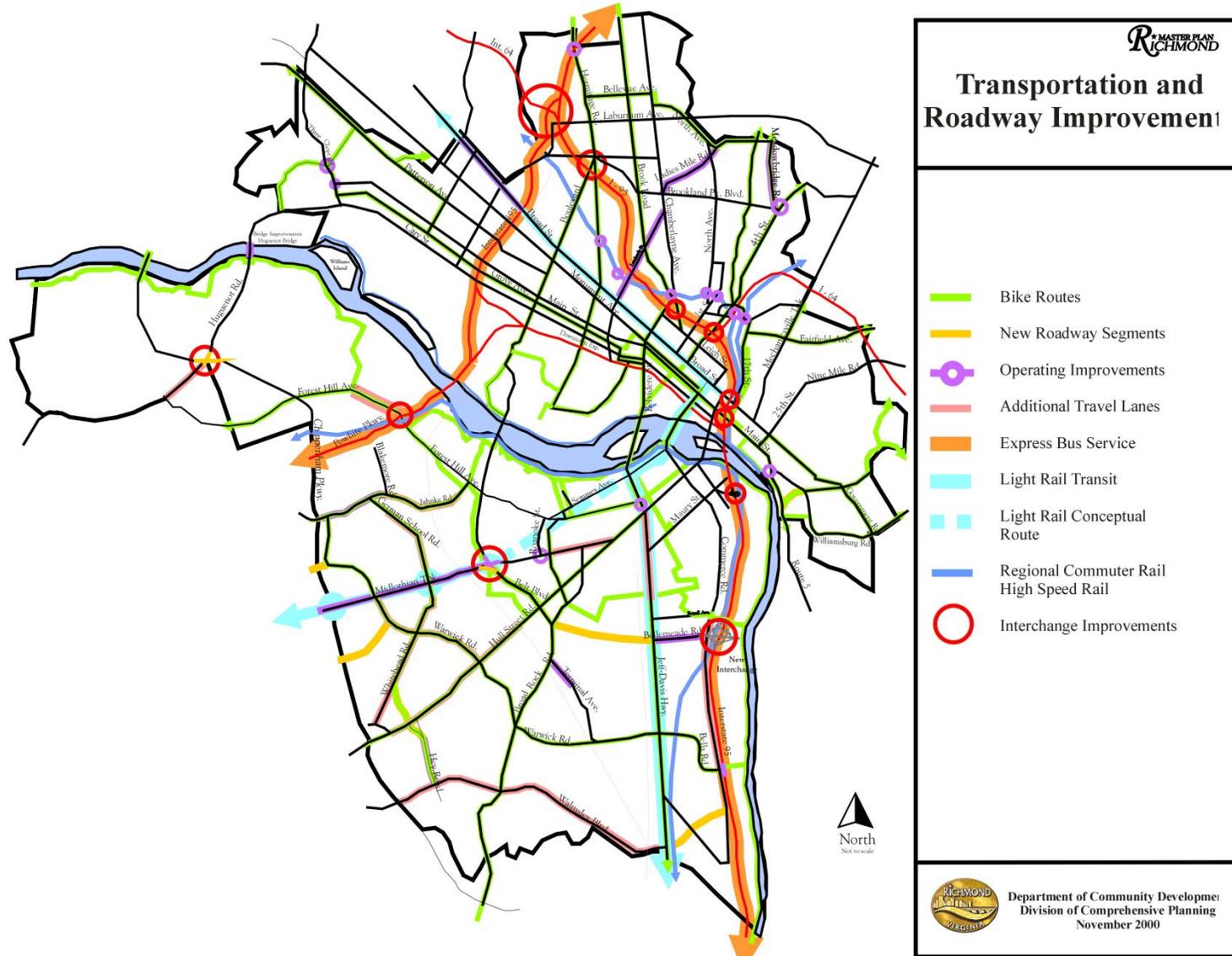
Major transportation improvement proposals for the Midlothian Planning District as shown in **Figure 3-67** include two interchange improvements, the second of which is at Midlothian Turnpike and Belt Boulevard and aims to support transit operations and proposed light rail. Hull Street, Jahnke, and German School Roads are proposed to be widened, which may alleviate congestion, and a connection is proposed between Warwick Road/Carnation Street with Cloverleaf Drive south of the Cloverleaf Mall. District-wide improvements in sidewalks and road edges are also suggested on major corridors.

The transportation proposals for the Near West District are shown in **Figure 3-68**. Interchange improvements are shown for I-95/I-64 at Belvidere and Chamberlayne, and at Boulevard and Heritage Roads. A comprehensive study for The Fan area for one-way streets and conversions, Downtown Expressway access points, traffic calming and safety enhancements is requested. Proposed light rail connecting Henrico County to downtown along with operational improvements to increase safety and relieve congestion is proposed for Broad Street.

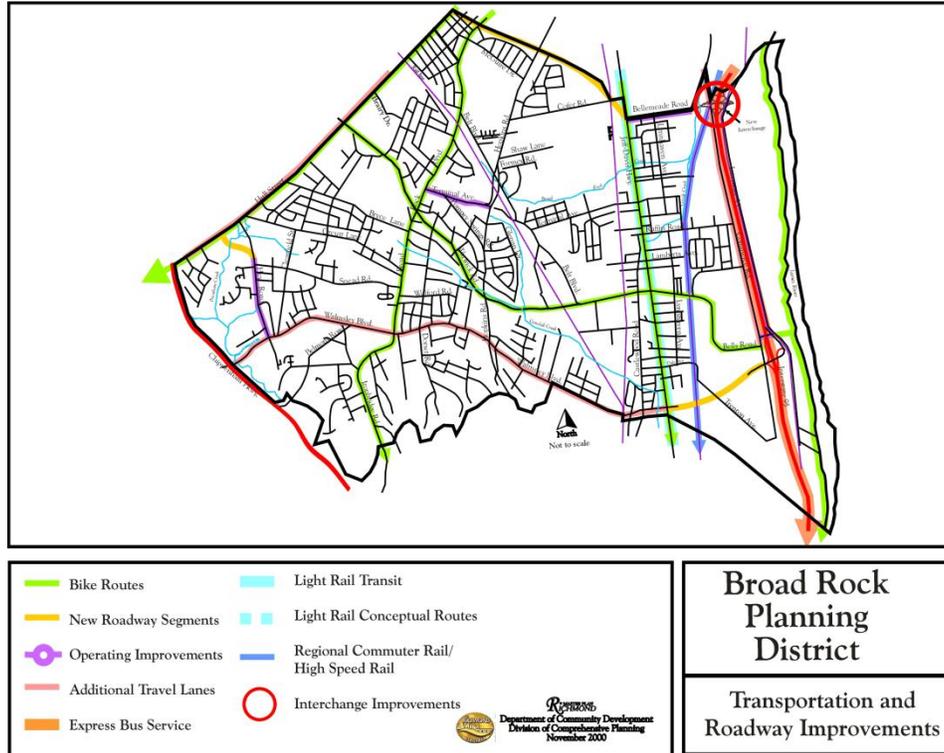
The North Planning District's transportation proposals are shown in **Figure 3-69**. Numerous interchange improvements are proposed along I-95/I-64: at Belvidere and Chamberlayne, at Boulevard and Heritage Roads (both previously mentioned in the Near West District plans) and the largest at I-195 and I-95/I-64. Operational improvements are suggested along Lombardy Street and Meadowbridge Road. Traffic circulation improvements are also suggested at Meadowbridge Road/Dill Avenue/Brookland Park Boulevard due to numerous intersections in a relatively short segment of street.

Transportation improvements for the Old South Planning District (**Figure 3-70**) include an interchange addition for I-95 at Bellmeade Road, interchange safety improvements at Maury and 4<sup>th</sup> Streets in the Manchester area, and a reconfiguration at Midlothian Turnpike at VA-161. Operational improvements are called for at Mayo's Bridge, Midlothian Turnpike at Roanoke Street, and at Bainbridge Street at Jefferson Davis Highway. Jefferson Davis Highway is also proposed to have light rail transit, lane additions from Bainbridge to south of Hopkins Road and a bicycle route. Light rail is also proposed along 9<sup>th</sup> Street/Semmes Avenue through to Midlothian Turnpike on an undetermined right-of-way.

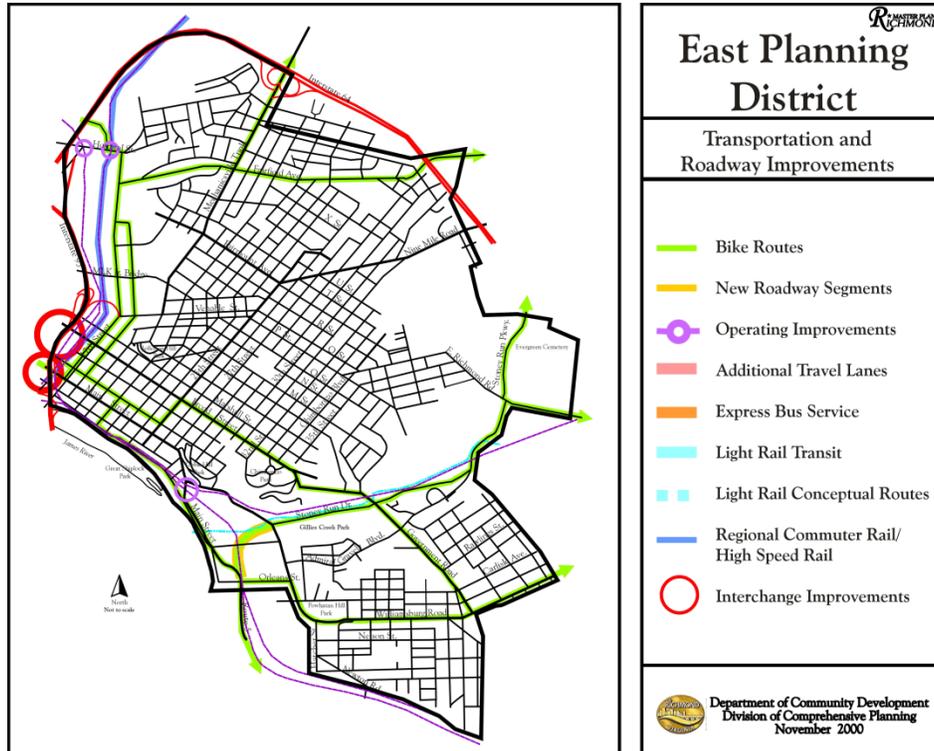
**FIGURE 3-62: CITY-WIDE TRANSPORTATION PLAN**



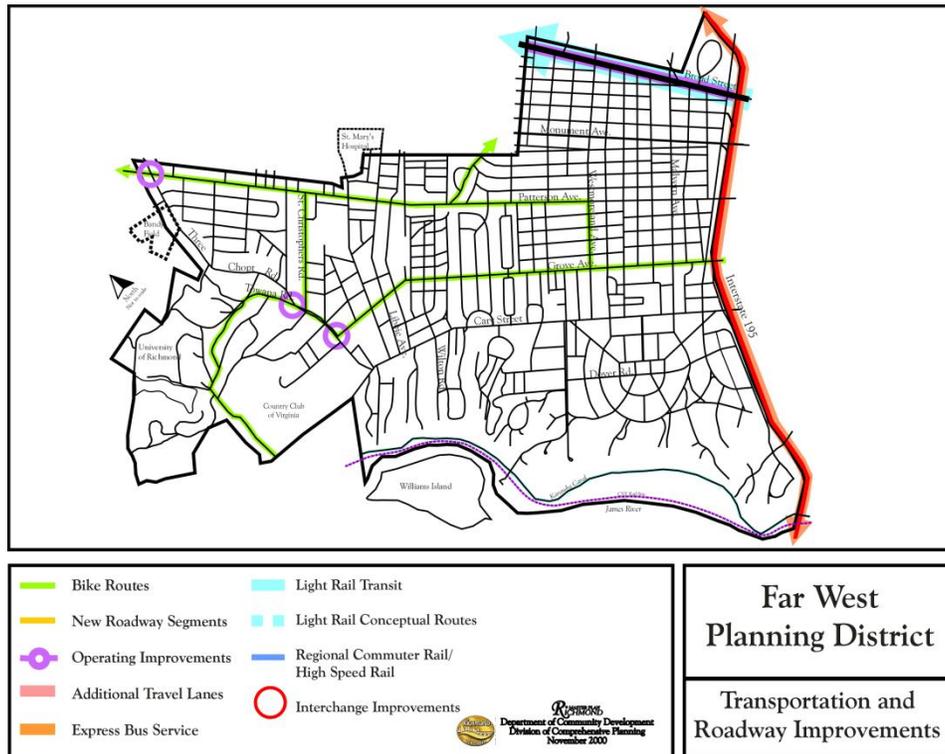
**FIGURE 3-63: BROAD ROCK PLANNING DISTRICT TRANSPORTATION PLAN**



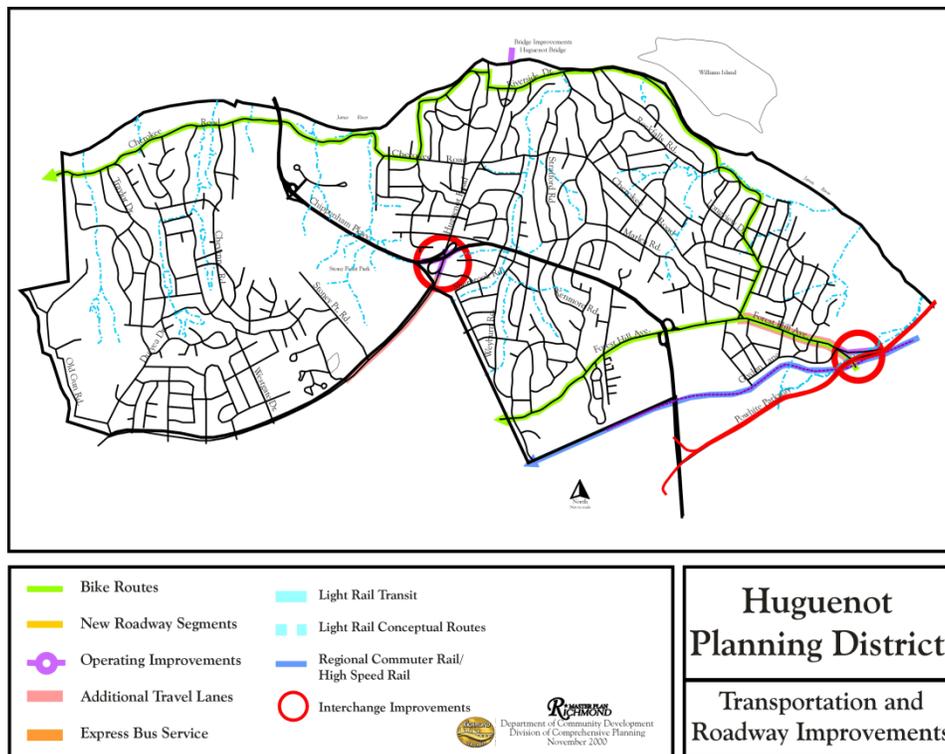
**FIGURE 3-64: EAST PLANNING DISTRICT TRANSPORTATION PLAN**



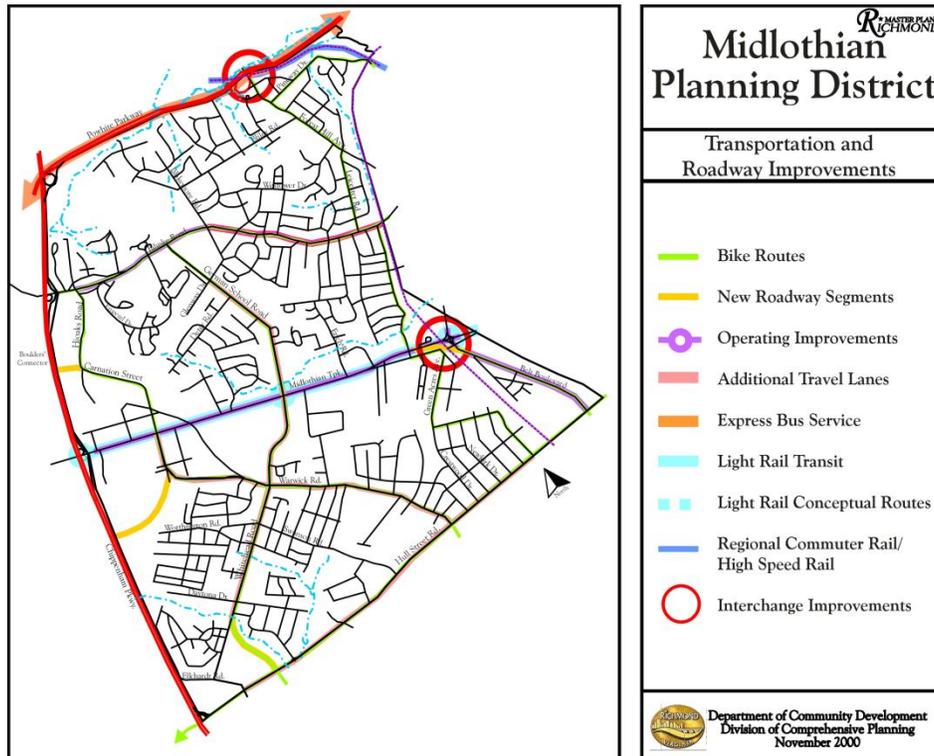
**FIGURE 3-65: FAR WEST PLANNING DISTRICT TRANSPORTATION PLAN**



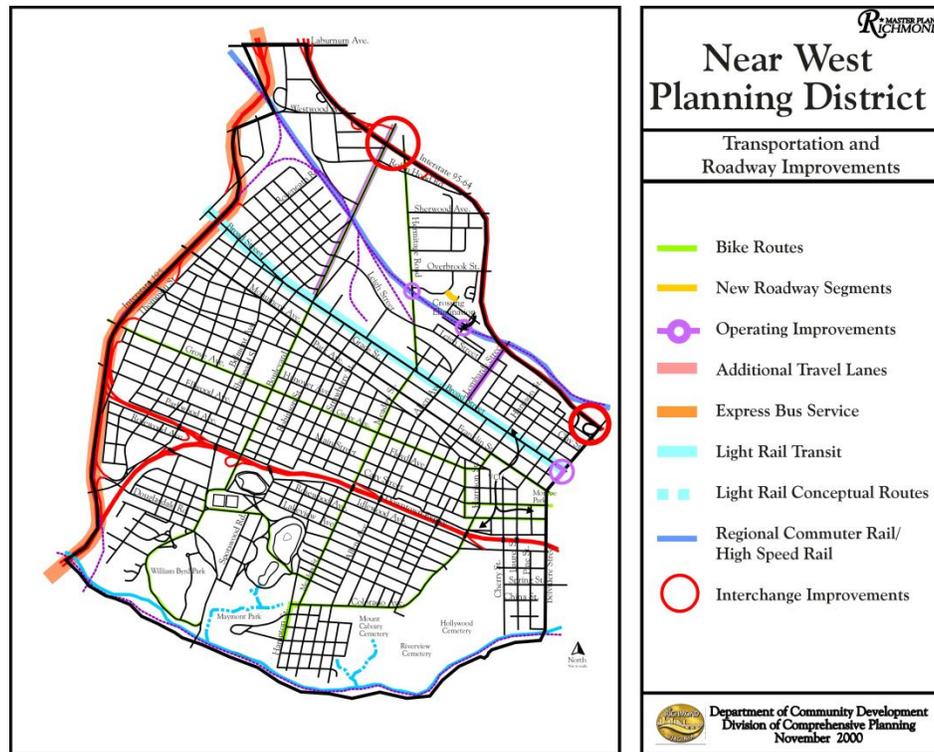
**FIGURE 3-66: HUGUENOT PLANNING DISTRICT TRANSPORTATION PLAN**



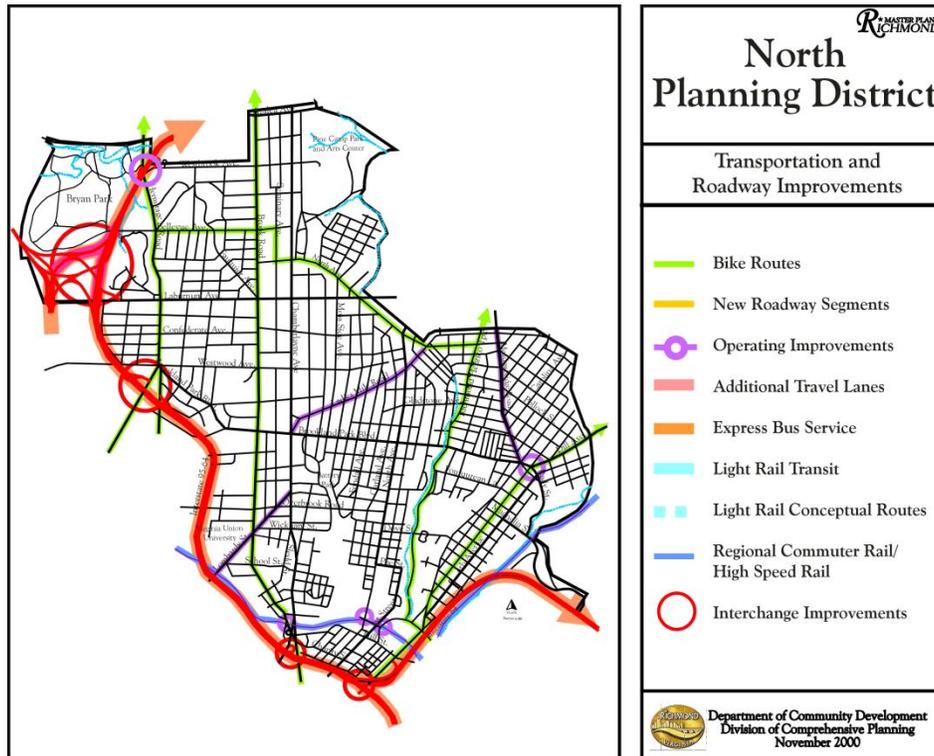
**FIGURE 3-67: MIDLOTHIAN PLANNING DISTRICT TRANSPORTATION PLAN**



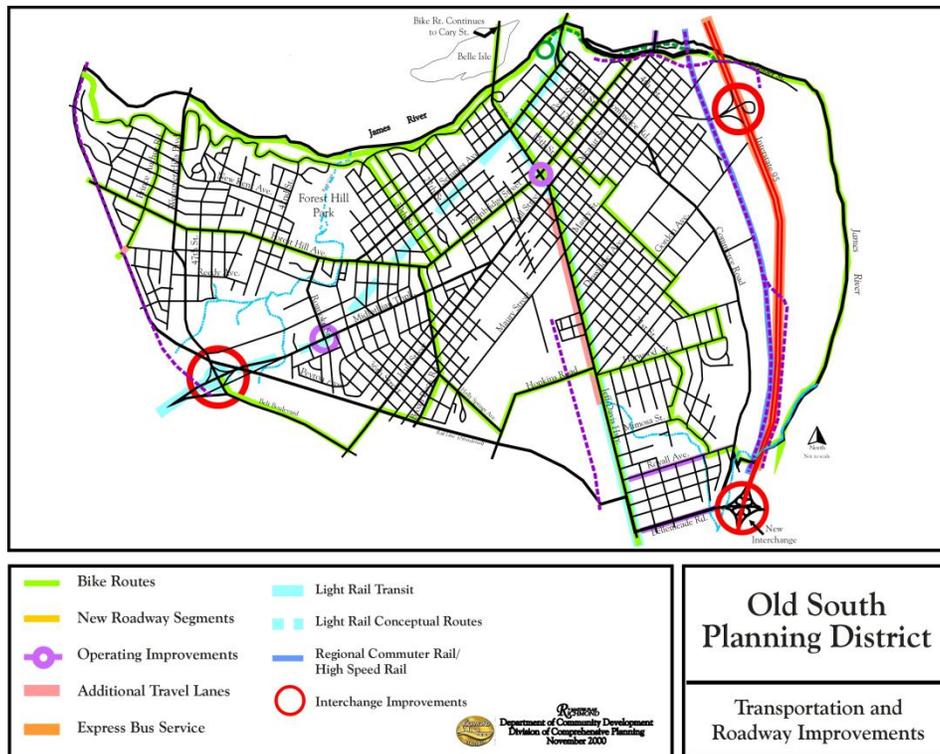
**FIGURE 3-68: NEAR WEST PLANNING DISTRICT TRANSPORTATION PLAN**



**FIGURE 3-69: NORTH PLANNING DISTRICT TRANSPORTATION PLAN**



**FIGURE 3-70: OLD SOUTH PLANNING DISTRICT TRANSPORTATION PLAN**



*HENRICO COUNTY*

Henrico County is predominantly single family residential in land use and will likely continue to be so in the future, as shown in **Figures 3-71** and **3-72**. Commercial corridors exist along US-250, US-33, and US-1, with some large developments along Laburnum Avenue from the Richmond International Raceway to White Oaks Village at I-64. Much of the southeastern part of the County is vacant forest lands. Industrial uses are mostly confined to around the airport, along I-64 and at the northern end of Richmond at I-64 and I-95 with some corridor industrial along US-33 and US-250.

Much of the County's current vacant land is proposed to be agricultural lands in the future land use map as shown in **Figure 3-72**. Piecemeal industrial parcels near the airport as well as along I-64 will be joined by planned industrial. U.S Routes 1, 33 and 250 will feature mixed use, governmental, and corridor commercial uses. A large part of the county along Cox Road near I-295 and I-64 considered in the Innsbrook Area Study is planned to be redeveloped into a mixed-use traditional neighborhood development and has the potential to house many residents and uses. The area is currently 1,351 acres and contains 8.6 million square feet of office and retail space.

*CHESTERFIELD COUNTY*

Chesterfield County is currently in the process of completing a new comprehensive plan, "Chesterfield Countywide Comprehensive Plan, 2011". As of the writing of this TDP, a final document was not complete. Future updates to this TDP should consider land use and transit recommendations identified in the comprehensive plan once it is complete.

The current land use plan map from October 2011 for Chesterfield County is presented in **Figure 3-73**. Much of the land use identified in the current land use plan is suburban residential, with high density residential, retail, and mixed use centers located along major corridors, including Midlothian Turnpike, Chippenham Parkway, Route 360 and Jefferson Davis Parkway.

FIGURE 3-71: HENRICO COUNTY EXISTING LAND USE PLAN

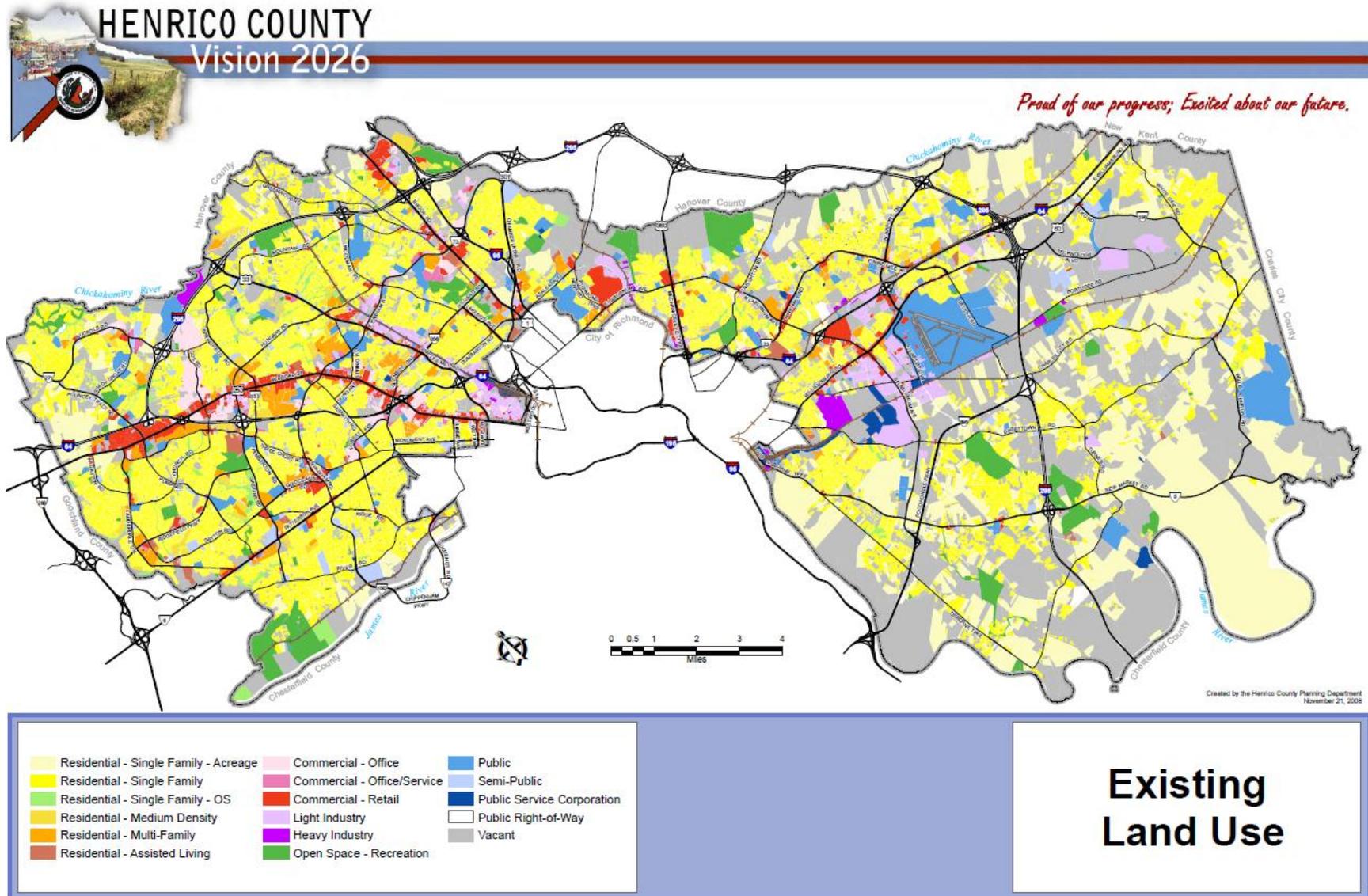
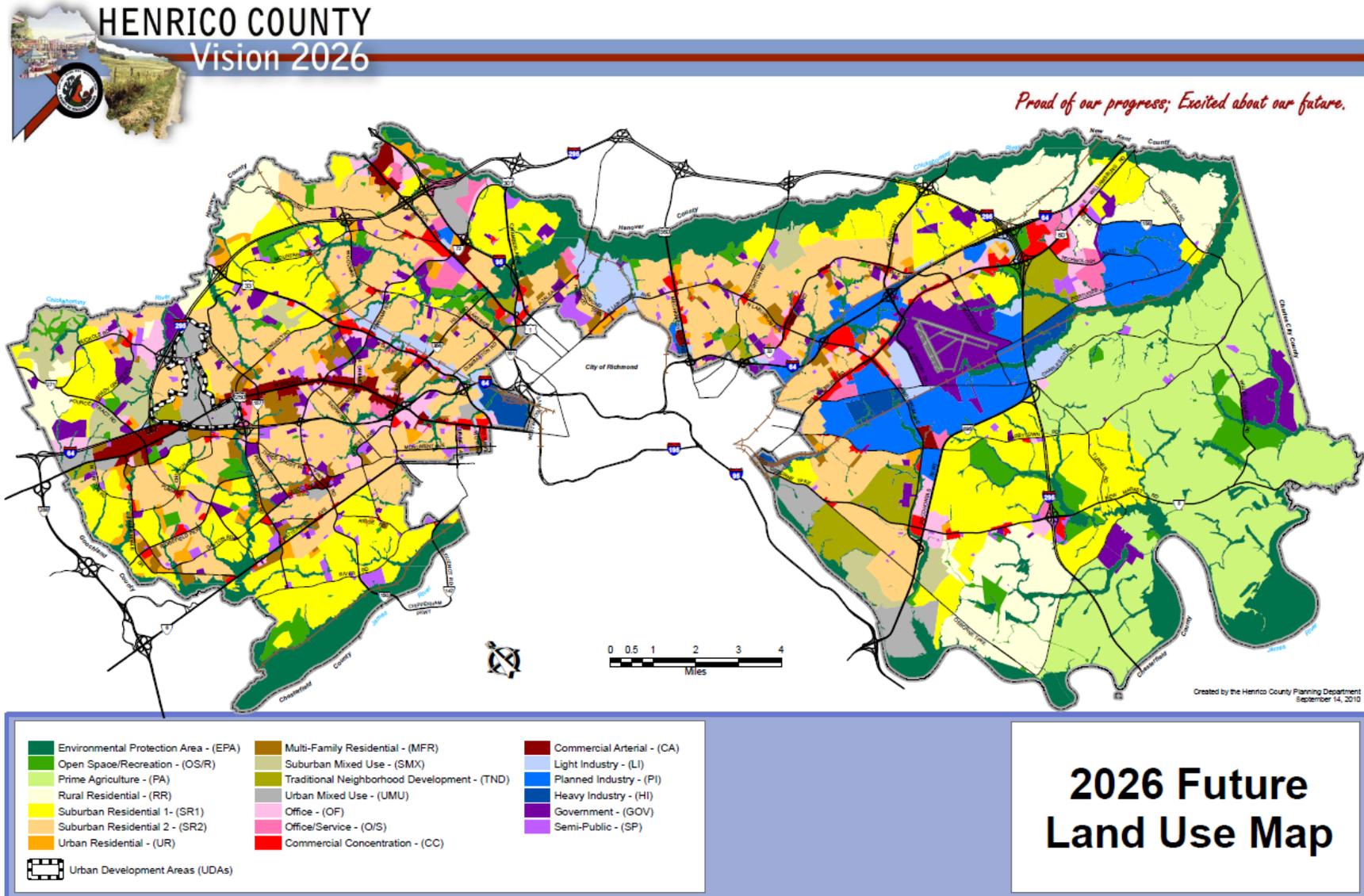
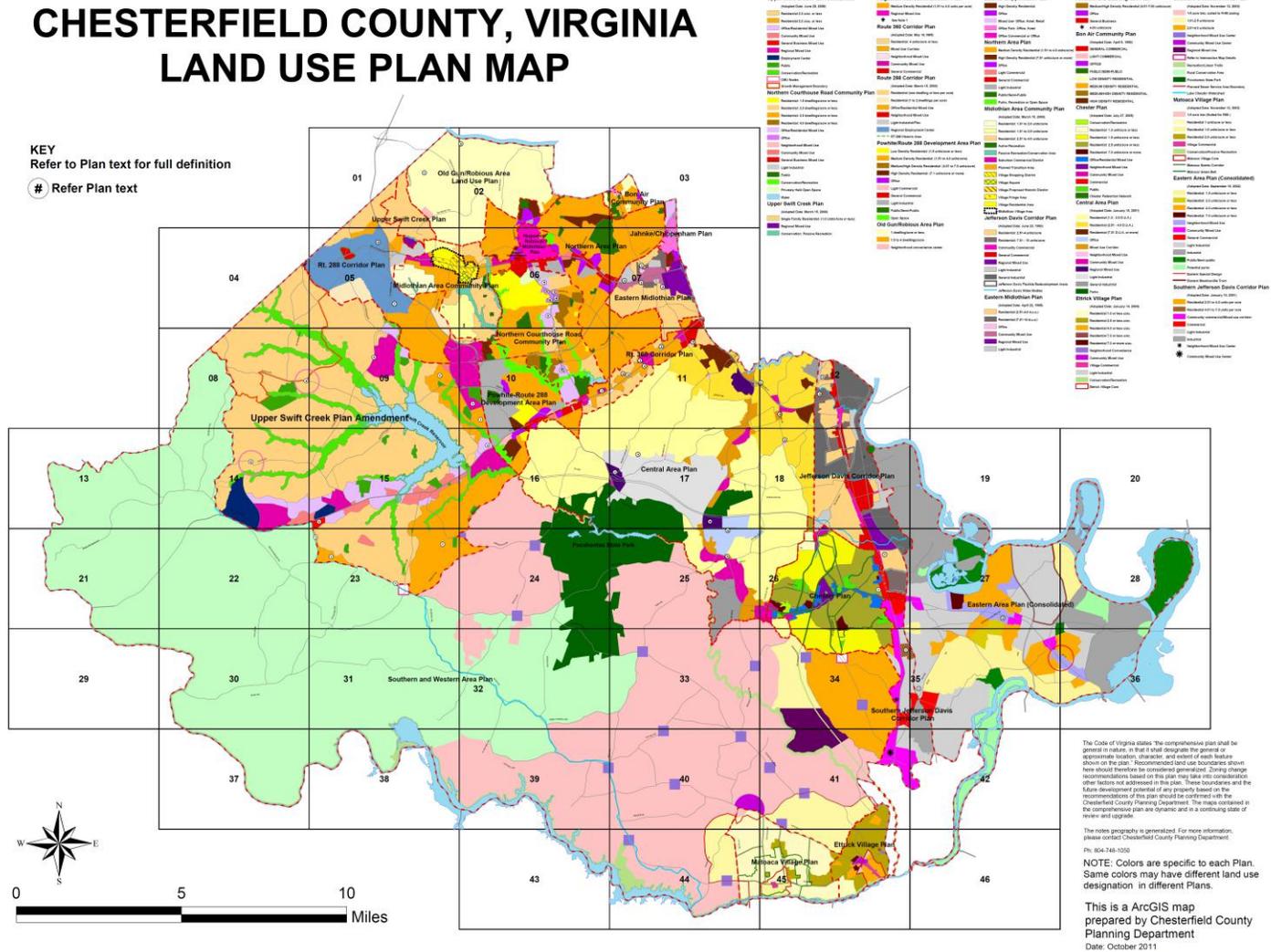


FIGURE 3-72: HENRICO COUNTY 2026 FUTURE LAND USE PLAN



**FIGURE 3-73: CHESTERFIELD COUNTY DRAFT LAND USE PLAN**



## BICYCLE AND PEDESTRIAN PLANS

Bicycle and pedestrian access complements GRTC's transit service by providing safe and convenient access to transit, and provides the ability to safely complete the final leg of the trip from transit to the destination. GRTC's entire fleet is equipped with bicycle racks; however, sidewalks and bike facilities are important to encourage these users to ride transit. The following is a summary of existing conditions and proposed changes to the existing network of bicycle and pedestrian facilities throughout Richmond, Henrico County and Chesterfield County.

### *RICHMOND*

The City of Richmond, by far, has the most developed network of bicycle routes compared to the two Counties. The city is committed to becoming a bike friendly community and is in the process of placing bike racks throughout the city. However, the city has only a few miles of separated pathways compared to the Counties. Many routes throughout Richmond are striped lanes or sharrows in shared traffic lanes. Separated paths tend to be within the core Richmond area while pathways snake across many areas of the city. **Figure 3-74** shows the existing bicycle facilities in Richmond.

### *HENRICO COUNTY*

The 2009 Henrico County Comprehensive Plan states the County's 4-lane corridors may be used by more advanced cyclists comfortable with shared-traffic routes but recommends the County's recreational areas and parks for less experienced cyclists. Currently, the County has two routes, US Bike Routes 1 and 76, and proposes a bike route to the southeast of the County. **Figure 3-75** shows the three routes and their placement through the County.

### *CHESTERFIELD COUNTY*

As previously mentioned, Chesterfield County is in the process of completing a comprehensive plan which will present a recommended bicycle network across the County as well as portions already constructed. As of the date of this writing, the final plan was not complete. Future updates should consider existing and proposed bike and pedestrian access for transit recommendations in Chesterfield County.

**FIGURE 3-74: RICHMOND DRAFT BICYCLE AND PEDESTRIAN EXISTING CONDITIONS MAP**

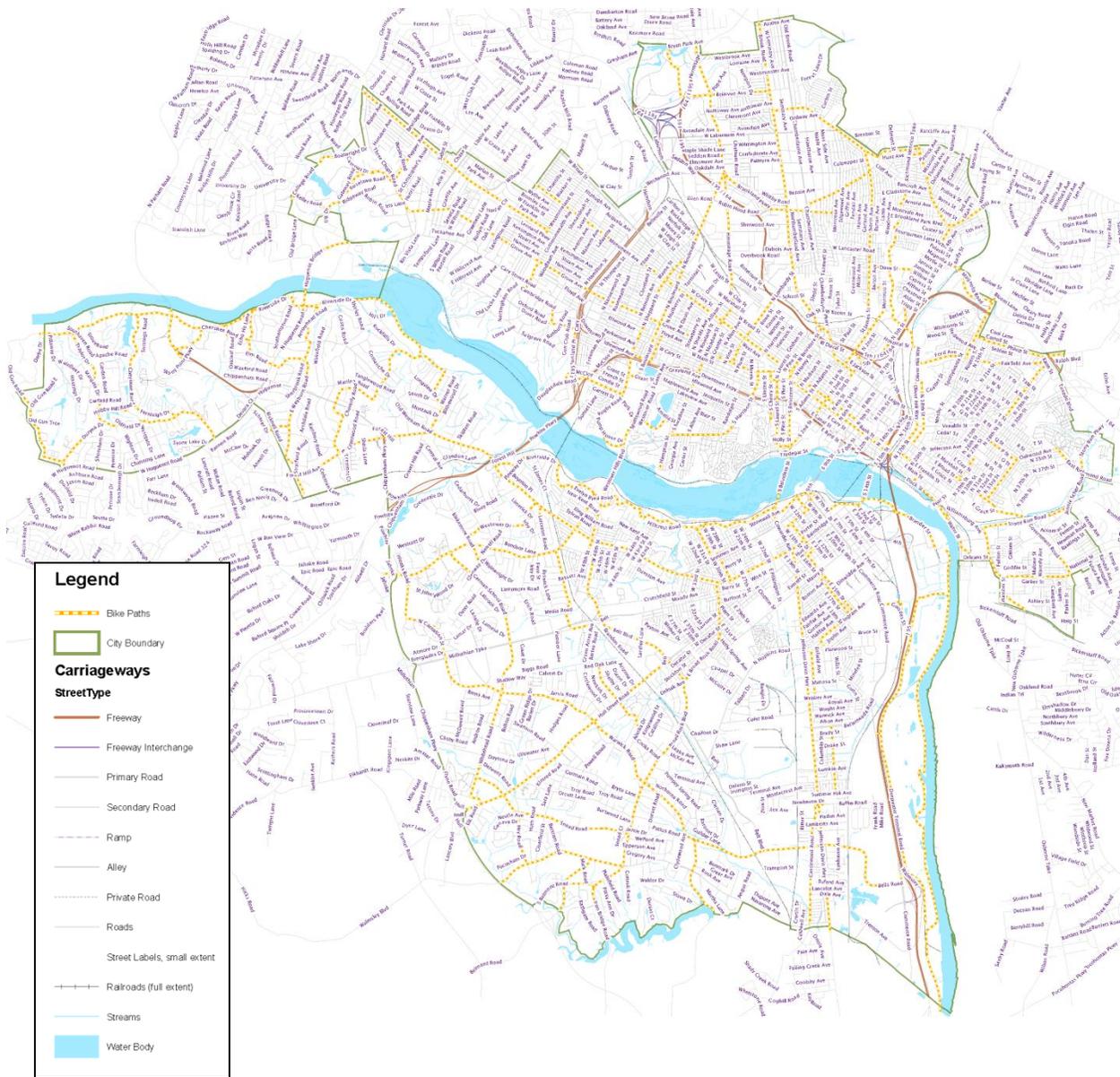
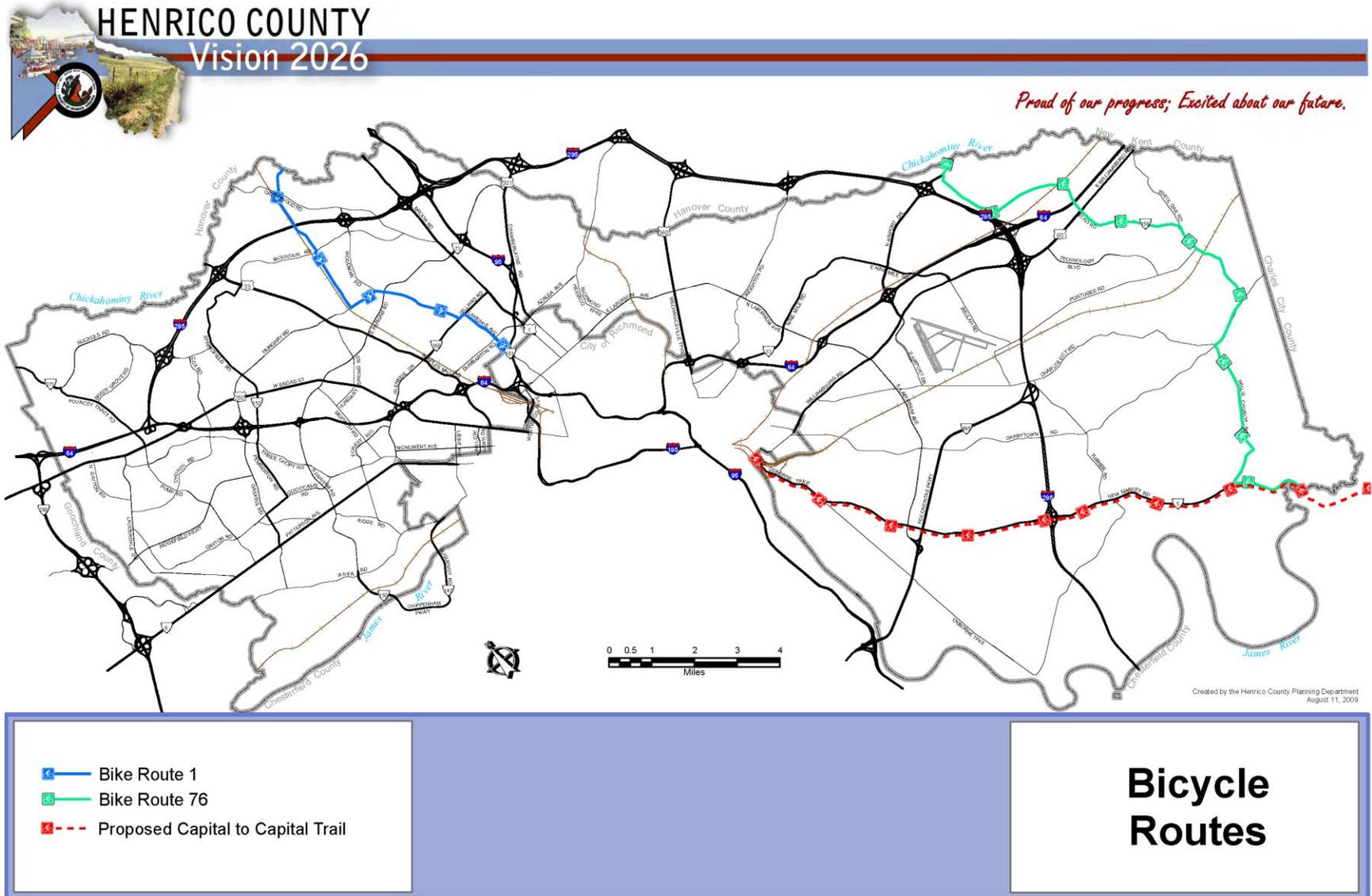


FIGURE 3-755: HENRICO COUNTY DRAFT BICYCLE AND PEDESTRIAN EXISTING AND PROPOSED ROUTES



## 4.0 TRANSIT SERVICE AND FACILITY NEEDS

This chapter identifies potential unconstrained service and facility needs for the GRTC service area. Service and facility/equipment needs are identified based on the evaluation conducted in previous chapters of this TDP, stakeholder meetings, and demographic analyses. A meeting with GRTC staff was also held to discuss potential service needs for inclusion in the TDP. Key findings that have been taken into consideration in identifying the unconstrained transit service and facility needs are as follows:

1. Analysis of ridership characteristics in **Chapter 3** of this TDP provided insight on where route realignments could occur and identified locations with high ridership activity that may warrant additional service or transfer center amenities.
2. Stakeholder outreach revealed a strong desire for a regional transit system; however, existing funding limitations create a challenge. Stakeholders also acknowledged the need to serve populations with the greatest need for transit, such as persons with disabilities, senior citizens, and persons with income below poverty.
3. The Richmond Regional Mass Transit Study, completed in 2008, identifies regional transit projects based on a three tier priority: Tier I - immediate need, Tier II – prior to 2031, and Tier III – after 2031. Descriptions of these projects are included in this chapter.
4. A review of GRTC’s 2008 Comprehensive Operational Analysis (COA) provided route alignment recommendations. The TDP’s list of unconstrained service needs includes updates to route recommendations where needed.
5. As future regional employment and population continues to grow outside of the GRTC service area, opportunities and challenges will arise on how to serve these areas in a cost effective and efficient manner.
6. Transit supportive areas not served by GRTC are beginning to emerge in western Henrico County, northern Henrico County, and portions of Chesterfield County.
7. A review of land use plans reveal the City of Richmond has prioritized transit with several major capital project investments proposed, including Broad Street Bus Rapid Transit and a downtown transit center.
8. An onboard survey analysis of GRTC passengers revealed a large number of regular riders that use transit as their primary means of transportation. Express riders are almost all choice riders with access to a vehicle. Needs identified in this chapter take into account those persons with the greatest need for transit, while expanding service options to all residents of the service area and the region.

Based on these findings, the following needs and service improvements are presented for consideration to be included in the FY2012-FY2017 TDP. It is important to note that this list represents ***potential*** TDP improvements, unconstrained by budget and not prioritized. Recommended improvements for the TDP six-year time period are identified in **Chapter 5**.

#### 4.1 UNCONSTRAINED SERVICE NEEDS

This section summarizes the unconstrained service needs for GRTC and the greater Richmond region. This is followed by capital needs in **Section 4.2**, and estimated costs in **Section 4.3**.

##### EXISTING GRTC SERVICE NEEDS

GRTC completed a Comprehensive Operations Analysis (COA) in 2008 with specific route recommendations. This section identifies the route specific needs from the COA, with modifications where applicable to update the service recommendations. This section also includes additional route improvement needs based on the service analysis and stakeholder outreach presented in **Chapter 3**.

##### LOCAL/FIXED ROUTE

Local bus service needs for GRTC's existing service area include systemwide and route specific needs. Systemwide, the following general needs have been identified:

**Clock Headways:** Providing schedules with clock headways for all routes wherever possible is recommended as a need in this TDP. Connecting routes should also be timed whenever possible to share the same headways at major transfer hubs identified in the capital needs section of this chapter.

**Span of Service:** Stakeholders expressed a need for longer service hours particularly to employment areas such as hospitals and retail centers where traditional work hours are less prevalent. The COA identifies the need for all routes to operate from 5:00 a.m. until 12:00 a.m. on weekdays, 6:00 a.m. to 11:00 p.m. on Saturday, and 6:00 a.m. to 10:00 p.m. on Sunday.

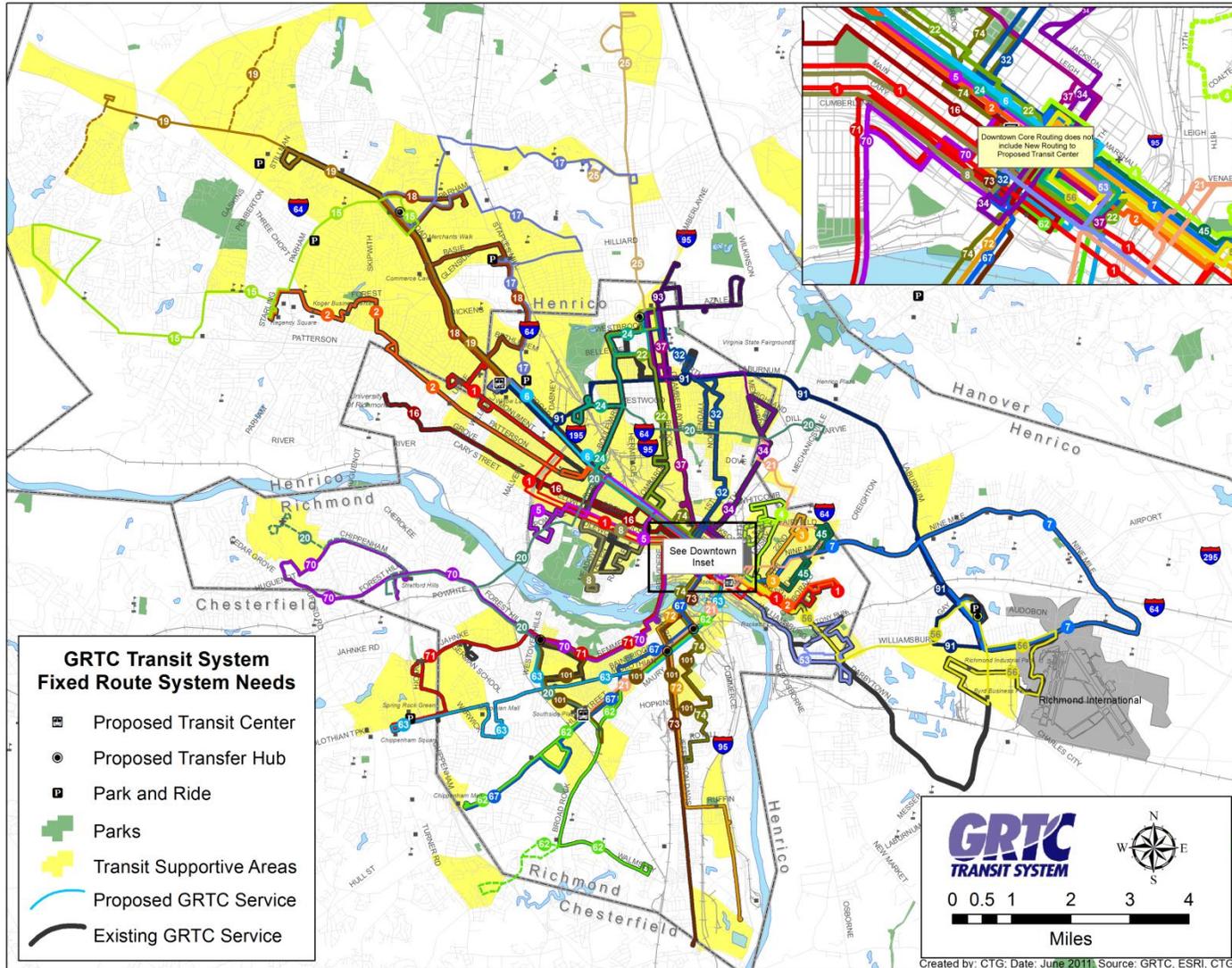
**Frequencies:** As defined in the COA and in **Chapter 2** of this TDP, local fixed-route service needs include a maximum headway of 15 to 20 minutes during the peak hours and 30 to 60 minutes during off-peak periods. This has been assumed for all routes, with a few exceptions outlined in later sections of this chapter.

**Downtown Transit Center:** With the addition of a downtown transit center, as identified in the capital needs section of this chapter, GRTC will need to modify route alignments in the downtown area to serve the new facility. While this TDP does not address specific alignment changes to the proposed site, it assumes changes to mileage will be minimal, and no additional costs will be incurred with these changes.

**Broad Street BRT:** The Broad Street BRT project described later in this chapter will require changes to headways and/or alignments for several of the routes that operate concurrently with the BRT service, such as Route 6, as well as to routes that connect to the service. As the BRT project progresses, proposed modifications to route headways and alignments should be included in future updates of this TDP.

**Figure 4-1** on the following page shows the unconstrained local bus service needs for the existing GRTC service area. The following route-specific needs for service within the current GRTC service area are described below.

**FIGURE 4-1 PROPOSED GRTC LOCAL FIXED ROUTE SYSTEM NEEDS**



**Route 1: Monument/Patterson/Churchill** – The GRTC COA recommends operating Route 1 on Main Street and Cary Street between 21<sup>st</sup> Street in Downtown Richmond and Thompson Street /Hamilton Street. With the exception of any rerouting needed to the proposed downtown transit center, the ends of the line remain the same, as shown in **Figure 4-2**.

*Alignment:* No changes are proposed to the alignment of Route 1 in the Churchill and Downtown Richmond area. Rather than traveling on Broad Street west of 21<sup>st</sup>, this route would travel via Main/Carey to Thompson/Hamilton, where it would travel to Monument Street to complete the route.

*Service Characteristics:* This route is proposed to operate from 5:00 a.m. until 11:00 p.m. on weekdays, and 6:00 a.m. to 11:00 p.m. on Saturday and Sunday. **Table 4-1** shows the proposed headways for Route 1.

Service Hours

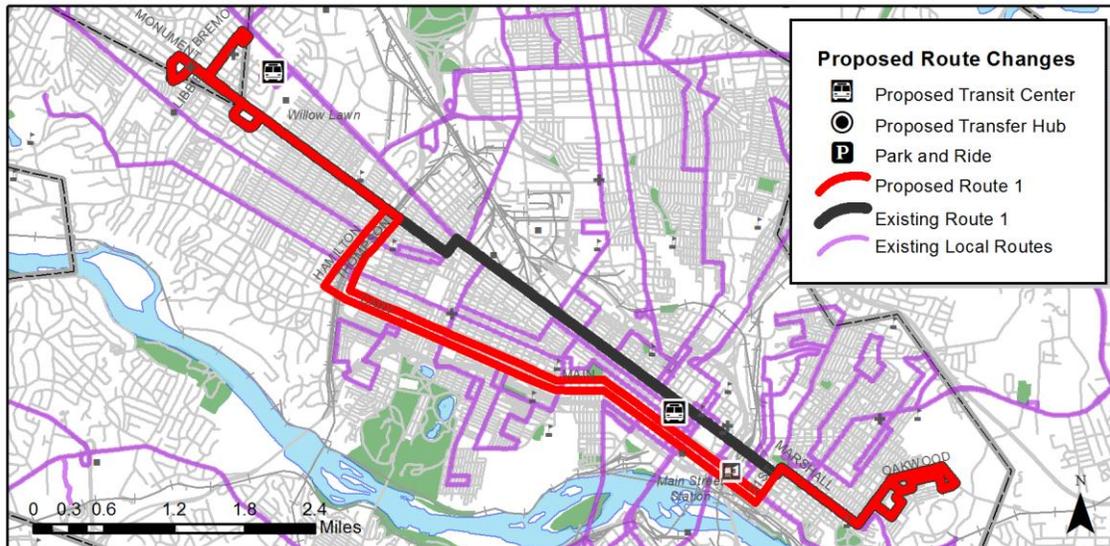
Weekdays: 5:00am – 11:00pm

Saturday and Sunday: 6:00am – 11:00pm

**TABLE 4-1: ROUTE 1 PROPOSED HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
1	15	30	30	30	30	30	15	30	30	30	30	30

**FIGURE 4-2: PROPOSED ROUTE 1 ALIGNMENT**



**Route 2 – Monument/Patterson/Churchill:** With the exception of downtown rerouting to accommodate the proposed downtown transit center, no changes are proposed for Route 2, as shown in **Figure 4-3**.

*Service Characteristics:* This route is proposed to have a separate schedule from Route 1. No changes are proposed to the span of service. Proposed frequencies for this route are as follows in **Table 4-2**.

Service Hours

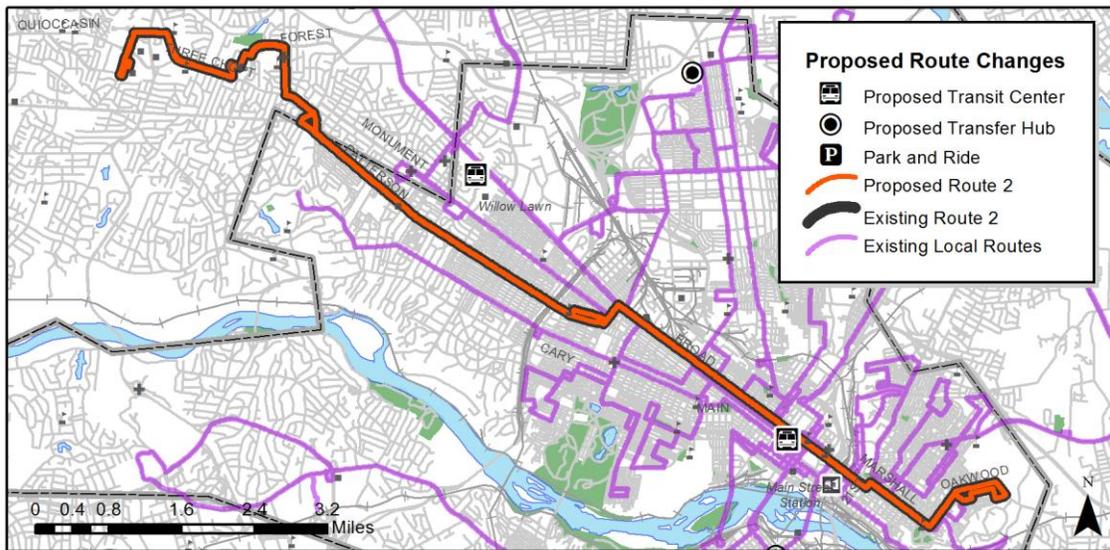
Weekdays: 5:06am – 12:54am

Saturday and Sunday: 5:42am – 1:00am

**TABLE 4-2: PROPOSED ROUTE 2 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
2	10	30	30	30	30	30	10	30	30	30	30	30

**FIGURE 4-3: PROPOSED ROUTE 2 ALIGNMENT**



**Route 3 Robinson/Fairmount:** The COA separates Route 3 and Route 3PP and eliminates the western portion of the route. The COA also recommends splitting the Route 3 from Route 4 and combining it with the Route 10.

*Alignment:* This TDP recommends ending the Route 3 at a downtown transfer location, currently at 8<sup>th</sup> and Marshall. This route would then travel on Broad to Marshall and would follow the existing alignment to Fairfield Court, as shown in **Figure 4-4**.

*Service Characteristics:* No changes are proposed to the span of service for this route. Proposed frequencies for this route are provided in **Table 4-3**.

Service Hours

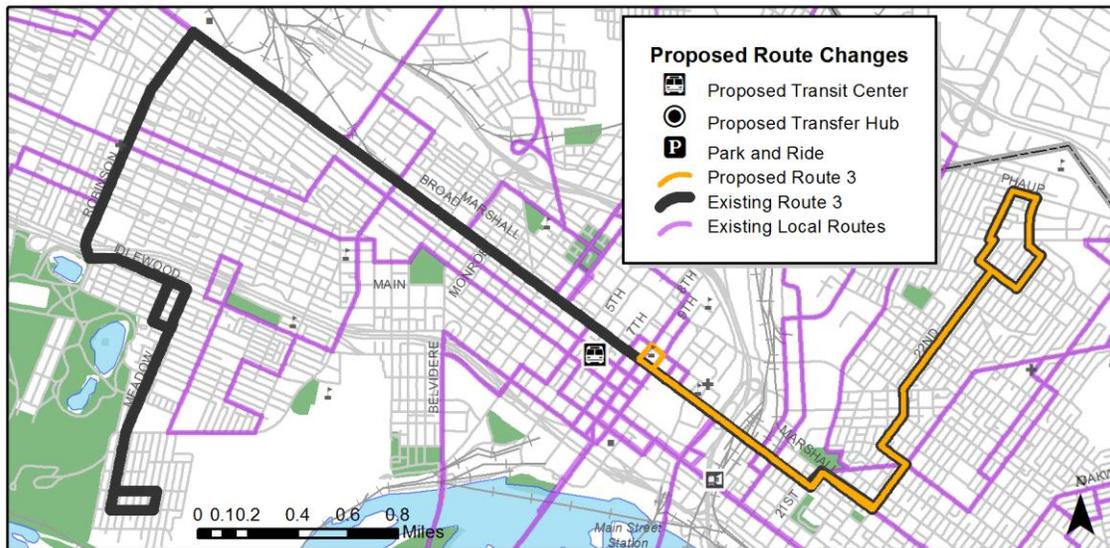
Weekdays: 5:22am – 12:34am

Saturday and Sunday: 5:25am – 12:38am

TABLE 4-3: ROUTE 3 PROPOSED HEADWAYS

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
3	15	30	30	30	30	30	15	30	30	30	30	30

FIGURE 4-4: ROUTE 3 PROPOSED ALIGNMENT



**Route 4 Robinson/Fairmont:** This TDP combines the eastern portion of Route 4 with the eastern portion of Route 11, and Route 11 is eliminated. The existing portion of Route 4 west of downtown becomes a new Route 5 and 8 described later in this section.

*Alignment:* From a downtown transfer location, currently at 8<sup>th</sup> and Marshall, this route travels along Broad Street to 21<sup>st</sup>, where it travels north to Jefferson and 21<sup>st</sup> to Mosby Street and Mechanicsville Turnpike. The route continues west on Whitcomb, south on Mecklenburg, east on Wood, south on Redwood Sussex, west on Hildreth, and east on Ford to return to Mechanicsville Turnpike and Downtown Richmond. To accommodate key destinations on Route 11, one alternative would be for every other trip to continue south on Mechanicsville Turnpike, west on Fairfield, south on Gay, west on Accommodation, south on Coalter, north on 18<sup>th</sup> and 17<sup>th</sup> to Fairfield and the Oliver Hill Court Building. The route would continue east on Fairfield to return to Mechanicsville Turnpike and Downtown Richmond, as shown in **Figure 4-5**.

*Service Characteristics:* No changes are proposed for the span of service for this route. **Table 4-4** shows the proposed frequencies for this route.

Service Hours

Weekdays: 5:30am – 12:30am

Saturday and Sunday: 5:30am – 12:30am

**TABLE 4-4: ROUTE 4 PROPOSED HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
4	15	30	30	30	30	30	15	30	30	60	60	60

**FIGURE 4-5: ROUTE 4 PROPOSED ALIGNMENT**



**Route 5 Belmont:** Route 5 is a new route that operates along the western portion of the existing Route 4.

*Alignment:* This route begins at 11<sup>th</sup> and Marshall, travels west on Broad, south on Harrison, west on Main Street, south on Belmont, west on Parkwood, south on McCloy, west on Idlewood, south on Rothesay, east on French, south on Freeman, east on Douglasdale, north on Belmont, west on Grant, north on McCloy, east on Grayland, north on Belmont, east on Cary, north on Robinson, and east on Broad Street to return to Downtown Richmond, as shown in **Figure 4-6**.

*Service Characteristics:* No changes are proposed to the span of service on this route. Proposed clock headways are provided in **Table 4-5**.

Service Hours

Weekdays: 5:17am – 12:55am

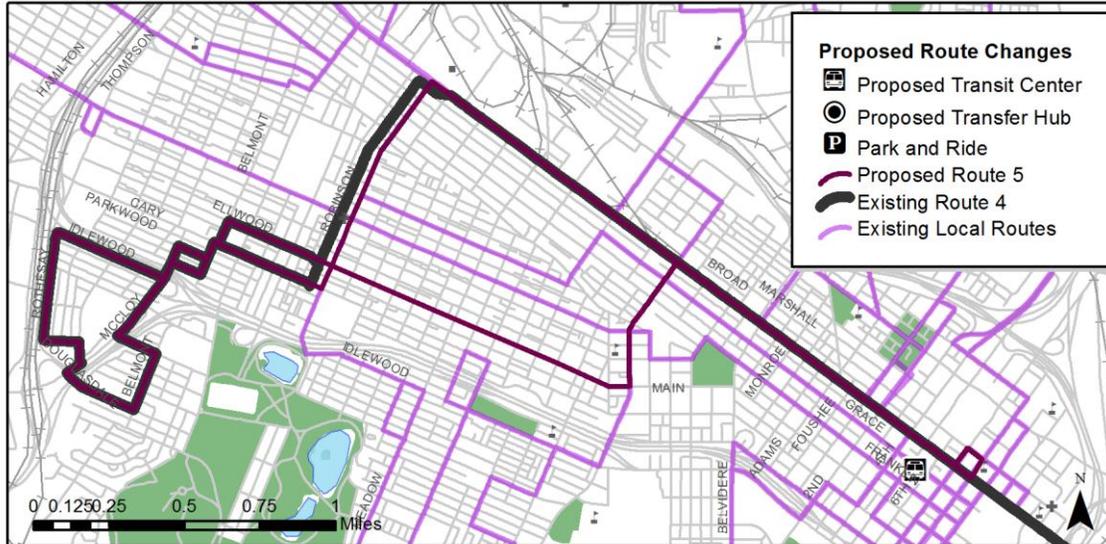
Saturday: 6:06am – 12:48am

Sunday: 6:06am – 12:48am

**TABLE 4-5: PROPOSED ROUTE 5 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
10	15	30	30	20	30	30	15	30	30	30	30	30

**FIGURE 4-6: PROPOSED ROUTE 5 ALIGNMENT**



**Route 6/53 – Broad Street:** With the implementation of the Broad Street BRT, GRTC intends to split Route 6 into two routes: Route 53 and Route 6. The eastern portion (Route 53) would serve both Darbytown and the Admiral Gravelly Loop, as shown in **Figure 4-7**.

*Alignment:* The alignment on Route 6 is proposed to operate from Downtown Richmond and would travel west on Broad Street to Willow Lawn. The proposed Route 53 would operate from Downtown Richmond and travel east on Main and Williamsburg Road to Henrico Arms and Edgelawn via Parker and Vinton Street. The route would then continue to complete a loop around the Montrose area via the existing routing from Darbytown Road, north on Parker Street, east on Carlisle, north on Central, west on Rawlings, north on Luray, west Accomac Street, east on Jennie Sher, west on Stony Run, south on Government Road, east on Admiral Gravelly, southwest on Carlisle to Government Road, where the route would travel south to return to Williamsburg Road and Downtown Richmond. With the establishment of the Broad Street BRT, a connection would also be made to Rocketts Landing.

*Service Characteristics:* Service frequencies for Route 6 will be reduced when the Broad Street BRT service is implemented as shown in **Table 4-6**. Until then, no changes are proposed to the span of service or headways on Route 6.

Service Hours

Weekdays: 5:10am – 11:52pm

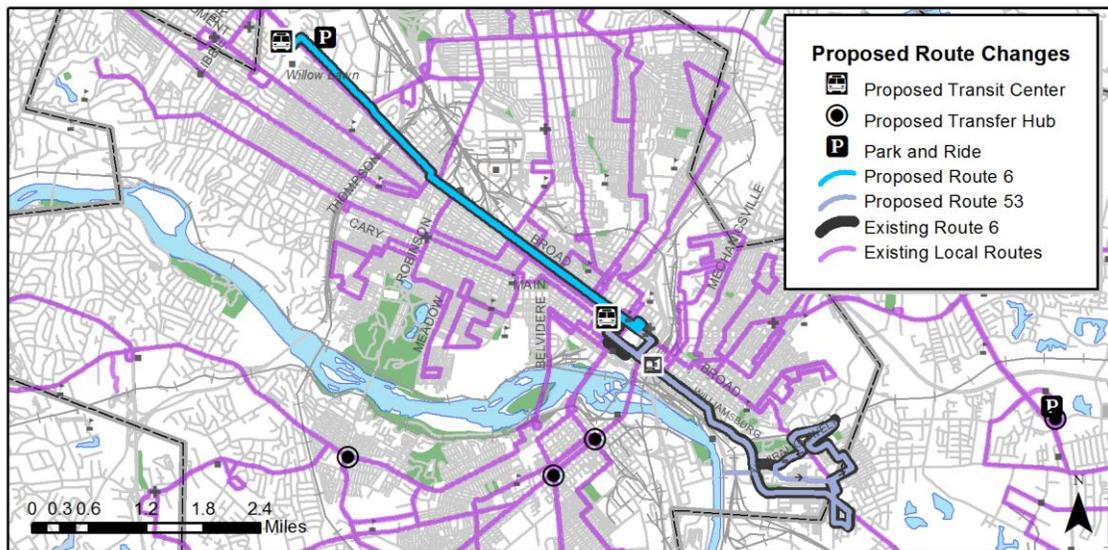
Saturday: 5:17am – 11:52pm

Sunday: 5:55am – 11:53pm

**TABLE 4-6: PROPOSED ROUTE 6 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
53	15	30	60	30	30	60	15	30	60	30	30	60
6	10	30	30	12	30	30	10	30	30	30	30	30

**FIGURE 4-7: PROPOSED ROUTE 53 AND ROUTE 6**



**Route 7-Seven Pines:** No changes are proposed to Route 7 in this TDP, as shown in **Figure 4-8**. A later section of this chapter addresses the potential for flex service in Eastern Henrico County. One strategy for Route 7 could be for GRTC to operate this route directly to White Oak Village, with the Laburnum/Nine Mile/Williamsburg loop operating as a deviated fixed-route service or demand response service to White Oak Village Shopping Center.

*Service Characteristics:* The span of service is proposed to be extended until 11:00 p.m. on weekdays, 6:00 a.m. until 11:00 p.m. on Saturday, and 6:00 a.m. to 10:00 p.m. on Sunday. Proposed clock headways are provided in **Table 4-7**.

Service Hours

Weekdays: 5:45am – 11:00pm

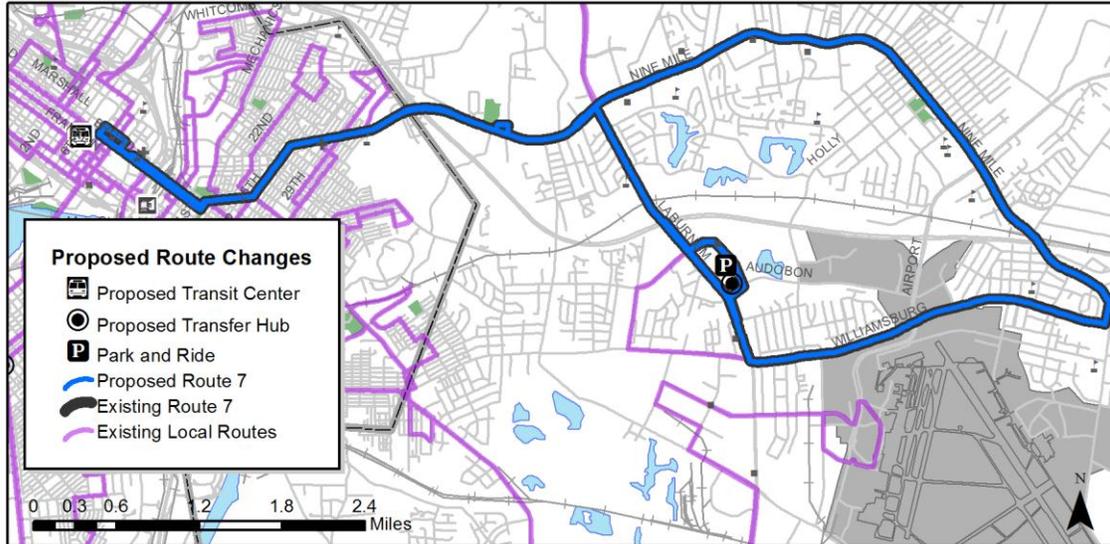
Saturday: 6:00am – 11:00pm

Sunday: 6:00am – 10:00pm

**TABLE 4-7: PROPOSED ROUTE 7 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
7	15	60	60	30	60	60	15	60	60	60	60	60

**FIGURE 4-8: PROPOSED ROUTE 7 ALIGNMENT**



**Route 8 – West End (New Route):** The COA recommends combining the western portions of Routes 3 and 4 to create a new Route 8. This TDP recommends an alignment for Route 8 that covers portions of these routes as well as the existing Route 10, which is modified for this TDP to cover portions of Routes 3 and 4 as well. **Figure 4-9** shows the proposed Route 8 alignment.

*Alignment:* From Broad Street in Downtown Richmond, this route would travel south on 8<sup>th</sup>, west on Main Street, south on Harrison Street, west on Idlewood, south on Randolph, west on Lakeview, south on Lombardy, east on Winder, south on Randolph, west on Colorado, south on Meadow, west on New York, north on Carter, west on New York, north on Meadow, west on Idlewood, north on Robinson, east on Cary, north on 7<sup>th</sup> to return to Broad Street and Downtown Richmond.

*Service Characteristics:* This route would provide the same span of service hours as Routes 3 and 4. **Table 4-8** shows the proposed frequencies for this new route.

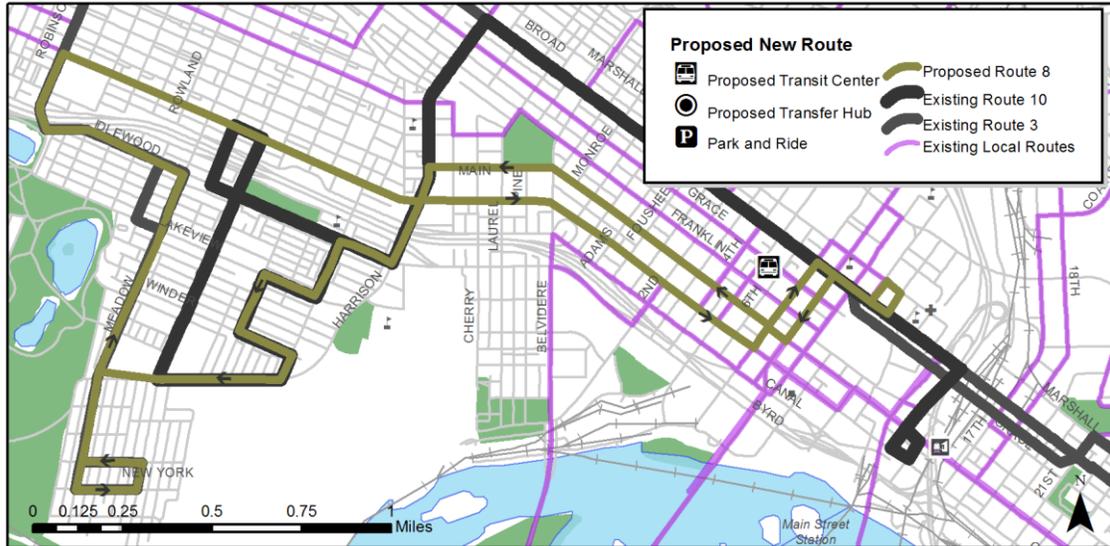
Service Hours

Weekdays: 5:30am – 12:30am  
Saturday and Sunday: 5:30am – 12:30am

**TABLE 4-8: PROPOSED ROUTE 8 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
8	15	30	30	30	30	30	15	30	30	60	60	60

**FIGURE 4-9: PROPOSED ROUTE 8 ALIGNMENT**



**Route 11-Oliver Hill/17<sup>th</sup> Street:** Route 11 is proposed for elimination as modifications to other routes maintain coverage to existing Route 11 stops with high ridership.

**Route 15-West Henrico:** Route 15 is a proposed new route that provides service to western Henrico County, an area that this TDP has identified as a transit supportive area not currently served by transit. This route would provide connections to multifamily communities along Ridgefield, Lauderdale, and Quioccasin to Regency Square and GRTC Route 2, as well as service along Parham Road to Broad Street, and connecting GRTC Routes 18, 19, and the proposed new Route 17.

*Alignment:* From Hungary Spring and Broad Street, this route travels northwest on Broad, south on Parham, west on Fargo, and south on Starling to Regency Square. The route continues west on Quioccasin, south on Gaskins, west on Patterson, north on Lauderdale, east on Ridgefield, and south on John Rolfe to return to Lauderdale and Regency Square Mall, as shown in **Figure 4-10**. This route may also be split into two routes, operating from the east and west to Regency Square.

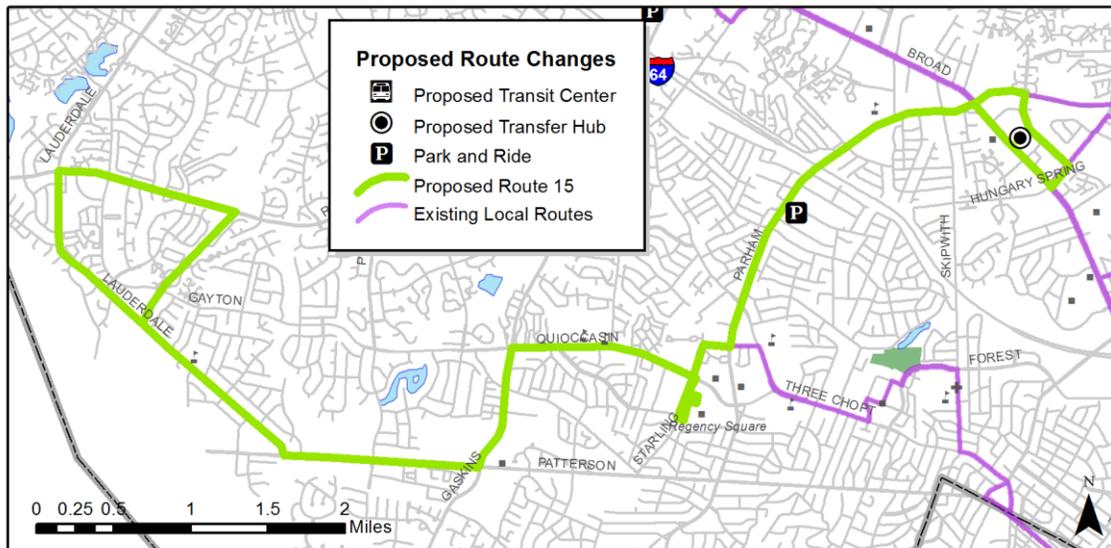
*Service Characteristics:* Span of service hours are proposed to operate from 5:00 a.m. until 6:00 p.m. on weekdays and 6:00 a.m. until 11:00 p.m. on Saturday and 10:00 p.m. on Sunday. Proposed clock headways for this route are provided in **Table 4-9**.

Weekdays: 5:00am – 11:00pm  
Saturday: 6:00am – 11:00pm  
Sunday: 6:00am – 10:00pm

TABLE 4-9: PROPOSED ROUTE 15 HEADWAYS

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
15	30	60	60	30	60	60	30	60	60	60	60	60

FIGURE 4-10: PROPOSED ROUTE 15 ALIGNMENT



**Route 16-Grove:** GRTC recently made modifications to Route 16; thus, no further changes have been identified, as shown in **Figure 4-11**.

*Service Characteristics:* No changes are proposed to the span of service hours. **Table 4-10** shows the proposed clock headways for this route.

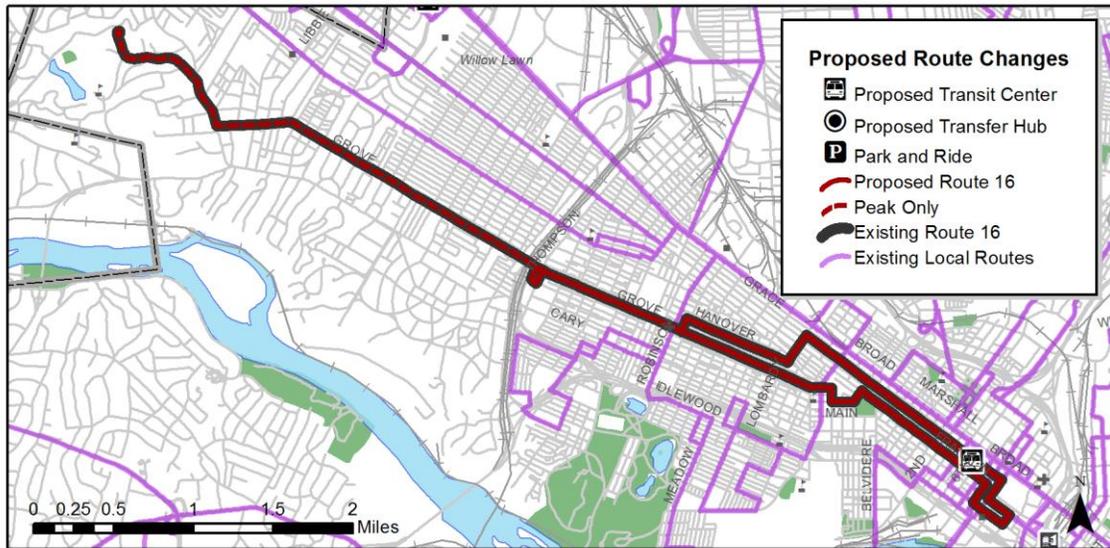
Service Hours

Weekdays: 5:30am – 7:42pm  
Saturday: No Service  
Sunday: No Service

TABLE 4-10: PROPOSED ROUTE 16 HEADWAYS

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
16	20	--	--	60	--	--	15	--	--	15	--	--

FIGURE 4-11: PROPOSED ROUTE 16 ALIGNMENT



**Route 17 – Western Henrico/Laurel (New Route):** This new route addresses service needs northeast of Broad Street in Henrico County. It provides service to Willow Lawn and the various routes that operate at Willow Lawn, J. Sargeant Reynolds Community College (presently not served by GRTC transit), the shopping center at Brook & Parham, Glenside Park-N-Ride, the Henrico County Government Complex and multifamily communities along Hungary, Parham and Hilliard, as shown in **Figure 4-12**.

*Alignment:* From Willow Lawn, this route travels north on Staples Mill to the Glenside Park and Ride, east on Hilliard, northwest on Hermitage, north on Staples Mill, west on Oakview to the Henrico County Government Buildings, south on Hungary Springs, north on Broad, east on Parham, north on Hungary Springs, east on Hungary, south on Woodman and east on Parham to J. Sargeant Reynolds and the shopping center at Brook & Parham. This route may also be split into two routes connecting via the transfer hub at Parham and Broad.

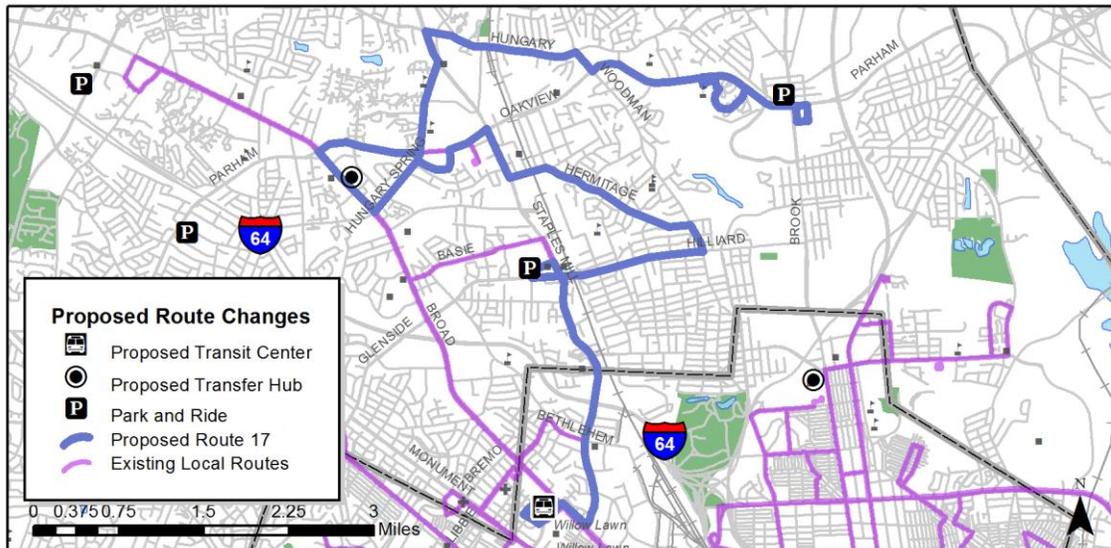
*Service Characteristics:* Span of service and clock headways (**Table 4-11**) proposed for this route are as follows:

Weekdays: 5:00am – 11:00pm  
 Saturday: 6:00am – 11:00pm  
 Sunday: 6:00am – 10:00pm

TABLE 4-11: PROPOSED ROUTE 17 HEADWAYS

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
17	30	30	60	30	30	60	30	30	60	60	60	60

FIGURE 4-12: PROPOSED ROUTE 17 ALIGNMENT



**Route 18-Henrico Shuttle:** No service changes were proposed in the COA to Route 18 as shown in **Figure 4-13**. This TDP does not include any further recommendations to the alignment.

*Service Characteristics:* No changes are proposed for the span of service for this route. **Table 4-12** shows the proposed clock headways for this route.

Service Hours

Weekdays: 6:40am – 7:00pm

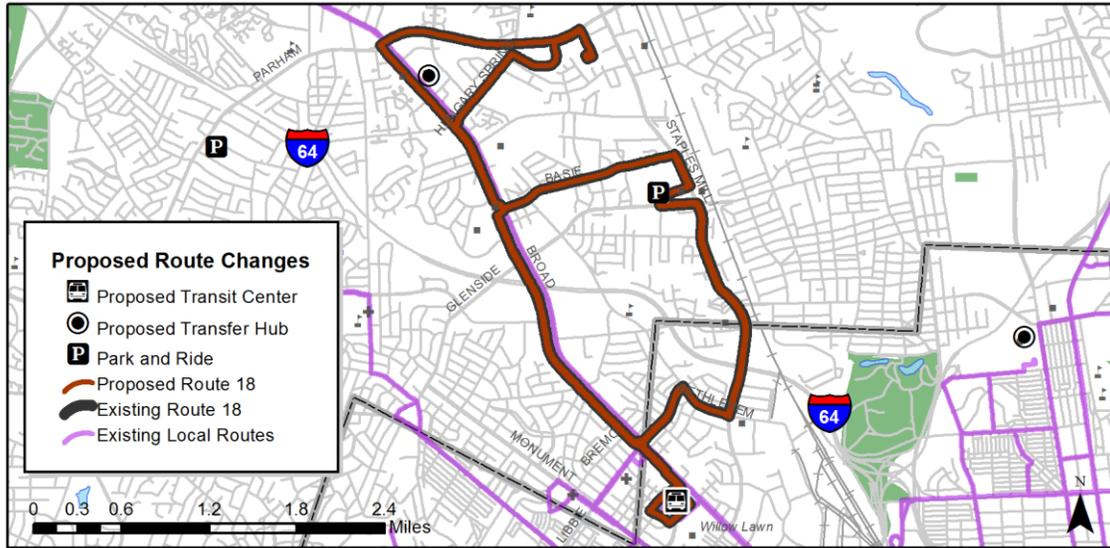
Saturday: No Service

Sunday: No Service

**TABLE 4-12: PROPOSED ROUTE 18 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
18	60	--	--	60	--	--	60	--	--	--	--	--

FIGURE 4-13: PROPOSED ROUTE 18 ALIGNMENT



**Route 19 – Pemberton Road:** This route is proposed to be extended to Short Pump and truncated to end at Willow Lawn with the implementation of the Broad Street BRT, as shown in **Figure 4-14**. This TDP also proposes select trips to Innsbrook and along Lauderdale Road. These segments could also be operated as deviation or flag type service discussed later in the chapter for West Henrico County.

*Alignment:* This route begins at Willow Lawn and travels north on Broad Street to Short Pump Mall. Select trips would travel south on Lauderdale to Church Street, and north on Cox through Innsbrook.

*Service Characteristics:* The span of service for this route is proposed to be extended on weekdays until 11:00 p.m. Additionally, service on Saturday and Sunday is also proposed. **Table 4-13** shows the proposed clock headways.

Service Hours

Weekdays: 5:00am – 11:00pm

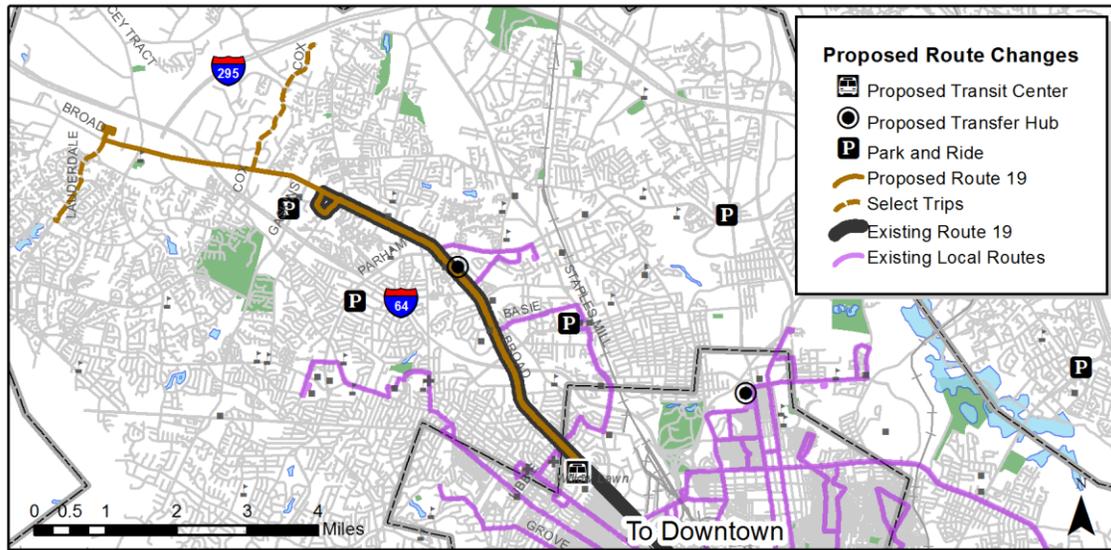
Saturday: 6:00am – 11:00pm

Sunday: 6:00am – 10:00pm

TABLE 4-13: PROPOSED ROUTE 19 HEADWAYS

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
19	30	30	60	30	30	60	30	30	60	60	60	60

FIGURE 4-14: PROPOSED ROUTE 19 ALIGNMENT



**Route 20 – Richmond West Connector:** Route 20 service was recently eliminated; however, the COA recommends a redesigned Route 20 that would serve as a new crosstown connector and provide access between northwest Richmond and the Southside, with connections to the Southside Transit Center, various shopping centers, and the Forest Hill Walmart. This TDP also identifies a need for select trips to serve Stony Point Fashion Park and the Stony Point Surgery Center.

*Alignment:* From Harvie Road and Mechanicsville Pike in northeast Richmond, this route would travel north on Mechanicsville Pike, west on Dill, west on Brookland, south on Boulevard, west on I-95, south on Powhite, west on Forest Hill, and south on Sheila to the Walmart. The route would continue east on Forest Hill, and south on Westover Hills to the Southside Transit Center at Hull Street and Belt Blvd where the route would make its return trip. Select trips would travel from the Forest Hills Walmart to the Stony Point Mall and Hospital via Chippenham Parkway, as shown in **Figure 4-15**.

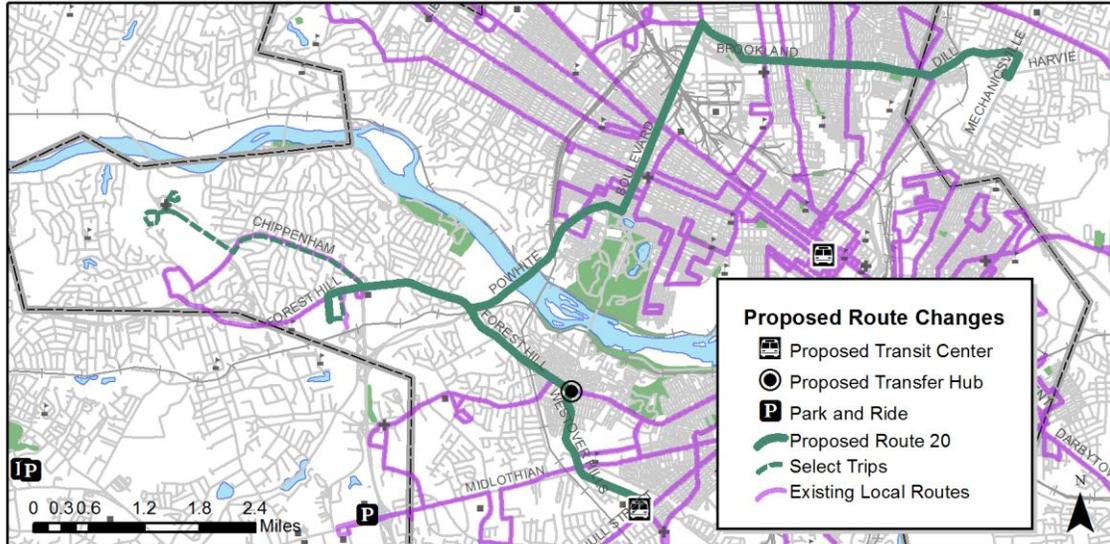
*Service Characteristics:* This route is proposed to operate all day with 30-minute headways on weekdays and 60-minute headways on Saturday and Sunday as shown in **Table 4-14**. Span of service and clock headways for this route are identified as follows:

- Weekdays: 5:00am – 11:00pm
- Saturday: 6:00am – 11:00pm
- Sunday: 6:00am – 10:00pm

**TABLE 4-14: PROPOSED ROUTE 20 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
20	30	60	60	30	60	60	30	60	60	30	60	60

**FIGURE 4-15: PROPOSED ROUTE 20 ALIGNMENT**



**Route 21 – Richmond East Connector:** Route 21 is a new route identified in the COA as a complementary service to the proposed Route 20 described above. This route provides connections between the Brookland Park, Fairfield Avenue, Hull Street and the Southside Transfer Center. The COA identifies an option to operate this route in conjunction with Route 20.

*Alignment:* From Brookland Park and Meadowbridge in northeast Richmond, this route would travel south on Mechanicsville Pike, east on Fairfield, east on Newbourne, south on 29<sup>th</sup>, west on Nine Mile, south on 25<sup>th</sup>, west on Jefferson, south on 17<sup>th</sup>, east on Grace, south on 18<sup>th</sup>, west on Main, south on 14<sup>th</sup> and south on Hull to Southside Plaza at Hull Street and Belt Boulevard, as shown in **Figure 4-16**. Return trips follow similar routing.

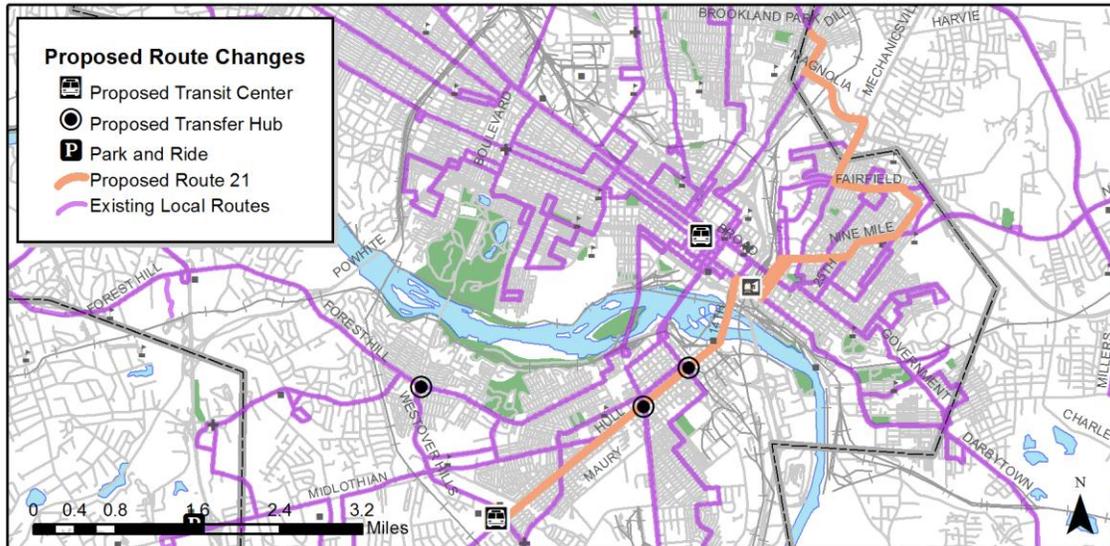
*Service Characteristics:* This route is proposed to operate at 30-minute headways on weekdays and 60-minute headways on Saturday and Sunday. Span of service hours and clock headways (**Table 4-15**) proposed for this route are listed below.

Weekdays: 5:00am – 11:00pm  
 Saturday: 6:00am – 11:00pm  
 Sunday: 6:00am – 10:00pm

**TABLE 4-15: PROPOSED ROUTE 21 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
21	30	60	60	30	60	60	30	60	60	30	60	60

**FIGURE 4-16: PROPOSED ROUTE 21 ALIGNMENT**



**Route 22- Hermitage: Downtown/Westbrook:** A recognized need for Route 22 in this TDP is the elimination of multiple routing on Fauquier; however, retaining the Brook Road segment. Additionally, this route connects to a proposed transfer hub at Brook & Azalea which would provide connections to proposed service continuing north to J. Sargeant Reynolds and Virginia Center, as shown in **Figure 4-17**.

*Alignment:* From downtown, this route follows the existing alignment west on Broad, north on Lombardy, west on Graham, north on Langston, east on Overbrook and north on Brook. The route continues north on Brook, west on Bellevue, north on Hermitage, east on Westbrook and North on Brook to a proposed transfer hub at the former Azalea Mall site. The route then continues east on Azalea, south on Chamberlayne and west on Westbrook to return to Downtown Richmond via the same routing.

*Service Characteristics:* No changes are proposed to the span of service on this route. Proposed clock headways are identified in **Table 4-16**.

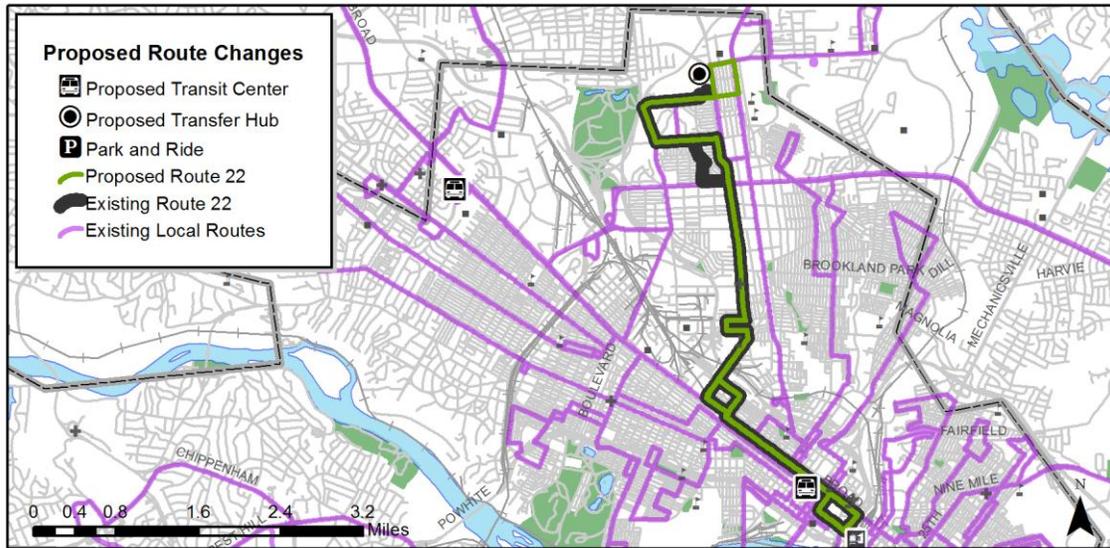
Service Hours

- Weekdays: 5:32am – 7:16pm
- Saturday: 6:05am – 5:40pm
- Sunday: 6:05am – 5:40pm

**TABLE 4-16: PROPOSED ROUTE 22 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
22	60	60	60	60	60	60	60	60	60	60	60	60

**FIGURE 4-17: PROPOSED ROUTE 22 ALIGNMENT**



**Route 24 – Crestwood/Westbrook:** No major changes are proposed for this route with the exception of the northern end, where the route is extended to Brook Road to provide a connection to the transfer hub at Brook & Azalea, as shown in **Figure 4-18**.

*Alignment:* From Downtown Richmond, this route travels the existing alignment west on Broad, north on Boulevard, north on Hermitage, east on Bellevue, and north on Brook to the proposed transfer hub at Brook & Azalea. Return trips travel south on Brook, west on Westbrook, and south on Hermitage to return to Broad Street and Downtown Richmond.

*Service Characteristics:* Clock headways proposed for this route are provided in **Table 4-17**. No changes are proposed to the span of service on this route.

Service Hours

Weekdays: 5:31am – 11:00pm

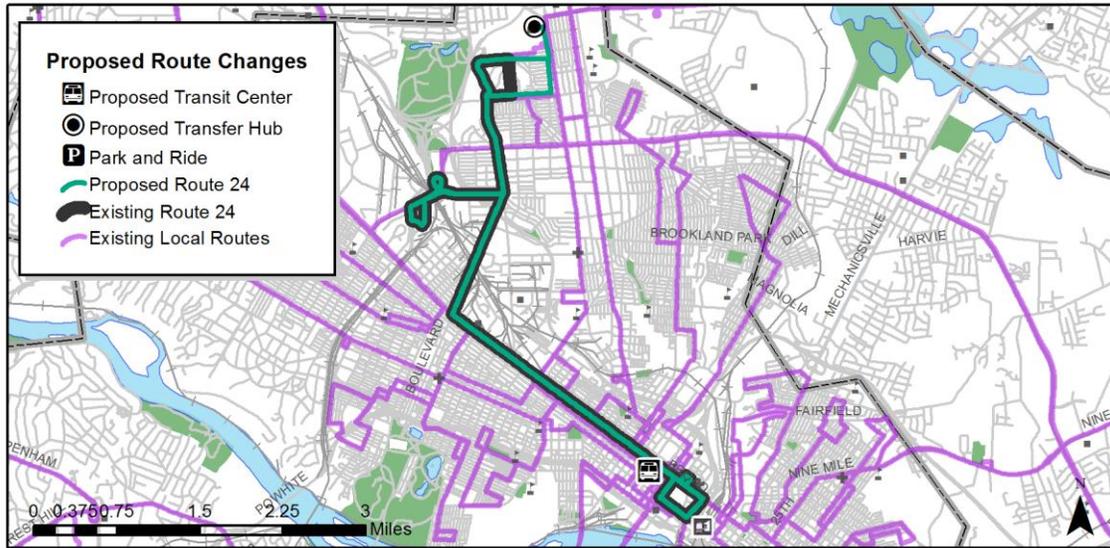
Saturday: 5:59am – 9:11pm

Sunday: 5:59am – 9:11pm

**TABLE 4-17: PROPOSED ROUTE 24 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
24	30	60	60	30	60	60	30	60	60	60	60	60

FIGURE 4-18: PROPOSED ROUTE 24 ALIGNMENT



**Route 25 – Route 1 North Henrico:** Route 25 is a new route proposed in this TDP to address a need for service along Route 1 (Brook) north of Azalea to serve shopping and multifamily locations along Route 1, J. Sargeant Reynolds Community College, and Virginia Center Commons, as shown in **Figure 4-19**.

*Alignment:* From the proposed transfer hub at Brook & Azalea, this route would travel north along Brook, west on Parham to J. Sargeant Reynolds Community College and the adjacent multifamily community, east on Parham, north on Brook to Virginia Center Commons. Return trips would travel south on Brook, west on Jeb Stuart Parkway, south on Virginia Center Parkway, south on Brook Road, east on Parham to J. Sargeant Reynolds Community College and south on Brook to return to the Brook & Azalea transfer hub.

*Service Characteristics:* The span of service hours and clock headways (**Table 4-18**) proposed for this route are provided below.

Service Hours

Weekdays: 5:00am – 11:00pm

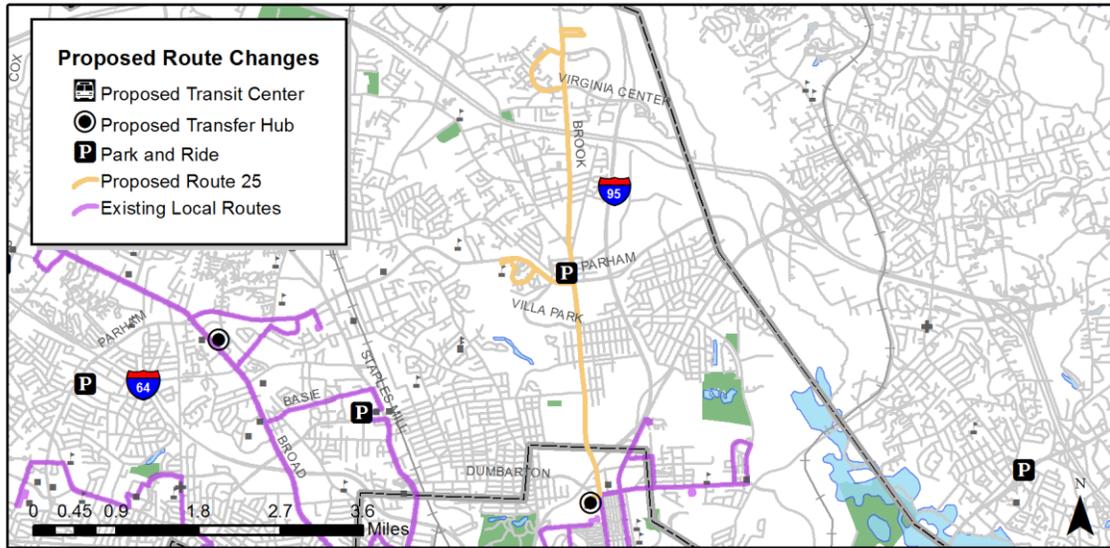
Saturday: 6:00am – 11:00pm

Sunday: 6:00am – 10:00pm

TABLE 4-18: PROPOSED ROUTE 25 HEADWAYS

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
25	15	30	60	30	30	60	15	30	60	30	30	60

**FIGURE 4-19: PROPOSED ROUTE 25 ALIGNMENT**



**Route 32 – Ginter Park:** No changes were proposed in the COA; however, this TDP proposes extending the route north to provide service to John Marshall High School and the proposed transfer hub at Brook & Azalea with route connections to the J. Sargeant Reynolds Community College and shopping at Virginia Center.

*Alignment:* From Downtown Richmond, this route travels the existing routing along 1<sup>st</sup>, Brookland Park, Montiero, and north to Laburnum. From Laburnum, trips traveling north travel northwest on North Avenue, northeast on Moss Side, west on Cheatwood, southwest on Bellevue, north on Old Brook Road, west on Westminister, north on Chamberlayne, and west on Azalea to the transfer hub at Brook & Azalea. Return trips travel south on Brook, east on Westbrook, and south on Old Brook, east on Bellevue, southeast on Cheatwood and south on Corbin to return to the existing route alignment toward Downtown Richmond, as shown in **Figure 4-20**.

*Service Characteristics:* No changes are proposed to the span of service hours on this route. Proposed clock headways for this route are provided in **Table 4-19**.

Service Hours

Weekdays: 5:15am – 12:34am

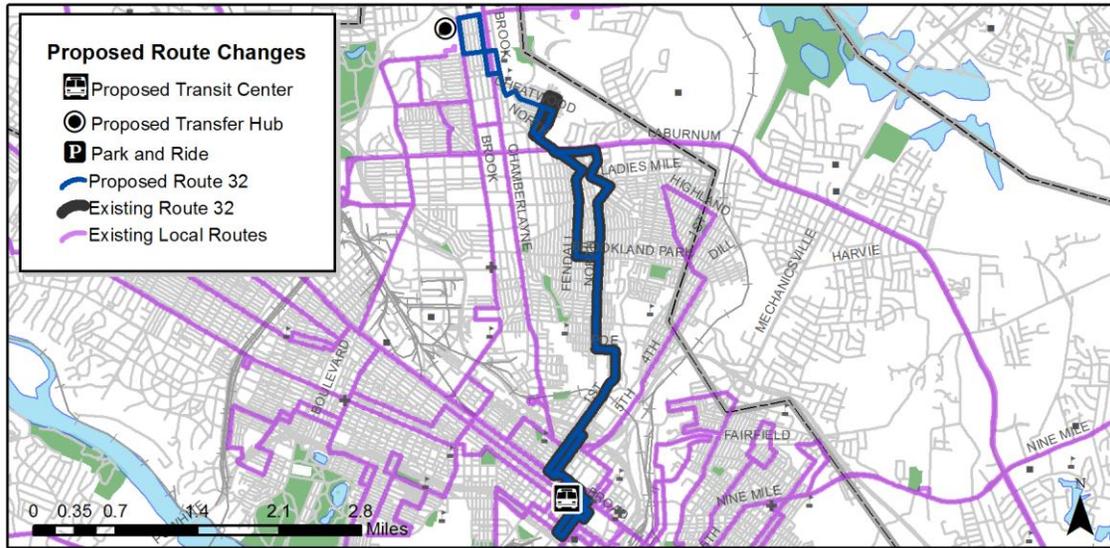
Saturday: 5:15am – 12:52am

Sunday: 5:23am – 12:47am

**TABLE 4-19: PROPOSED ROUTE 32 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
32	10	20	20	15	20	20	10	20	20	30	30	30

**FIGURE 4-20: PROPOSED ROUTE 32 ALIGNMENT**



**Route 34 – Highland Park:** This route is extended per COA recommendations to serve the Raceway on the northern end and offices on Byrd Avenue on the southern end. This route is also extended along Laburnum to Brook and Chamberlayne to provide connections to other routes operating along these roadways, as shown in **Figure 4-21**.

*Alignment:* From Downtown Richmond, this route would travel via the existing routing north on 4<sup>th</sup> Avenue to Meadowbridge Road, north on 1<sup>st</sup>, west on Highland, and north on Meadowbridge to Laburnum. This route would continue west on Laburnum, north on Brook, east on Claremont and south on Chamberlayne to return to Laburnum and the existing routing on Meadowbridge to Downtown Richmond. Changes in Downtown Richmond include routing from Jackson & 8<sup>th</sup>, south on 8<sup>th</sup>, west on Canal, south on 7<sup>th</sup>, east on Byrd, north on 9<sup>th</sup>, west on Leigh and north on 8<sup>th</sup>.

*Service Characteristics:* No changes are proposed for the current span of service hours for this route. Proposed clock headways for this route are provided in **Table 4-20**.

Service Hours

Weekdays: 5:05am – 12:10am

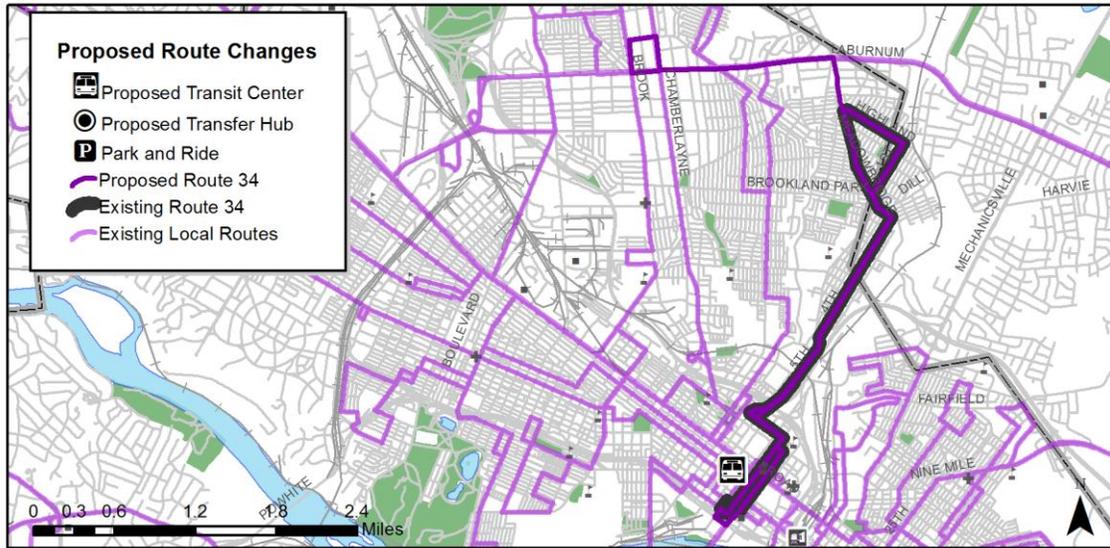
Saturday: 5:20am – 12:19am

Sunday: 5:42am – 12:11am

**TABLE 4-20: PROPOSED ROUTE 34 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
34	10	20	20	15	20	20	10	20	20	30	30	30

**FIGURE 4-21: PROPOSED ROUTE 34 ALIGNMENT**



**Route 37- Chamberlayne:** The COA proposes extending Route 37 north to the Virginia Center Commons Mall. Since this TDP already addresses this need via a proposed new route from Brook & Azalea, Route 37’s extension is not included. The COA also recommends rerouting the downtown segment of Route 37 to serve Leigh Street, as shown in **Figure 4-22**.

*Alignment:* From 9<sup>th</sup> and Main in Downtown Richmond, this route travels north on 9<sup>th</sup>, west on Leigh, and north on Main to travel the existing alignment. Return trips travel east on Leigh, south on 8<sup>th</sup>, west on Broad, and south on 14<sup>th</sup> Street to Main.

*Service Characteristics:* No changes are proposed to the span of service hours on this route. Proposed clock headways for this route are provided in **Table 4-21**.

Service Hours

Weekdays: 5:24am – 12:29am

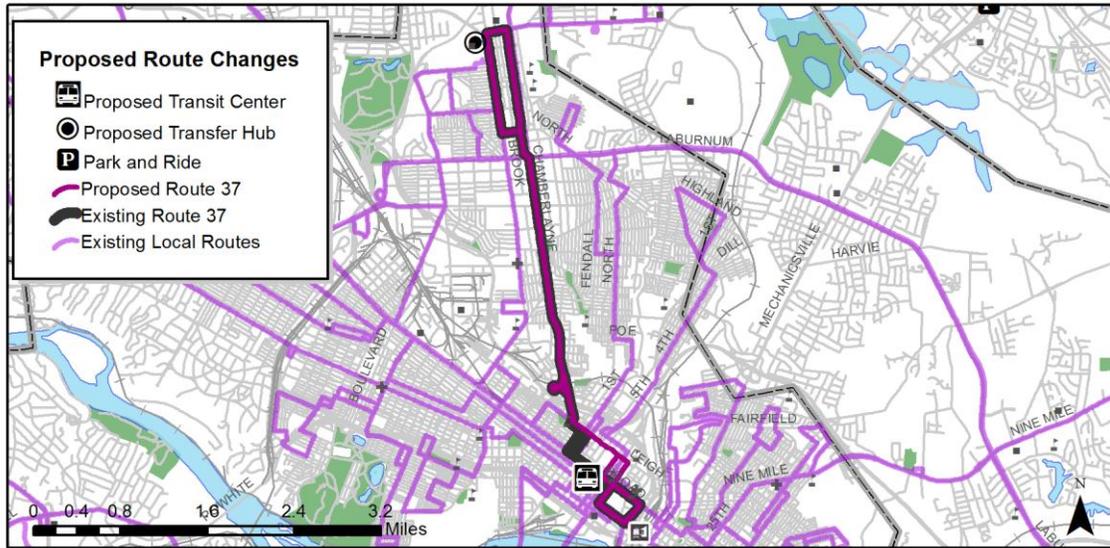
Saturday: 5:52am – 12:33am

Sunday: 6:30am – 1:01am

**TABLE 4-21: PROPOSED ROUTE 37 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
37	15	30	30	30	30	30	15	30	30	30	30	30

FIGURE 4-22: PROPOSED ROUTE 37 ALIGNMENT



**Route 45 -Jefferson:** Route 45 was implemented in 2011 and makes up the eastern portion of the previous Route 10. This route is modified to end at a transfer point in Downtown Richmond, currently 8<sup>th</sup> and Marshall. No further changes are proposed to this route, as shown in **Figure 4-23**.

*Service Characteristics:* No changes are proposed to the span of service on this route. Proposed clock headways for this route are provided in **Table 4-22**.

Service Hours

Weekdays: 5:15am – 12:38am

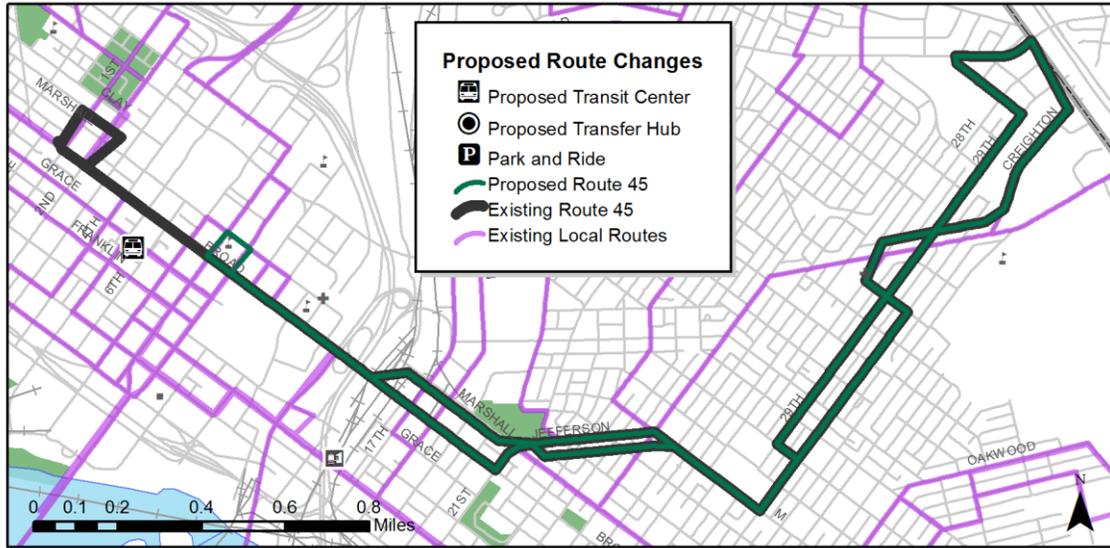
Saturday: 6:14am – 12:38am

Sunday: 6:14am – 12:38am

TABLE 4-22: PROPOSED ROUTE 45 HEADWAYS

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
45	30	30	30	30	30	30	30	30	30	30	30	30

FIGURE 4-23: PROPOSED ROUTE 45 ALIGNMENT



**Route 56-South Laburnum:** The COA proposed elimination of segments of Route 56 with little to no ridership. This TDP includes those recommendations, with the option to continue service to employment on Charles City Road, as shown in **Figure 4-24**. This extension could be operated on select trips only, based on demand to these stops. This option could also be covered as part of a deviated fixed-route previously described for Route 7.

*Alignment:* From Downtown Richmond, this route travels the existing alignment to Government. The route then continues east on Williamsburg Road, north on Millers, east on Gay, south on Laburnum, east on Williamsburg, south on Airport, west on Eubank and north on Laburnum to return to White Oak Village. Alternatively, the route may continue west on Eubank, south on Klochner, east on Sarellan, south on Glen Aldern and west on Charles City to return north on Laburnum to White Oak Village.

*Service Characteristics:* Currently, this route operates three trips per day to the airport. With the new alignment along Williamsburg Road that connects to Route 6, this service may warrant more frequent service throughout the day. Service is proposed on Weekdays, Saturday and Sunday from 6:00 a.m. to 11:00 p.m. (10:00 p.m. on Sunday). **Table 4-23** shows the proposed clock headways for this route.

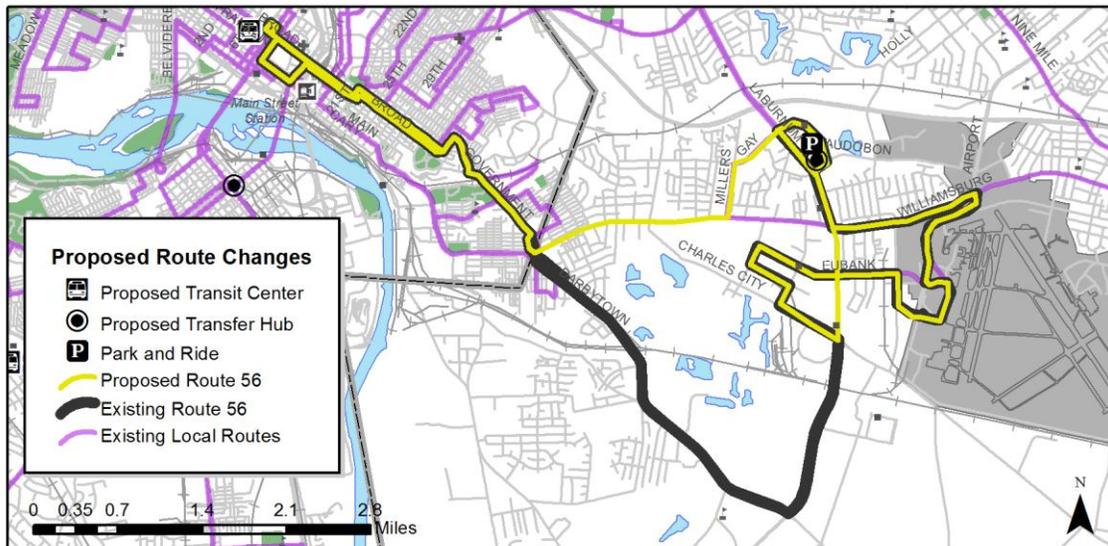
Service Hours

Weekdays: 6:00am – 11:00pm  
 Saturday: 6:00am – 11:00pm  
 Sunday: 6:00am – 10:00pm

**TABLE 4-23: PROPOSED ROUTE 56 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
56	30	60	60	60	60	60	30	60	60	60	60	60

**FIGURE 4-24: PROPOSED ROUTE 56 ALIGNMENT**



**Route 62- Hull:** The COA proposed modifications to Route 61 and Route 62. Since the COA was completed, Route 61 was eliminated and the existing Route 62 follows the COA’s proposed Route 61 alignment. This TDP recommends keeping the existing Route 62 as it is, with limited stop service north of the Southside Transfer Center stopping only at Hull and Midlothian, Cowardin, Commerce and 9<sup>th</sup>, as shown in **Figure 4-25**. Local service would be provided by Routes 63 and an expanded Route 101 circulator later described in this section. This TDP also identifies a proposed extension from Broad Rock Boulevard south to provide service on select trips south on Belmont Road to transit supportive areas just south of the Chesterfield county line with return trips serving the entrance to Forest Creek Apartments previously served by Route 61.

*Service Characteristics:* No changes are proposed for the existing span of service days and hours for this route. Clock headways are provided in **Table 4-24**.

Service Hours

Weekdays: 5:00am – 12:45am

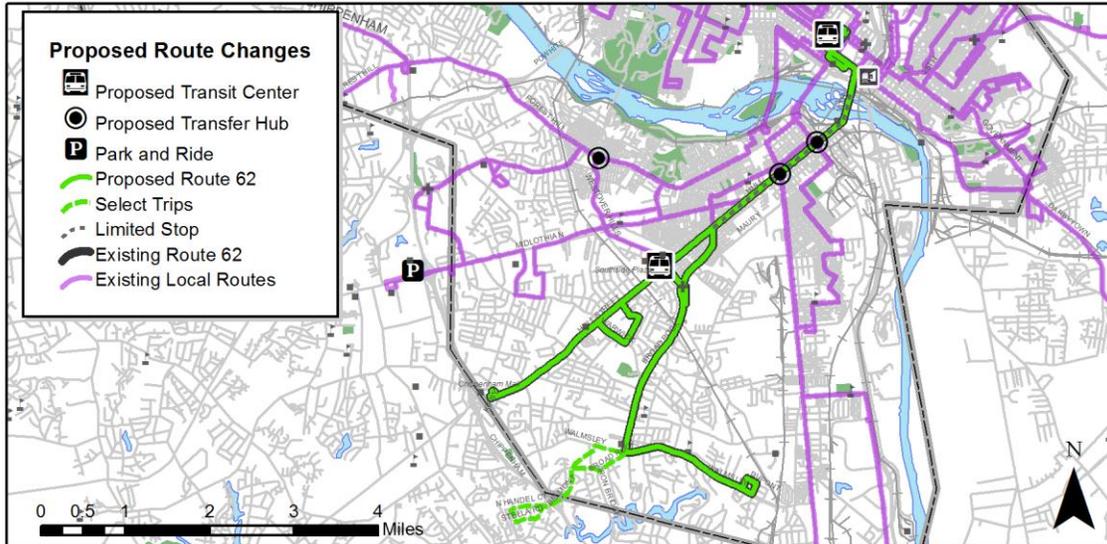
Saturday: 5:09am – 12:03am

Sunday: 5:17am – 12:07am

**TABLE 4-24: PROPOSED ROUTE 62 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
62	15	30	60	15	30	60	15	30	60	60	60	60

**FIGURE 4-25: PROPOSED ROUTE 62 ALIGNMENT**



**Route 63- Midlothian:** The COA recommends modifying the Westover Hills deviation from Midlothian, which is reflected in **Figure 4-26** below. A slight modification to the COA recommendation moves the Crutchfield service to Midlothian since the Route 101 provides circulator service along Crutchfield.

*Alignment:* Much of the same routing in the existing Route 63 applies to the proposed Route 63. From Downtown Richmond, Route 63 would travel south on Hull Street, west on Midlothian, north on Westover Hills, east on Forest Hill, south on 48<sup>th</sup> to Westover Hills, and west on Midlothian, with the existing deviation to Warwick Village and continuing to Chippenham Square Mall. Return trips travel via the same alignment to Downtown Richmond.

*Service Characteristics:* No changes are proposed to the existing span of service hours and days of service on this route. **Table 4-25** shows proposed clock headways for this route.

Service Hours

Weekdays: 5:00am – 12:45am

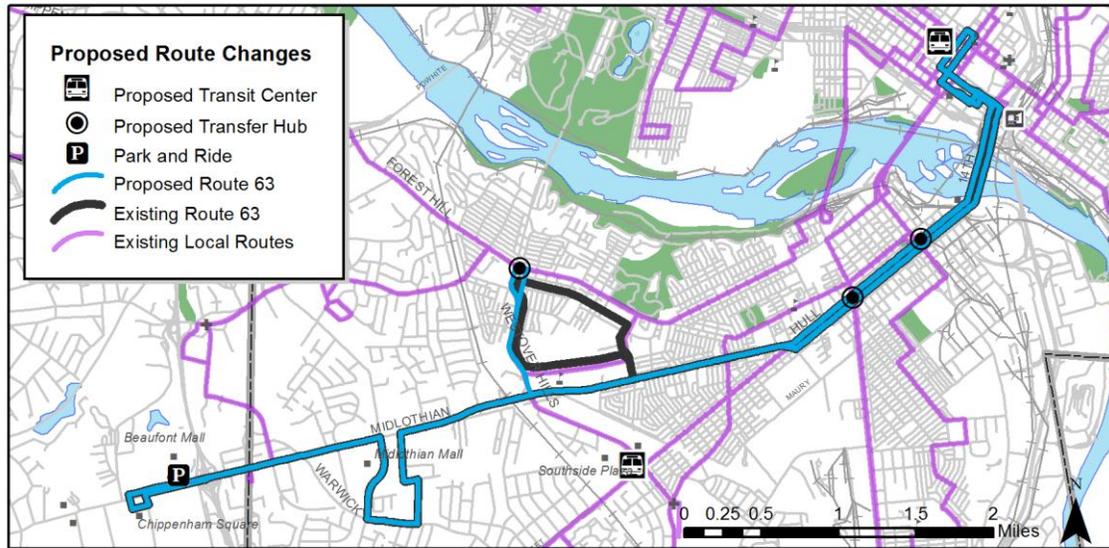
Saturday: 5:09am – 12:03am

Sunday: 5:17am – 12:07am

TABLE 4-25: PROPOSED ROUTE 63 HEADWAYS

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
63	15	30	60	30	30	60	15	30	60	60	60	60

FIGURE 4-26: PROPOSED ROUTE 63 ALIGNMENT



**Route 67 – Chippenham:** This TDP does not identify any needed changes to Route 67, as shown in Figure 4-27.

*Service Characteristics:* No changes are proposed to the weekday span of service hours on this route. Service is added on Saturday and Sunday from 6:00 a.m. until 11:00 p.m. and 10:00 p.m., respectively. Service is added in the off-peak periods with proposed clock headways provided in Table 4-26.

Service Hours

Weekdays: 5:00am – 12:45am

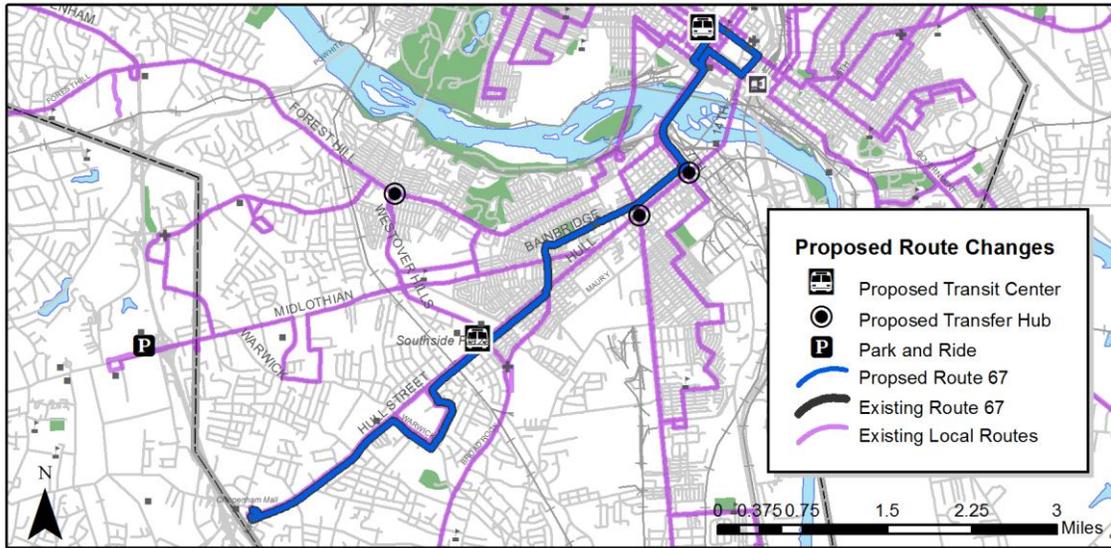
Saturday: 6:00am – 11:00pm

Sunday: 6:00am – 10:00pm

TABLE 4-26: PROPOSED ROUTE 67 HEADWAYS

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
67	15	60	60	30	60	60	15	60	60	60	60	60

FIGURE 4-27: PROPOSED ROUTE 67 ALIGNMENT



**Route 70-Forest Hill:** No changes are proposed to this route, as shown in **Figure 4-28**.

*Service Characteristics:* No changes are proposed to the existing span of service hours and days. Proposed clock headways are provided in **Table 4-27**.

Service Hours

Weekdays: 5:36am – 11:31pm

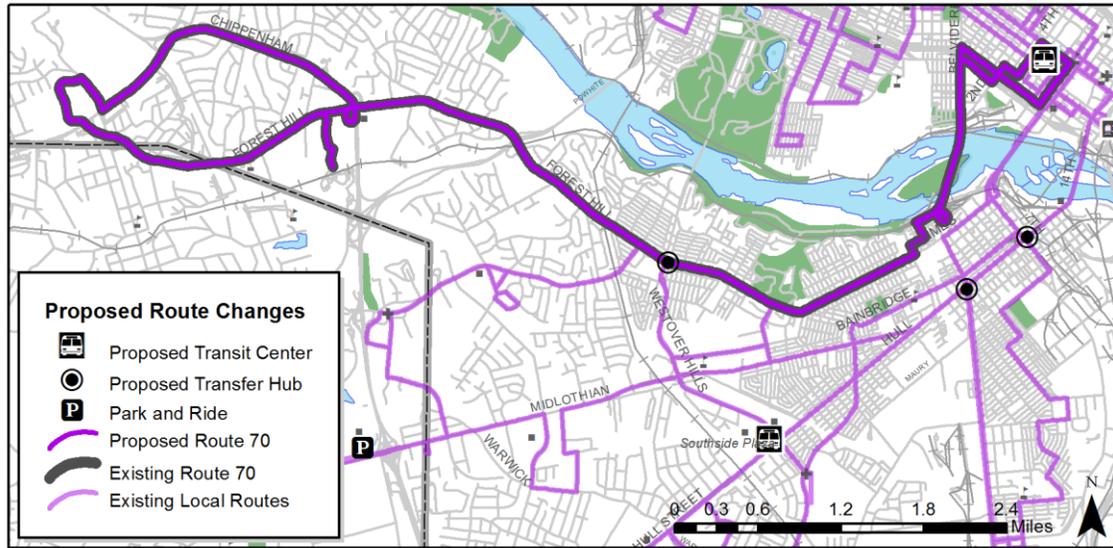
Saturday: 6:06am – 11:28pm

Sunday: 6:11am – 10:57pm

TABLE 4-27: PROPOSED ROUTE 70 HEADWAYS

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
70	15	60	60	30	60	60	15	60	60	60	60	60

**FIGURE 4-28: PROPOSED ROUTE 70 ALIGNMENT**



**Route 71-Forest Hill:** Recommendations to Route 71 identified in the COA include an extension to Chippenham Square and the elimination of the Glenway Court deviation, as shown in **Figure 4-29**.

*Alignment:* From Downtown Richmond, Route 71 follows the exiting alignment along Forest Hill Avenue, Jahnke Road, Hioaks Road and Carnation with the exception being the elimination of the deviation to Glenway Court. From Midlothian Turnpike, this route would continue west to Spring Rock Green.

*Service Characteristics:* No changes are proposed to the span of service hours and days of service for this route. Proposed clock headways are identified in **Table 4-28**.

Service Hours

Weekdays: 5:36am – 11:31pm

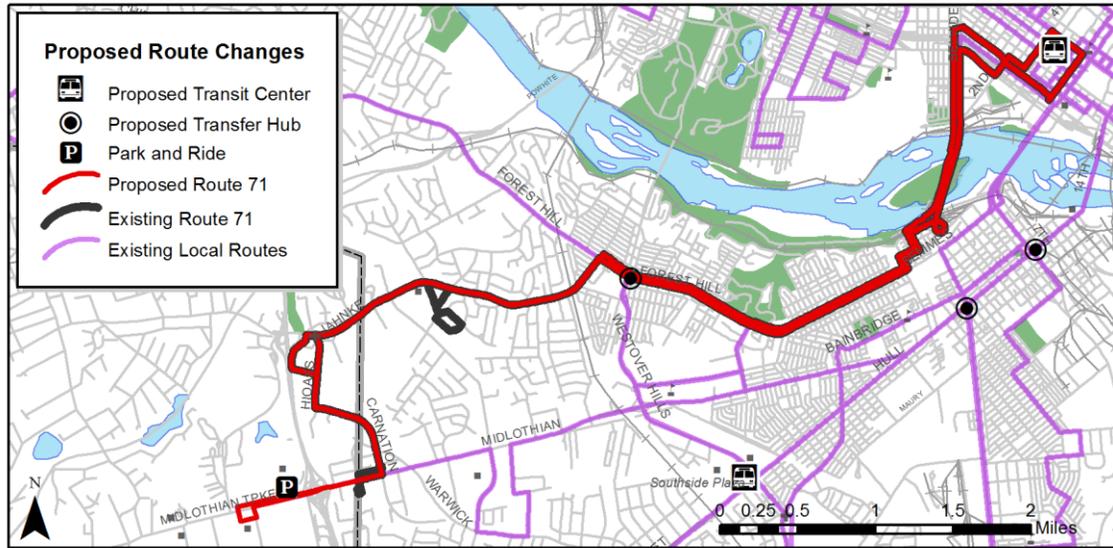
Saturday: 6:06am – 11:28pm

Sunday: 6:11am – 10:57pm

**TABLE 4-28: PROPOSED ROUTE 71 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
71	15	60	60	30	60	60	15	60	60	60	60	60

**FIGURE 4-29: PROPOSED ROUTE 71 ALIGNMENT**



**Route 72-Amphill:** No changes are proposed to the existing Route 72, as shown in **Figure 4-30**.

*Service Characteristics:* No changes are proposed for the span of service for this route. Proposed clock headways for this route are provided in **Table 4-29**.

Service Hours

Weekdays: 5:13am – 1:13am

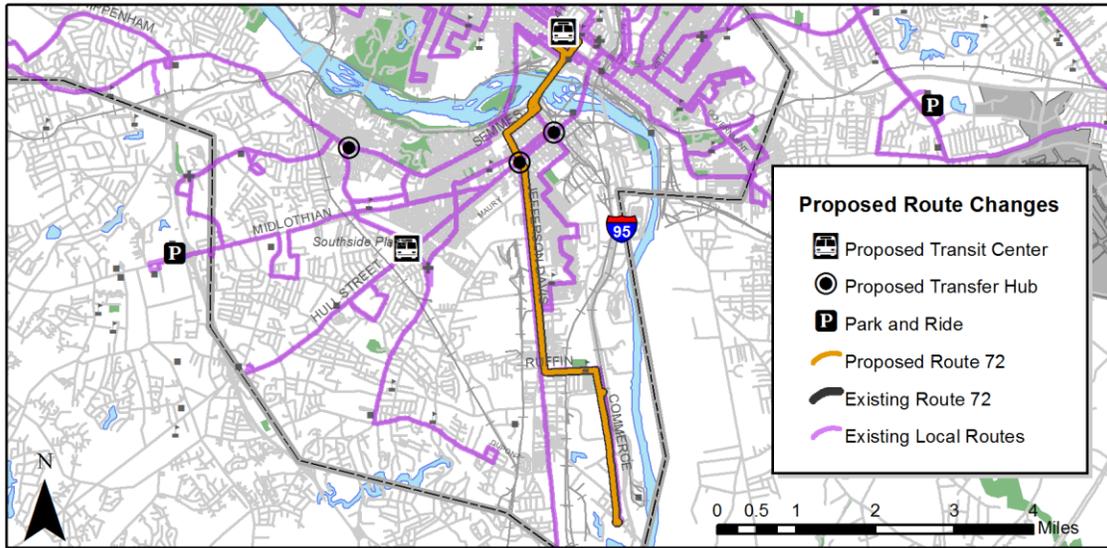
Saturday: 5:59am – 1:06am

Sunday: 5:59am – 1:06am

**TABLE 4-29: PROPOSED ROUTE 72 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
72	30	60	60	30	60	60	30	60	60	60	60	60

**FIGURE 4-30: PROPOSED ROUTE 72 ALIGNMENT**



**Route 73- Ampt Hill:** No changes are proposed to Route 73, Ampt Hill, as shown in **Figure 4-31**.

*Service Characteristics:* No changes are proposed for the span of service hours on this route. Clock headways are proposed in **Table 4-30**.

Service Hours

Weekdays: 5:13am – 1:13am

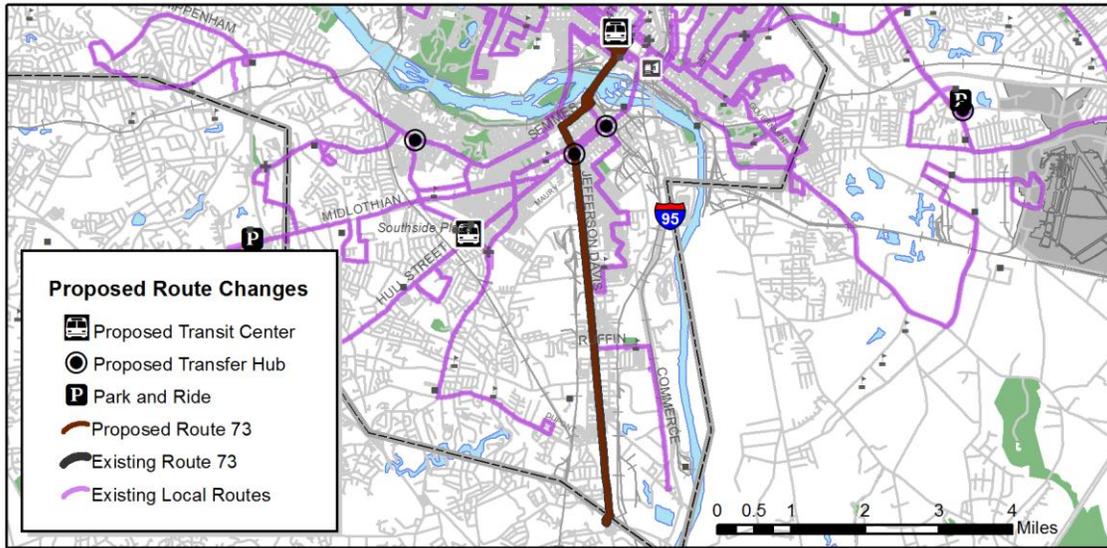
Saturday: 5:59am – 1:06am

Sunday: 5:59am – 1:06am

**TABLE 4-30: PROPOSED ROUTE 73 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
73	15	30	30	30	30	30	15	30	30	60	60	60

**FIGURE 4-31: PROPOSED ROUTE 73 ALIGNMENT**



**Route 74 – Oak Grove:** No changes are proposed for Route 74 in this TDP, as shown in **Figure 4-32**.

*Service Characteristics:* No changes are proposed to the span of service hours and days for this route. Proposed clock headways for this route are provided in **Table 4-31**.

Service Hours

Weekdays: 5:47am – 1:14am

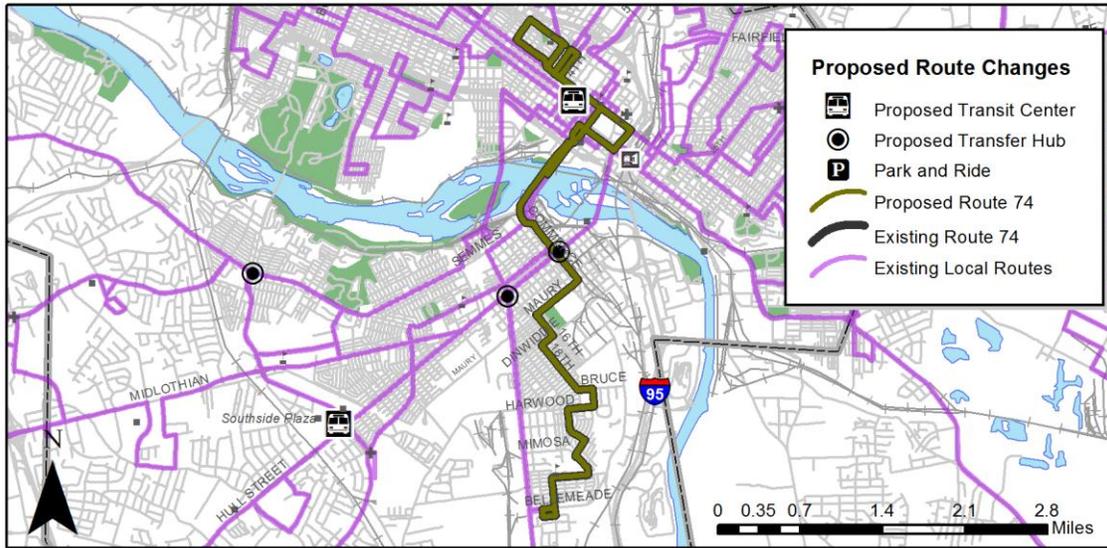
Saturday: 6:21am – 12:25am

Sunday: 6:21am – 12:25am

**TABLE 4-31: PROPOSED ROUTE 74 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
74	15	30	30	30	30	30	15	30	30	60	60	60

FIGURE 4-32: PROPOSED ROUTE 74 ALIGNMENT



**Route 91- Laburnum Connector:** No changes are proposed to Route 91 as shown in **Figure 4-33**.

*Service Characteristics:* The service hours along this route are proposed to be extended from 6:00 a.m. until 11:00 p.m. with service on Weekdays, Saturday and Sunday. Proposed clock headways are provided in **Table 4-32**.

Service Hours

Weekdays: 6:00am – 11:00pm

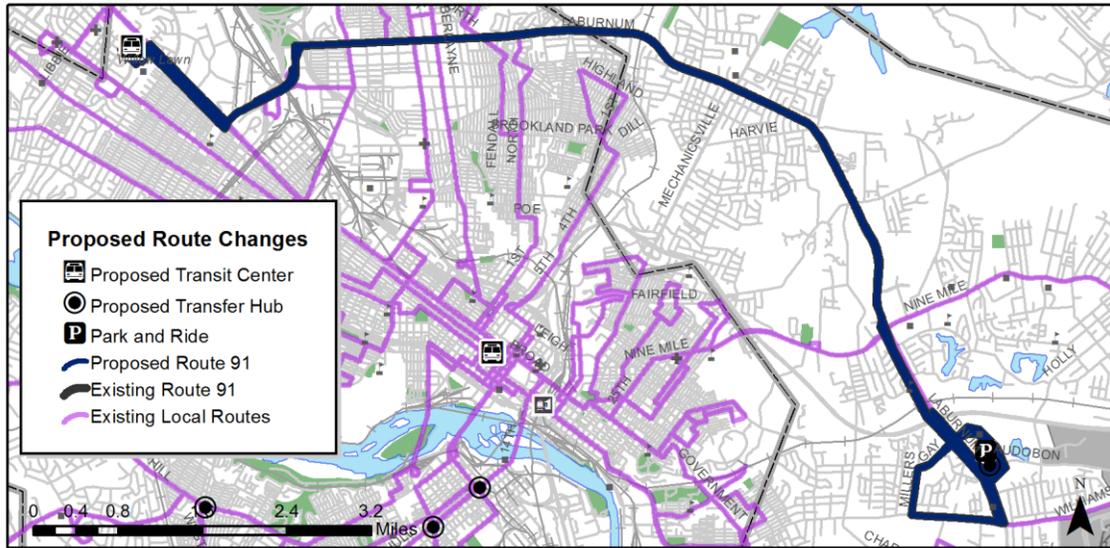
Saturday: 6:00am – 11:00pm

Sunday: 6:00am – 10:00pm

TABLE 4-32: PROPOSED ROUTE 91 HEADWAYS

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
91	60	60	60	60	60	60	60	60	60	60	60	60

**FIGURE 4-33: PROPOSED ROUTE 91 ALIGNMENT**



**Route 93 – Azalea Connector:** No changes are proposed to Route 93 as shown in **Figure 4-34**; however, the COA does identify the potential to operate Route 93 off of Route 34. Changes to Route 34 previously described in this section would accommodate this change.

*Service Characteristics:* No changes are proposed the span of service for this route. Proposed clock headways for this route are provided in **Table 4-33**.

Service Hours

Weekdays: 6:50am – 6:50pm

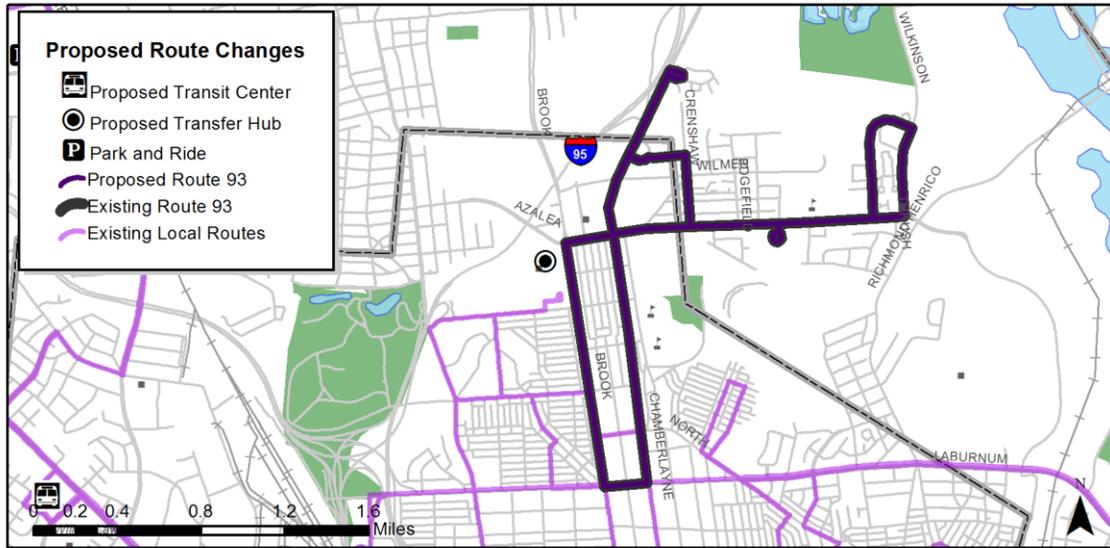
Saturday: No Service

Sunday: No Service

**TABLE 4-33: PROPOSED ROUTE 93 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
93	30	--	--	30	--	--	30	--	--	--	--	--

FIGURE 4-34: PROPOSED ROUTE 93 ALIGNMENT



**Route 101 – Southside Plaza/Belt Boulevard Connector:** Route 101 is a new route that provides connector service between Forest Hill and the Southside Plaza Transit Center via Belt Boulevard. This TDP recommends extending this circulator service to operate via Hull Street and serve the Manchester community.

*Alignment:* From the Southside Plaza Transfer Center, this route travels the existing alignment via Belt Boulevard north to Westover Hills, east on Forest Hill, south on Roanoke Street and west on Crutchfield Street to return to Westover Hills, Belt Boulevard and Southside Plaza. This TDP recommends continuing to the McGuire VA Center via Belt Boulevard, and returning to travel northeast on Hull Street, southeast on Commerce, southwest on Maury, southeast on 16<sup>th</sup>, east on Bruce, south on Lone, west on Harwood, north on Commerce, east on Semmes, and southeast on 7<sup>th</sup> to Hull Street, where the route would return southwest to Southside Plaza, as shown in **Figure 4-35**.

*Service Characteristics:* This route is proposed to operate on Weekdays, Saturday and Sunday from 6:00 a.m. until 11:00 p.m. (10:00 p.m. on Sunday). Proposed clock headways are provided in **Table 4-34**.

Service Hours

Weekdays: 6:00am – 11:00pm

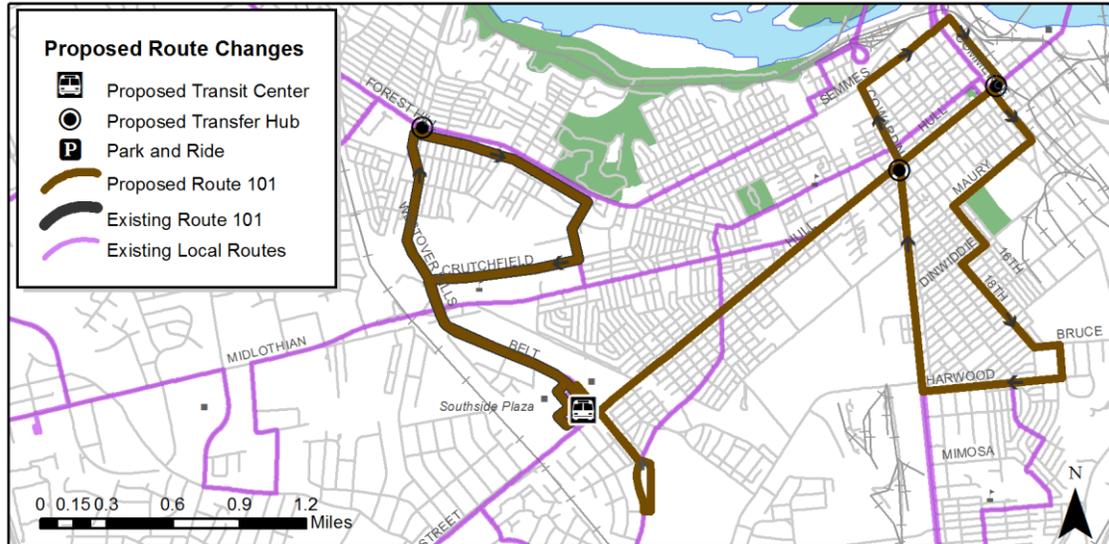
Saturday: 6:00am – 11:00pm

Sunday: 6:00am – 10:00pm

**TABLE 4-34: PROPOSED ROUTE 101 HEADWAYS**

Route	AM Peak			Base			PM Peak			Evening		
	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun	Wk	Sat	Sun
101	30	30	60	30	30	60	30	30	60	60	60	60

**FIGURE 4-35: PROPOSED ROUTE 101 ALIGNMENT**



**EXPRESS**

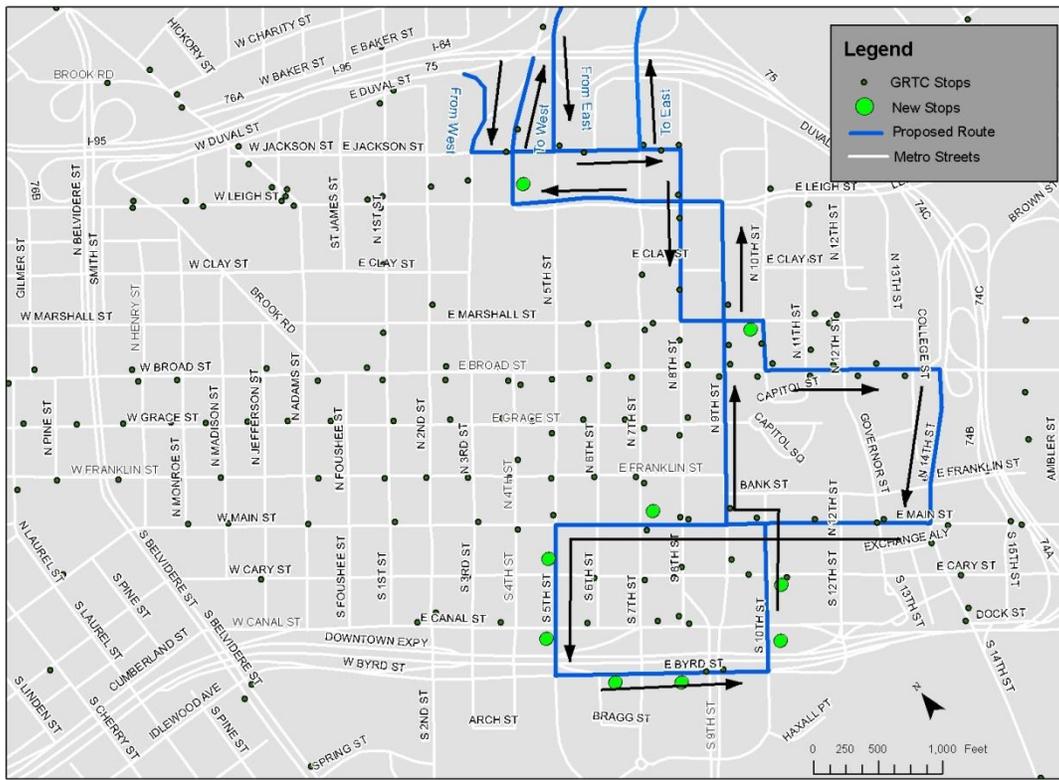
GRTC currently provides express bus service to Henrico County, Chesterfield County and Hanover County. Recommended needs for these routes are described below.

**All Existing Express Routes:** One express bus service need identified by GRTC staff is a reduction in the number of bus trips by utilizing large coach buses to provide more passenger comfort and reduce operating costs. Additionally, a realignment of downtown routing is proposed to accommodate new offices on Byrd Street, as shown in **Figures 4-36 to 4-37**. New express service from Henrico County to VCU the Monroe Park Campus is also identified as a need.

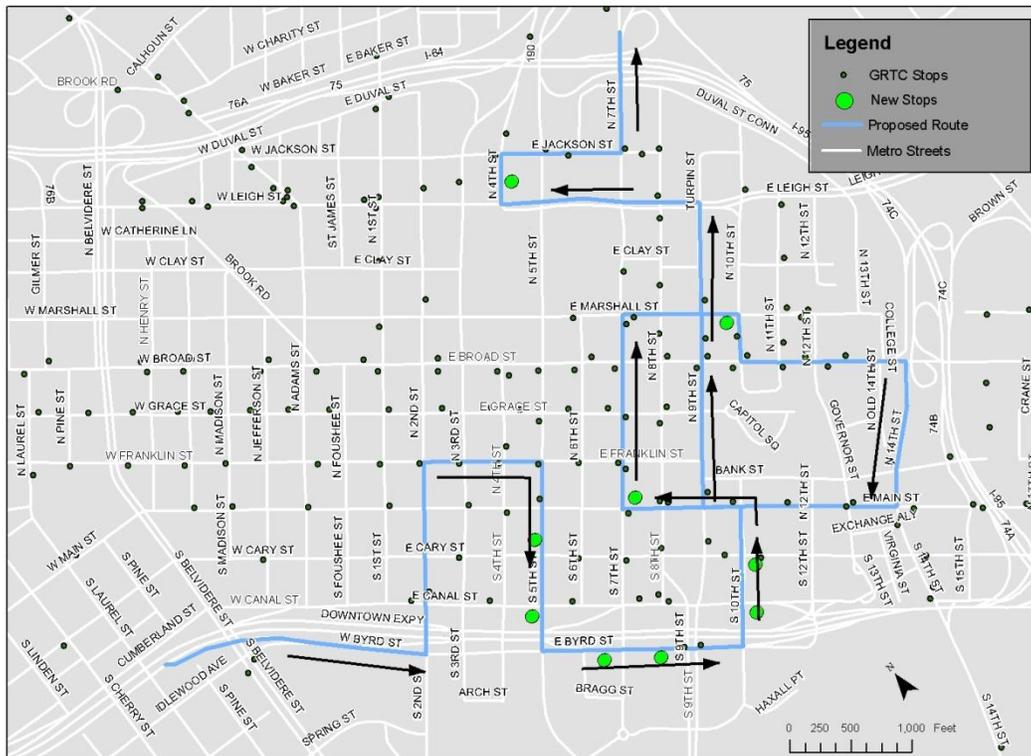
**Express Route 95:** This express service operates between Richmond and Petersburg with a stop in Chester. The current park-and-ride location in Chester is a temporary location at John Tyler Community College. GRTC will need to identify a permanent location for this park-and-ride in the future. Additionally, a new park-and-ride lot along this route at Tollway 895/Chippenham Parkway may be needed.

**Henrico County Express Routes:** This TDP also identifies a need to consolidate trips on the Henrico County Express Routes and to utilize the larger 45’ coach buses purchased in FY2010. This would provide additional cost savings with fewer trips.

**FIGURE 4-36: PROPOSED DOWNTOWN EXPRESS ROUTING – HENRICO COUNTY**



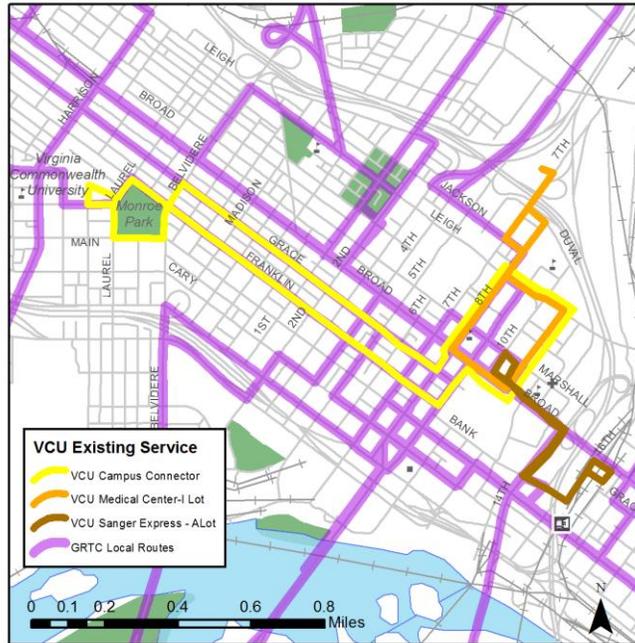
**FIGURE 4-37: PROPOSED DOWNTOWN EXPRESS ROUTING - CHESTERFIELD & RICHMOND ROUTES**



VCU ROUTES

Beginning in fall 2011, only VCU Routes 84, 86 and 87 will be operating, as shown in **Figure 4-38**. Stakeholder outreach revealed a need for alternative and creative funding options to help support the VCU routes.

**FIGURE 4-38: FY2011 VCU SHUTTLE SERVICE**



Additionally, a need exists for new express service from Henrico to the VCU Monroe Park Campus.

Express Service from Henrico County to Monroe Park Campus

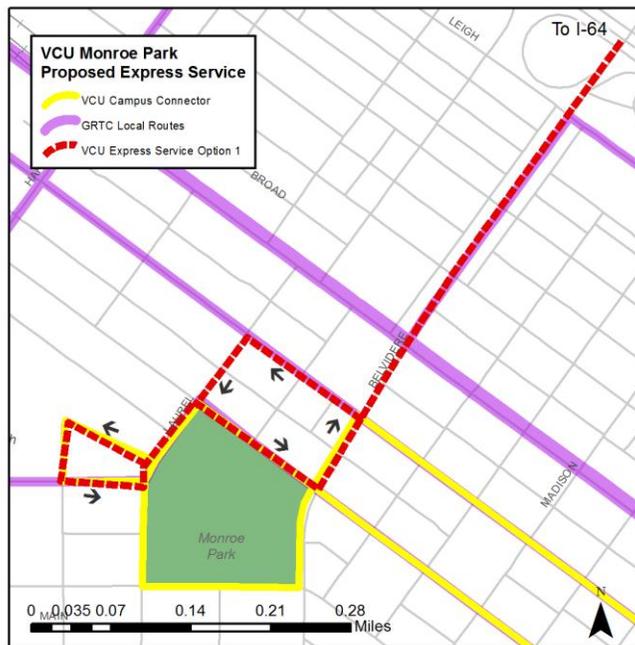
Approximately 1,976 VCU employees commute from Eastern Henrico County and 1,525 VCU employees commute from Western Henrico County. A recent survey of 3,793 VCU employees revealed a strong demand for express bus service from Henrico County park-and-ride locations to the VCU Monroe Park Campus.

- 30.83 percent of the survey respondents said they were very likely to ride express bus service to Monroe Park Campus, and 25.89 percent said they were somewhat likely to ride;
- 35.14 percent were very likely to ride current routes at a subsidized cost, and 26.15 percent were somewhat likely to ride;
- 42.2 percent were very likely to ride a subsidized express service that stopped at a central location on Monroe Park Campus, and 25.96 were somewhat likely to ride; and
- 54.10 percent (2,052 respondents) were willing to travel 1 to 4 miles to a park-and-ride.

Because of this demand, this TDP recommends dedicated express service to the VCU Monroe Park Campus from park-and-ride locations in Henrico County. Three potential operating scenarios at the VCU are presented in **Figures 4-39** through **4-41** below.

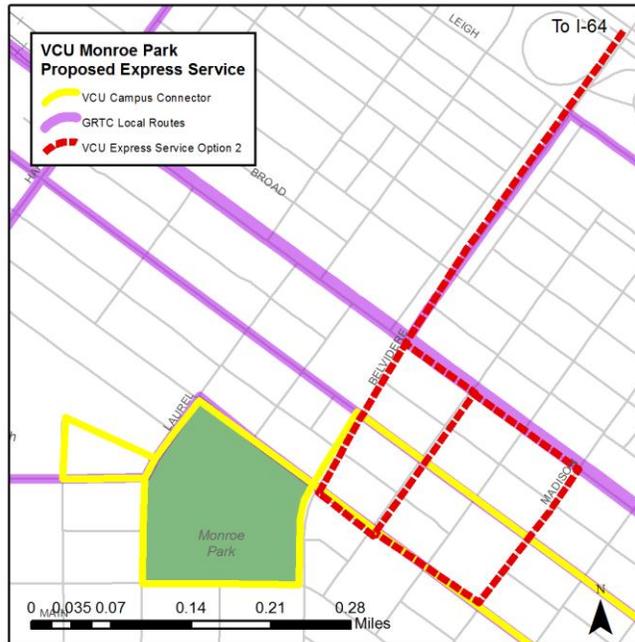
**Option 1:** From I-64, this option travels southwest on N. Belvidere Street, northwest on Grace Street, south on N. Laurel Street, west on Cathedral Place, south on N. Cathedral Place, east on S. Cathedral Place, north on Laurel Street, east on Franklin Street, and north on Belvidere Street to I-64. This option provides service to the heart of the campus including the Student Center and Cabell Library. This option also provides connections to the VCU Campus Connector.

**FIGURE 4-39: PROPOSED VCU EXPRESS SERVICE - OPTION 1**



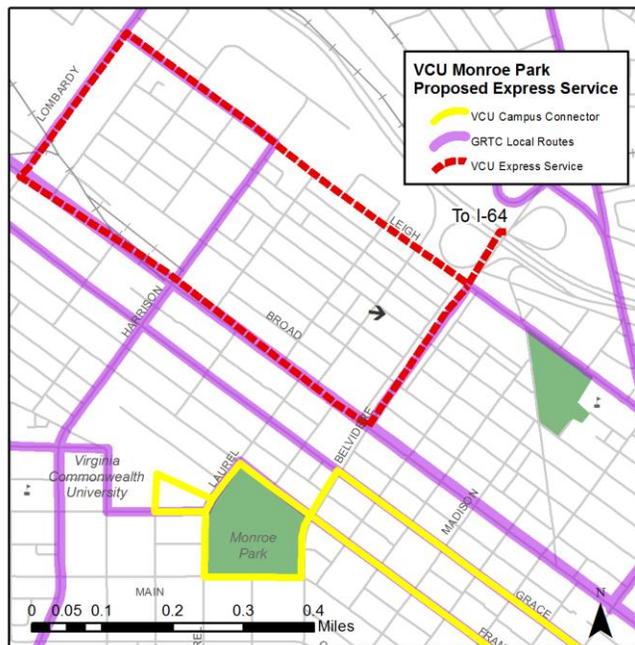
**Option 2:** Option 2 provides service to Monroe Park Campus by traveling south on Belvidere Street, southeast on Franklin and north on Henry or Madison to Broad Street. This option does not penetrate as much of the VCU campus; however, it connects to the VCU Campus Connector. This alignment would also require travel on narrow one way streets with street parking.

**FIGURE 4-40: PROPOSED VCU EXPRESS SERVICE – OPTION 2**



**Option 3:** This option travels northwest on Leigh Street, southwest on Lombardy Street, southeast on Broad Street, and north on Belvidere Street. Although this option provides connections to routes serving Broad Street, this option is the furthest from the VCU Monroe Park Campus and does not provide a direct connection to the VCU Campus Connector.

**FIGURE 4-41: PROPOSED VCU EXPRESS SERVICE OPTION 3**



This TDP assumes express service via I-64 from park-and-ride locations in Western Henrico County at Gaskins, Parham and Glenside to VCU Monroe Park. Although further planning and study is needed to develop a service plan and alignment for the VCU express service, Option 1 is assumed to be the preferred option for the purpose of the TDP. This service is assumed to operate with one vehicle providing two AM peak period inbound trips, and one outbound AM peak period trip, one midday round-trip, and two PM peak period outbound trip and one PM peak period inbound trip. A second route, from the park-and-ride in White Oaks Shopping Center in Eastern Henrico may also be warranted; however, this is assumed to be a longer term need outside of the timeframe of this TDP as the current express service becomes more established. For the purpose of this TDP, **Table 4-35** shows a proposed schedule for the VCU Express service.

**TABLE 4-35: PROPOSE VCU EXPRESS SERVICE SCHEDULE**

Inbound			VCU	Outbound		
Gaskins	Parham	Glenside		Glenside	Parham	Gaskins
6:45 AM	7:00 AM	7:10 AM	<b>7:30 AM</b>			8:15 AM
8:15 AM	8:30 AM	8:40 AM	<b>9:00 AM</b>			
11:30 AM	11:45 AM	11:55 PM	<b>12:15 PM</b>	12:35 PM	12:45 PM	1:00 PM
			<b>5:00 PM</b>	5:30 PM	5:40 PM	6:00 PM
6:00 PM			<b>6:30 PM</b>	6:50 PM	7:00 PM	7:15 PM

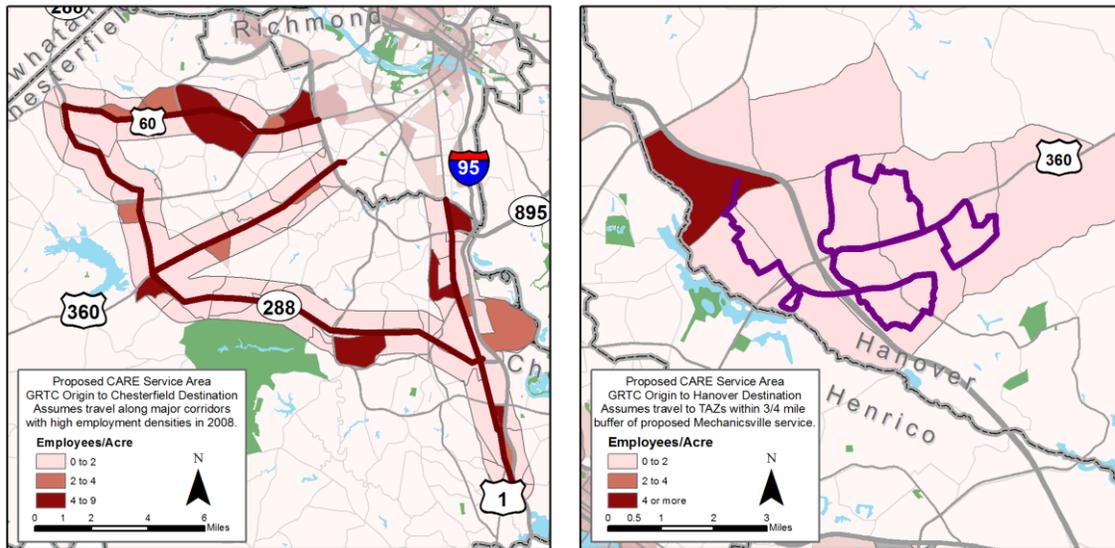
**CARE/C-VAN**

Stakeholder outreach identified a need for more efficient routing and scheduling for CARE service. While GRTC can address this with capital investment, the result should be a lower operating cost to provide the CARE/C-VAN service. Although GRTC provides service to all of Henrico County and City of Richmond, riders expressed a need for CARE and C-VAN service to adjacent counties including Chesterfield and Hanover Counties. Specifically, a need was identified to serve major employment and medical facilities that are located in these adjacent counties.

This TDP assumes trips to destinations in Chesterfield and Hanover counties for CARE passengers in Henrico and Richmond would occur along major corridors with the greatest employment densities as shown in **Figure 4-42**. This TDP assumes CARE receives a total of 529 trips per square mile, based on the average trip per square mile as reported in the NTD for 2009. This TDP assumes a 17 percent increase in the service area with Chesterfield County at 72.6 square miles of new service area, and a 5.8 percent increase for Hanover County with 30.4 square miles.

Finally, stakeholders expressed a need for longer service hours on the CARE system. This TDP assumes that both City of Richmond and Henrico County CARE service operates from 4:30 a.m. to 12:30 a.m. on Monday through Sunday.

**FIGURE 4-42: PROPOSED CARE SERVICE AREA EXTENSION TO DESTINATIONS IN CHESTERFIELD AND HANOVER COUNTIES**



**OTHER**

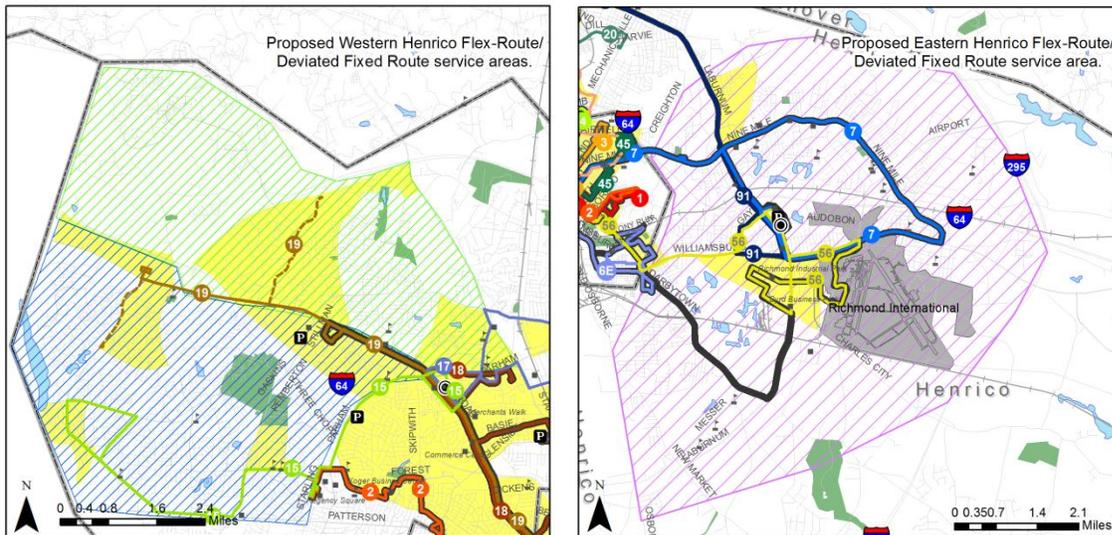
Deviated fixed-routes and on-call transit services can provide an opportunity for transit service in areas with a transit need that may not warrant a permanent fixed-route. This service can also provide a secondary benefit for such service can also operate as ADA paratransit service. Western and eastern Henrico County may be candidates for a flexible type of transit service as shown in **Figure 4-43**. This could also be implemented as a precursor to regular fixed-route service to gauge demand and level of ridership if a fixed-route service was implemented. This TDP assumes this service would operate from 6:00 a.m. to 12:00 a.m. on Monday through Friday, 6:00 a.m. to 11:00 p.m. on Saturday and 6:00 a.m. to 10:00 p.m. on Sunday. Potential flex/deviated route areas that have been identified in this TDP are as follows:

**Western Henrico (South of Broad):** This service area is bordered by Parham Road to the east, Patterson Avenue to the south, the county line to the west, and Broad Street the north. Connections to GRTC fixed-route service could occur at the Fountain Square Shopping Center Transfer Hub as well as Regency Square. This route could also provide connections from fixed-route service to Short Pump Mall on regularly scheduled trips.

**Western Henrico (North of Broad):** This service area is bordered by Staples Mill and Parham Road on the east, Broad Street to the south and the county line to the north and west. This route could also operate from Fountain Square Shopping Center with connections to GRTC fixed-route service.

**Eastern Henrico:** A deviated fixed-route or on-call transit service could be based out of The Shops at White Oak Village with connections to GRTC fixed-route service at the shopping center. This area is bordered by Creighton to the north, the Henrico County line and Osborne Turnpike to the west, I-295 to the east, and 895 to the south.

**FIGURE 4-43: PROPOSED HENRICO COUNTY FLEX ROUTE/DEVIATED FIXED ROUTE SERVICE**



#### OTHER CITY OF RICHMOND/HENRICO COUNTY SERVICE NEEDS

In addition to needs identified in the existing service area, other needs have been identified through stakeholder outreach and the Richmond Regional Mass Transit Study for the City of Richmond and Henrico County. This section describes those needs. It is also important to note that the City of Richmond is currently conducting a strategic multimodal transportation study which will include ways to improve and expand upon transit. Although study recommendations will not be available within the timeframe of this TDP analysis, future TDP updates should include relevant transit components of the plan.

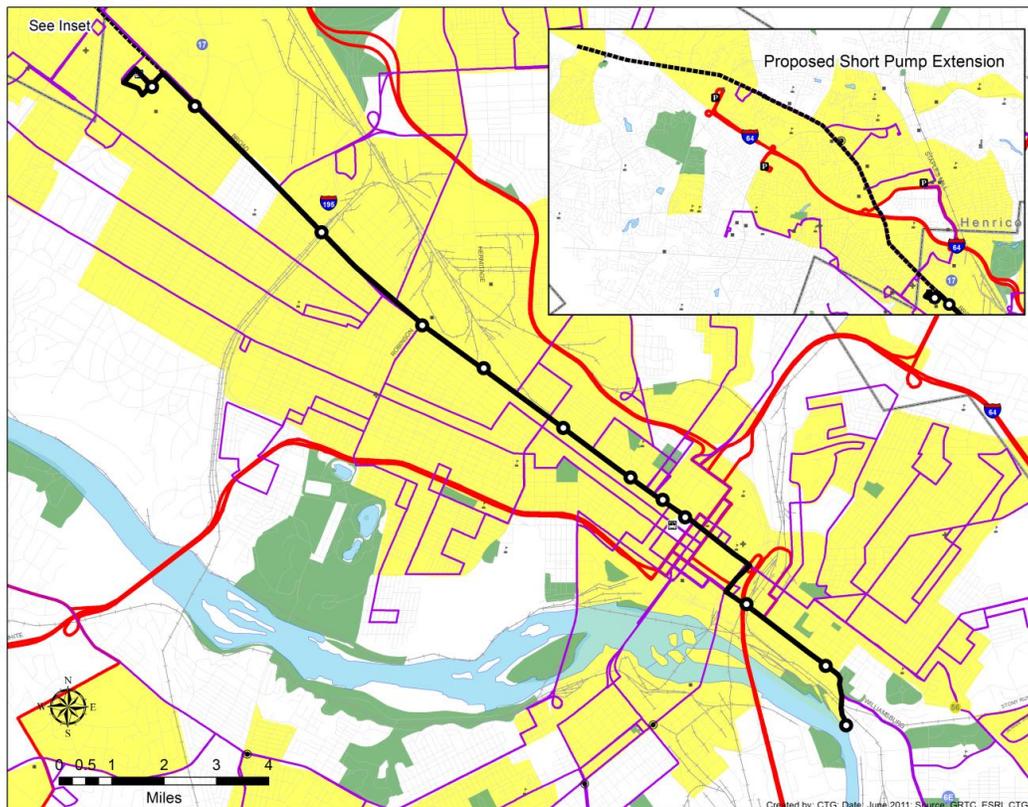
#### BUS RAPID TRANSIT

**Broad Street Corridor BRT:** The Richmond Regional Mass Transit Study (2008) includes recommendations for the Broad Street Corridor. This corridor is currently in the planning stages for Bus Rapid Transit (BRT). The Broad Street BRT is anticipated to begin during the time frame of this TDP with an anticipated opening date of the first segment in 2015. The Broad Street BRT is anticipated to operate between Willow Lawn Shopping Center and Rockett's Landing, located south of Downtown Richmond. A second phase of the BRT project calls for the extension of service from Willow Lawn to Short Pump.

*Service Characteristics:* This TDP assumes the BRT operates seven days a week between 5:00 a.m. and 1:00 a.m. with 10-minute headways during peak periods and 15-to 30-minute headways during off-peak periods and weekends.

*Alignment:* The Broad Street corridor is 17.6 miles long and travels from Short Pump to Rockett's Landing, passing through Downtown Richmond. **Figure 4-44** shows the current proposed BRT alignment and station locations.

**FIGURE 4-44: PROPOSED BROAD STREET BRT ALIGNMENT**

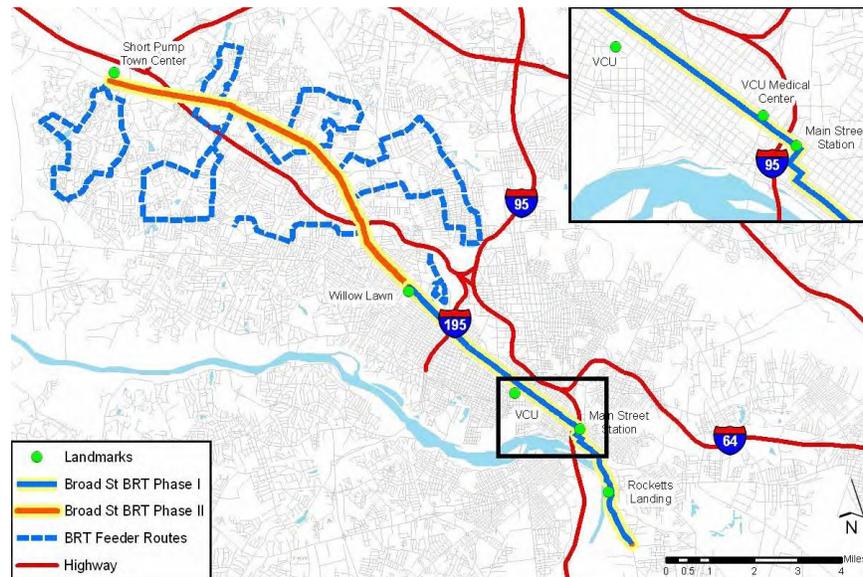


**Broad Street/BRT Feeder Routes:** Implementation of BRT service in the Broad Street corridor will require modifications to several existing routes. The Richmond Regional Mass Transit Study also identifies eight feeder routes to operate in conjunction with Broad Street BRT service.

*Alignment:* The eight circulators are shown in **Figure 4-45**, and provide connecting service to various stops along the BRT line.

*Service Characteristics:* These routes are proposed to operate seven days a week with 30-minute headways on Monday through Saturday and 60-minute headways on Sunday. Service is proposed to operate from 6:00 a.m. to 12:00 a.m. on weekdays; 6:00 a.m. to 12:00 a.m. on Saturdays, and 6:00 a.m. to 11:00 p.m. on Sunday. These routes were identified as Tier 2 for implementation prior to 2031, which is outside of this TDP's time period. Thus, these feeder routes are not included as an identified need for this TDP.

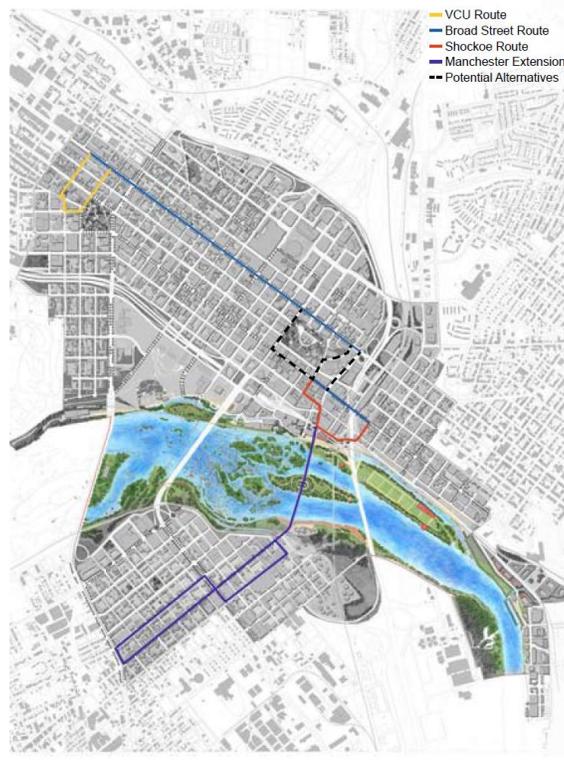
**FIGURE 4-45: PROPOSED BRT CIRCULATORS (SOURCE: RICHMOND REGIONAL MASS TRANSIT STUDY)**



#### DOWNTOWN RICHMOND CIRCULATOR/DOWNTOWN STREETCAR SYSTEM

Stakeholder outreach also identified a need for a downtown circulator to provide access for employees, business travelers and tourists to get around to primary destinations in Downtown Richmond, such as the Convention Center, area hotels, entertainment and dining areas and museums. The Richmond Downtown Master Plan (2009) proposes a downtown electric streetcar system to complement the Broad Street BRT and existing GRTC service, as shown in **Figure 4-46**. The routes shown in blue and red follow Broad Street, Main Street, and Canal Street, providing service to Shockoe Bottom and the previously proposed multimodal Main Street Station. The route shown in gold connects to the VCU Monroe Park campus and the VCU MCV Campus. The route shown in green crosses the river on the historic Mayo Bridge and provides service to Old Manchester. While a downtown streetcar system would be outside of the timeframe of the TDP, a local bus circulator could provide similar type of service in the downtown area.

**FIGURE 4-46: PROPOSED DOWNTOWN STREET CAR SYSTEM**  
(SOURCE: DOWNTOWN RICHMOND MASTER PLAN)



**LOCAL/FIXED ROUTE**

The Richmond Regional Transit Study proposes new local routes in the following corridors in Henrico County.

**Route 1 North:** The Route 1 North corridor extends north from Downtown Richmond through Henrico County to the Town of Ashland in Hanover County. The study identifies the need for commuter bus or rail service between Richmond and Ashland, as well as service extensions of existing GRTC local bus routes between Henrico County and Town of Ashland. The Henrico County segment of the local bus service is described in the previous section. The remaining segment would be to the Town of Ashland. This route was identified as a Tier I project with an immediate implementation need.

*Alignment:* The Richmond Regional Transit Study identifies this route alignment as an extension of existing GRTC service, such as Route 37, traveling northbound on Route 1 and west on Route 54 to the Town of Ashland.

*Service Characteristics:* The Route 1 North local bus service extension is proposed to be provided by local bus service operating seven days a week from 6:00 a.m. 12:00 a.m. on weekdays; 6:00 a.m. to 11:00 p.m. on Saturday and 6:00 a.m. to 10:00 p.m. on Sunday. Recommended headways are 30 minutes on weekdays and Saturdays and 60 minutes on Sundays.

**Route 5 Corridor:** The Richmond Regional Transit Study identifies the need for transit service along the Route 5 corridor as new development similar to Rockett’s Landing occurs. The Route 5 corridor is proposed to include a local bus route that travels along Route 5 between Route 895 and Rockett’s Landing that would feed into the Broad Street BRT service. A planning study is currently underway to identify specific transit needs along this corridor. New service along this corridor is anticipated to occur outside of the timeframe of this TDP, and thus should be incorporated in future TDP updates. This route was identified as a Tier I project with an immediate need.

*Alignment:* As identified in the Richmond Regional Transit Study, this route would operate along Route 5 between Route 895 and Rockett’s Landing for a distance of 7.2 miles.

*Service Characteristics:* This proposed route would operate seven days a week, from 6:00 a.m. to midnight on weekdays; 6:00 a.m. to 11:00 p.m. on Saturday; and 6:00 a.m. to 10:00 p.m. on Sunday. The proposed route would require three vehicles during peak periods with recommended headways at 30 minutes on weekdays and Saturdays and 60 minutes on Sundays.

#### EXPRESS SERVICE

Express service needs identified for Henrico County are as follows.

**Richmond International Airport Limited Stop Bus:** The Richmond Regional Mass Transit Study identifies the need for a limited-stop bus route between the Richmond International Airport and Downtown Richmond. In the short term, the route is proposed to be limited stop bus service, with a long range plan for Light Rail. This commuter bus project was identified as Tier I with an immediate need.

*Alignment:* The proposed alignment for the limited stop service travels from Richmond International Airport to Main Street Station along Williamsburg Road, with a stop at Rockett’s Landing.

*Service Characteristics:* The limited-stop bus route is proposed to operate seven days a week, between 6:00 a.m. and 11:00 p.m. on Monday through Saturday and 6:00 a.m. to 10:00 p.m. on Sundays. This service would require two vehicles to operate during peak service. Headways are proposed to be 30 minutes on weekdays and Saturdays and 60 minutes on Sunday.

#### CHESTERFIELD COUNTY SERVICE NEEDS

Chesterfield County is located south of the City of Richmond, and is considered a suburban community in the region. Transit service in the county is limited to GRTC commuter bus service, with small pockets of GRTC fixed-route service on the edge of the Richmond city line, and Access Chesterfield, which provides demand response transit services to persons with disabilities, senior citizens and individuals with income below poverty. Although Chesterfield County is on the GRTC Board of Directors, the county does not currently fund any transit service. Transit service needs have been identified from demographic analysis and stakeholder outreach in Chesterfield County, as well as from the Richmond Regional Mass Transit Study.

**LOCAL/FIXED ROUTE**

Development in Chesterfield County consists of traditional suburban land uses that do not necessarily support traditional fixed-route transit service. This trend is likely to continue over the timeframe of this TDP. Chesterfield County's current focus is on providing transit service through Access Chesterfield to those populations with the greatest need for transit service such as elderly, disabled and individuals with incomes below poverty. There are pockets of transit supportive areas near the Chesterfield county line, which warrants consideration of GRTC service extensions as described in the previous section. Major travel corridors in Chesterfield County that were identified in the Richmond Regional Mass Transit Study as candidates for local fixed-route service are described below.

**Route 1 South (Jefferson Davis):** The Route 1 South corridor extends south from Downtown Richmond through Chester and Colonial Heights to Petersburg. As described in the Richmond Regional Mass Transit Study, local bus service along the Route 1 South corridor would provide connecting service between developing areas of Chesterfield County and existing GRTC service, which includes an area that has many residents who could be characterized as transit dependent. This project was identified as Tier I with an immediate need.

*Alignment:* This Route 1 service is proposed to travel between Downtown Richmond to Chester via Route 360 and Route 1.

*Service Characteristics:* This route would operate seven days a week from 6:00 a.m. to midnight on weekdays; 6:00 a.m. to 11:00 p.m. on Saturday, and 6:00 a.m. to 10:00 p.m. on Sunday. Recommended headways are proposed to be 30 minutes on weekdays and Saturdays and 60 minutes on Sundays.

**Route 288 Crosstown:** The Richmond Regional Mass Transit Study proposes a Route 288 regional crosstown route, which would provide a connection between Chesterfield County and the rapidly developing areas in western Henrico County and Goochland County, including Short Pump and the West Creek Corporate Center, without traveling through Downtown Richmond. This was identified as Tier II with a need prior to 2031 which is outside the timeframe of this TDP, thus has not been included for consideration in this TDP.

*Alignment:* This route would travel through Short Pump Town Center and central Chesterfield County via Route 288 with stops at Short Pump Town Center, West Creek Corporate Center, the Watkins Center and Bon Secours Medical Center.

*Service Characteristics:* This proposed crosstown route would operate seven days a week from 6:00 a.m. to 12:00 a.m. on weekdays, 6:00 a.m. to 11:00 p.m. on Saturdays, and 6:00 a.m. to 10:00 p.m. on Sundays. Headways are proposed to be 20 minutes during peak periods and 60 minutes during off-peak periods and weekends.

**Hull Street Road (Route 360):** The Richmond Regional Mass Transit Study includes a proposal for transit service along Route 360 that would provide local bus service to the corridor's developing residential areas and activity nodes. This corridor was identified as a Tier I project with an immediate need.

*Alignment:* This route is proposed to operate on Hull Street Road between the City of Richmond and Commonwealth Centre and can be operated independently or as an extension of existing GRTC service.

*Service Characteristics:* Local bus service along the Hull Street Road corridor is proposed to operate seven days a week from 6:00 a.m. to 12:00 a.m. on weekdays, 6:00 a.m. to 11:00 p.m. on Saturdays, and 6:00 a.m. to 10:00 p.m. on Sundays. This route is proposed to operate at 30-minute headways on weekdays and Saturdays and 60-minute headways on Sundays.

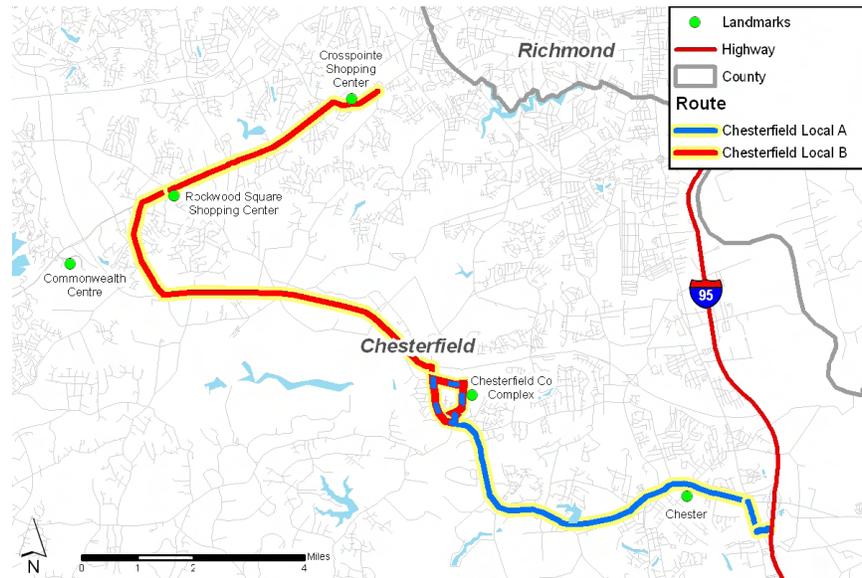
**Midlothian Local Route:** The Richmond Regional Mass Transit Study includes a proposal for local route service along the Midlothian Corridor, which extends west from Downtown Richmond through Chesterfield County to Powhatan County. GRTC's Route 63 was identified as a candidate for service extension from South Richmond to the Watkins Center. This route was identified as a Tier II priority, with implementation prior to 2031, which is outside of this TDP's timeframe, thus has not been included for consideration in this TDP.

*Service Characteristics:* This route is proposed to operate seven days a week with 30-minute headways from Monday through Saturday and 60-minute headways on Sunday. Service hours would be from 6:00 a.m. to 12:00 a.m. on weekdays, 6:00 a.m. to 11:00 p.m. on Saturday, and 6:00 a.m. to 10:00 p.m. on Sunday.

**Chesterfield County Local Routes:** In addition to the corridor routes identified in this section, the Richmond Regional Mass Transit Study identified two potential local routes that would serve areas within Chesterfield County, including Route 10, the Government Center complex, and Hull Street, as shown in **Figure 4-47**. This service was identified as a Tier II priority with implementation prior to 2031, which is outside of this TDP's timeframe, and thus has not been included for consideration in this TDP.

*Service Characteristic:* The proposed routes would operate seven days a week with 30-minute headways on Monday through Saturday and 60-minute headways on Sunday. Service is proposed to operate between 6:00 a.m. and 12:00 a.m. on weekdays, and 6:00 a.m. to 11:00 p.m. on Saturday and Sunday.

FIGURE 4-47: PROPOSED CHESTERFIELD COUNTY LOCAL BUS (SOURCE: RICHMOND REGIONAL MASS TRANSIT STUDY)



**EXPRESS**

The following describes express service needs for existing GRTC express routes serving Chesterfield County as well as future service needs.

**Route 82 – Commonwealth 20/Swift Creek Express:** This existing express route operates Monday through Friday from Swift Creek Church via Hull Street and Commonwealth 20 at Commonwealth Centre Parkway in Chesterfield to Richmond with five AM peak and five PM peak trips. This route ranks 2<sup>nd</sup> among the express routes for riders per mile and 3<sup>rd</sup> for riders per trip. This service is currently funded by the state, and the existing funds are scheduled to run out on July 2012. A permanent source of funding for this service is needed beginning on July 2012 for this service to continue to operate.

**Midlothian Commuter Bus:** The Richmond Regional Mass Transit Study identifies a need for express bus service in the Midlothian corridor, from Route 288 to Downtown Richmond. The first phase of this route would be commuter bus, with a long term phase proposed to be commuter rail. This commuter bus project was identified as a Tier I priority with an immediate need.

*Service Characteristics:* Service would include four inbound trips and one outbound trip during weekday morning peak period and four outbound trips and one inbound trip during the weekday evening peak period.

*Alignment:* From Downtown Richmond, this route would travel via Main Street, Powhite Parkway, and the Midlothian Turnpike to the Midlothian area.

#### CARE/C-VAN

Chesterfield County provides service to persons with disabilities, persons over the age of 65 or persons living below poverty through Access Chesterfield. The following identifies existing and future needs for paratransit service in Chesterfield County.

**Funding Alternatives:** Access Chesterfield has grown since its inception in 2004. All of the funding for this service comes from Chesterfield County with no support from the state or federal government. The county is focused on providing transit for Human Services and populations with the greatest need for transit service. The greatest need for paratransit service enhancements in Chesterfield County as identified by the County is finding new sources of funds for continued growth of the Access Chesterfield program.

**Service from City of Richmond/Henrico County to Chesterfield Destinations:** As discussed in the Henrico County section of this chapter, CARE/C-VAN stakeholders identified a need for expanded paratransit service from origins in Henrico County and City of Richmond to destinations in Chesterfield County.

#### OUTSIDE SERVICE AREA

Although GRTC's current service area is primarily within Henrico County and City of Richmond, GRTC is recognized as the major transit service provider throughout the region. Stakeholder outreach identified a need for a regional transit system, with expanded regional connections to employment centers. This section identifies regional transit needs as identified from stakeholders as well as from the Richmond Regional Mass Transit Study.

#### TOWN OF ASHLAND

The Town of Ashland is located north of Henrico County on US 1/I-95. GRTC recently ended express service to Fredericksburg that also served the Town of Ashland. With a close regional proximity to GRTC's service area, this TDP identifies potential transit needs that may provide opportunities to expand regional transit options to the Town of Ashland.

Local/Fixed Route: The Town of Ashland completed a Transit Services Plan in 2008 that addressed transit service needs in the town. The plan included recommendations for the near and long term.

**Town of Ashland Circulator Route:** This circulator route would operate in a counter-clockwise direction providing service to the Library, Hanover Human Services Center, Sedgefield, Ashland Junction Shopping Center, Walmart, and Ashland Town Square. This route would operate as a deviated fixed-route to accommodate ADA complementary paratransit requirements.

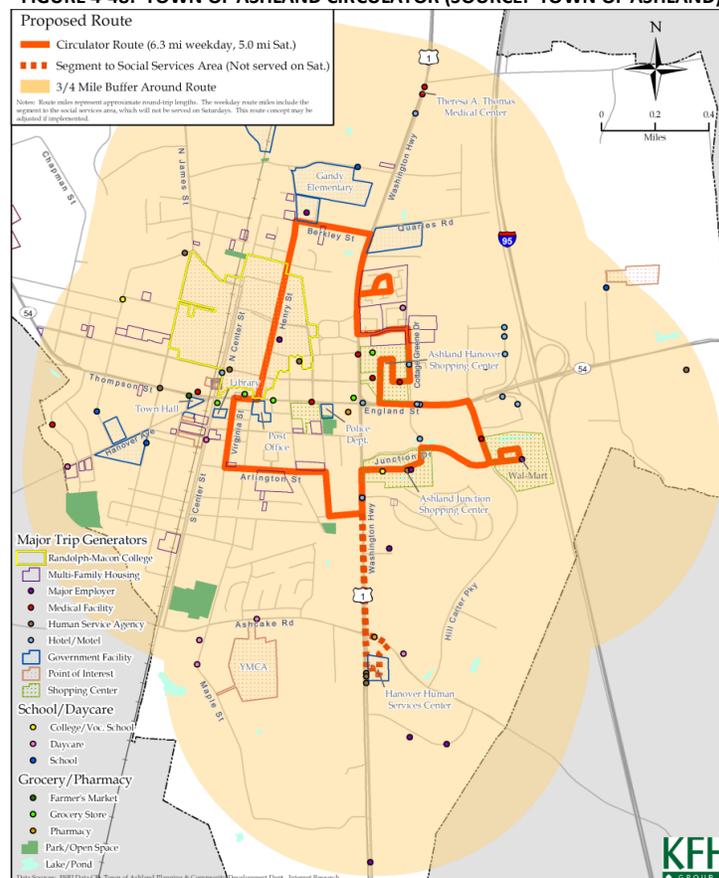
*Alignment:* From the Ashland Library, this route travels south on Virginia Street, east on Arlington Street, south on Washington Highway to Hanover Human Services Center, north on Washington Highway, east on Junction Drive to the Walmart, north on Hill Carter Parkway, west on England Street to Ashland Hanover Shopping Center, north on Cottage Green Drive, west on Omni Park Drive, north on

Washington Highway, west on Berkley Street and south on Henry Street to return to the Library. On Saturdays, the segment to Hanover Human Services Center would not operate, as shown in **Figure 4-48**.

*Service Characteristics:* This route is proposed to operate on Monday through Friday from 7:00 a.m. to 6:00 p.m. and on Saturdays from 10:00 a.m. to 5:00 p.m. Headways are proposed to be 45 minutes on weekdays and 30 minutes on Saturday.

*Long Range Local Service:* In the long range, the plan identifies the need for a second vehicle to provide ADA paratransit, and additional service need in planned development areas east of I-95, industrial developments along Hill Carter Parkway and regional transit connections to Hanover County and GRTC, which would likely be outside of the timeframe of this TDP.

**FIGURE 4-48: TOWN OF ASHLAND CIRCULATOR (SOURCE: TOWN OF ASHLAND)**



Commuter/Express Bus: GRTC recently stopped its express service between Richmond and Fredericksburg, which included a stop at Ashland on the return trip southbound in the a.m. and northbound in the p.m. Although ridership on this route was low, the need for commuter bus service between Ashland and Richmond may still exist, as identified in the Richmond Regional Mass Transit Study. Additionally, a need for commuter service between Ashland and Fredericksburg may exist. Close coordination with the Town of Ashland should occur before implementing new express bus service to ensure the most productive service is provided.

**I-95 Ashland Commuter Bus:** This service would operate between the Town of Ashland and Downtown Richmond. Additional service to/from West Henrico may also be warranted. In the long range, the Richmond Regional Mass Transit Study proposes commuter rail service. The Town of Ashland has a downtown redevelopment plan that is centered around the Amtrak rail station, which would further support this service. The Richmond Regional Mass Transit Study identified the commuter bus project as a Tier I priority with an immediate need.

**Alignment:** The Regional Mass Transit Study identifies a route alignment from Downtown Ashland that travels east of Route 54, stopping at a park-and-ride in the vicinity of the I-95 interchange, and continuing south on I-95 to 3rd Street, east on Jackson Street, south on 8th Street and west onto Broad Street to Main Street Station.

*Service Characteristics:* This service is proposed to operate Monday through Friday during peak periods and midday with four inbound trips during weekday morning peak hours and four outbound trips during the weekday evening peak hours as well as one midday round-trip. Service is proposed to operate with 30-minute headways.

#### HANOVER COUNTY

Hanover County is located northwest of Richmond and borders Henrico County. GRTC recently began express route service along Mechanicsville Turnpike to Mechanicsville – a service need previously identified in the Richmond Regional Mass Transit Study. Additional fixed-route and express route needs as identified in the Richmond Regional Transit Study are identified below.

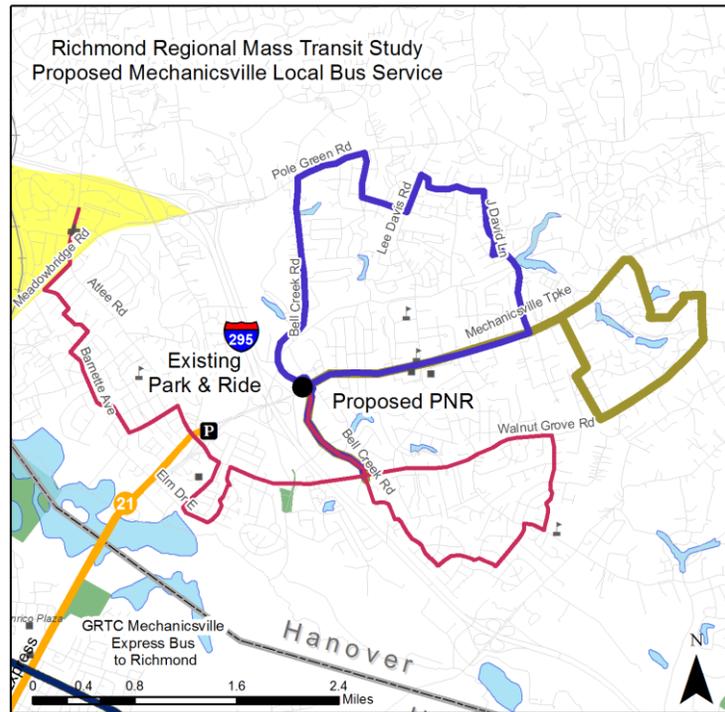
Fixed Route: Local bus service needs in the Mechanicsville area are as follows:

**Mechanicsville Area Local Bus Service:** The Richmond Regional Mass Transit Study identifies three potential local routes serving the Mechanicsville area with service to Downtown Mechanicsville and connections to the Mechanicsville Park and Ride lot and the Mechanicsville commuter bus. This project was identified as a Tier II priority for implementation prior to 2031, which is outside of this TDP’s time period, and thus has not been included for consideration in this TDP.

*Alignment:* **Figure 4-49** shows the proposed alignments for the three local Mechanicsville area routes. All three routes would provide service to Downtown Mechanicsville and the park-and-ride. The park-and-ride identified in the regional study is different than the existing park-and-ride facility.

*Service Characteristics:* These local routes are proposed to operate seven days a week with 30-minute headways on Monday through Saturday and 60-minute headways on Sunday. The service is proposed to operate from 6:00 a.m. to 12:00 a.m. on weekdays, and 6:00 a.m. to 11:00 p.m. on Saturday and Sunday.

**FIGURE 4-49: PROPOSED MECHANICSVILLE LOCAL**



**CARE/C-VAN:** Stakeholder outreach efforts revealed a demand for ADA paratransit service from Henrico County, Richmond and Chesterfield County to destinations in Hanover County particularly to medical facilities in Mechanicsville. Additionally, should the proposed local fixed-route service be implemented, complementary paratransit service would be required, unless the service is provided as a deviated fixed-route service. Based on an estimated 2008 population within ¼ mile radius of the proposed Hanover alignments of 29,395 people and 21.3 square miles of service area in Hanover County, this TDP estimates 8,000 to 11,000 paratransit trips per year should the proposed fixed-route service be implemented. This is based on CARE’s 2009 trips per capita of .28 and trips per square mile of 529.

**NEW KENT COUNTY**

New Kent County is located to the east of Henrico County along I-64, and is centered between Richmond and Williamsburg. New Kent County is predominately rural in nature; however, the county has expressed a need for a park-and-ride located in the county. Although New Kent County is outside of GRTC’s current service area and is served by Bay Transit, the need for express service to Richmond has been identified in the Richmond Regional Mass Transit Study. The Bay Transit TDP also identifies the need for commuter service from New Kent County and Charles City County to Richmond. This service would also complement express service needs identified in the Williamsburg TDP from New Kent County to Williamsburg. The following express routes are identified as transit service needs in New Kent County in the Richmond Regional Mass Transit Study.

**I-64 East Commuter Bus:** Commuter bus service between Providence Forge and Downtown Richmond is proposed in the Richmond Regional Mass Transit Study with park-and-rides located at Providence Forge and at the interchange of I-64 and Route 155.

*Alignment:* The I-64 East commuter bus would travel from a park-and-ride lot located in Providence Forge and would travel northbound on Route 155, where it would serve a second park-and-ride in the vicinity of I-64 and Route 155. The route would continue westbound via I-64, and would travel to Downtown Richmond via Nine Mile Road, 5th Street, and Broad Street.

*Service Characteristics:* This route is proposed to operate on weekdays via four inbound trips and one outbound trip during the AM peak period and four outbound trips and one inbound trip during the PM peak period. This route would require four vehicles during the peak period to travel a distance of 27.3 miles. This project was identified as a Tier I priority with an immediate need.

#### GOOCHLAND COUNTY

**I-64 West:** The I-64 West corridor extends from central Richmond west to Goochland County. The Richmond Regional Mass Transit Study identifies a need for commuter bus service between Oilville and Main Street Station with park-and-ride lots located in Oilville and at the I-64/Route 288 interchange.

*Service Characteristics:* This route would operate four inbound trips and one outbound trip during weekday morning peak period and four outbound trips and one inbound trip during the weekday evening peak period. This project was identified as a Tier II priority with implementation prior to 2031, which is outside of this TDP's time period, and thus has not been included for consideration in this TDP. However, stakeholder outreach has identified this corridor as a future candidate for transit service as development continues and traffic congestion increases in the corridor. Future updates to this TDP may warrant inclusion of this service.

#### POWHATAN COUNTY

**Powhatan Corridor:** The Richmond Regional Mass Transit Study identifies a need for commuter bus service along the Powhatan Corridor which would connect Powhatan County and the western portion of Chesterfield County with Downtown Richmond. This service is proposed to operate between the Route 60 and Route 522 interchange in Powhatan County and Downtown Richmond. This corridor has a Tier II priority with implementation prior to 2031, which is outside of this TDP's time period, and thus has not been included for consideration in this TDP.

*Alignment:* This route would travel from a park-and-ride lot in the vicinity of the Route 60/Route 522 interchange, would continue eastbound on Route 60 to the Watkins Center in western Chesterfield County, and would travel on Route 288 to Powhite Parkway and Downtown Richmond.

*Service Characteristics:* This route is proposed to operate four inbound trips and one outbound trip during weekday morning peak period and four outbound trips and one inbound trip during the weekday evening peak period.

**OUTSIDE OF THE RICHMOND REGION**

**Other Transit Providers:** A review of TDPs created by transit providers adjacent to GRTC revealed service needs to the City of Richmond, as identified below. None of these services were identified as priorities by other transit providers; thus, cost estimates are not considered for inclusion in this TDP. Since these services were identified as unconstrained needs in other TDPs, they are worth mentioning in the GRTC TDP.

*Fredericksburg:* As previously noted, GRTC recently eliminated express service to Fredericksburg. At the time of the FRED TDP, this service was in operation, thus no recommendations were made for service to Richmond. In the future, as the corridor south of Fredericksburg along Route 1 continues to develop and a new VRE station is built in Spotsylvania County, reinstatement of this service may be warranted.

*Charlottesville/JAUNT Service Area:* The JAUNT TDP identifies needs for commuter service to Richmond, particularly to the Short Pump area. Opportunities may exist for GRTC to partner with or connect to any services provided by JAUNT to this area.

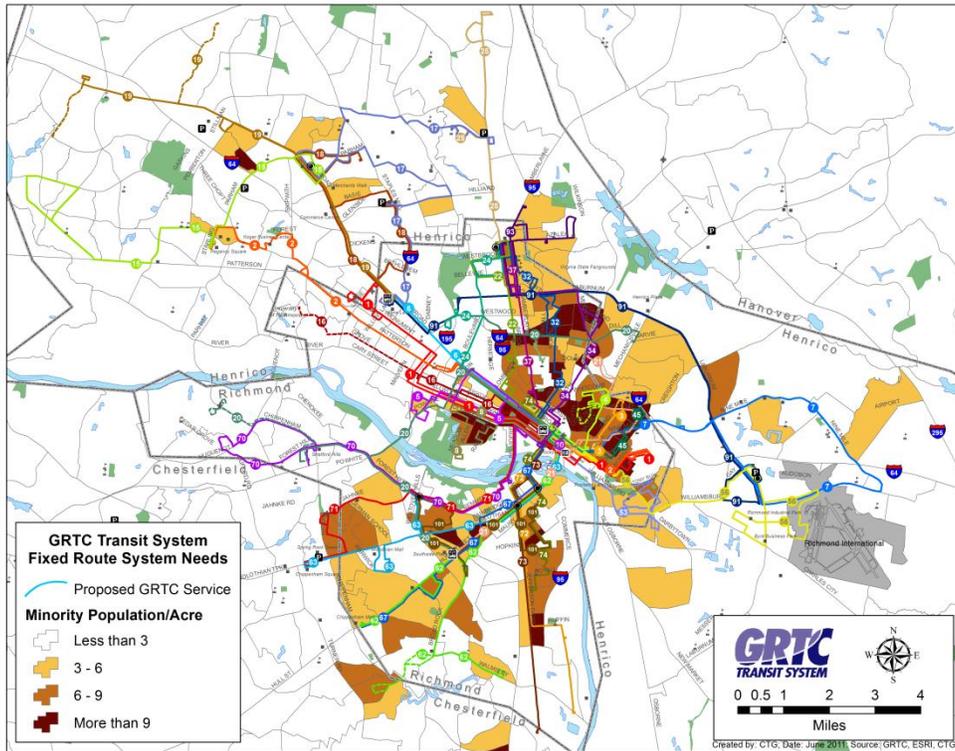
*Williamsburg:* As mentioned in the New Kent needs section, Williamsburg is located east of Richmond on I-64. The Williamsburg Area Transit TDP identifies a need for commuter service to Providence Forge in New Kent County, as well as commuter service to Richmond. Opportunities may exist for GRTC to partner with or connect to any service provided.

*Intercity Rail:* While likely outside of the timeframe of this TDP, several studies have identified the need for intercity rail between Richmond and Williamsburg/Hampton Roads and Fredericksburg/Washington DC areas.

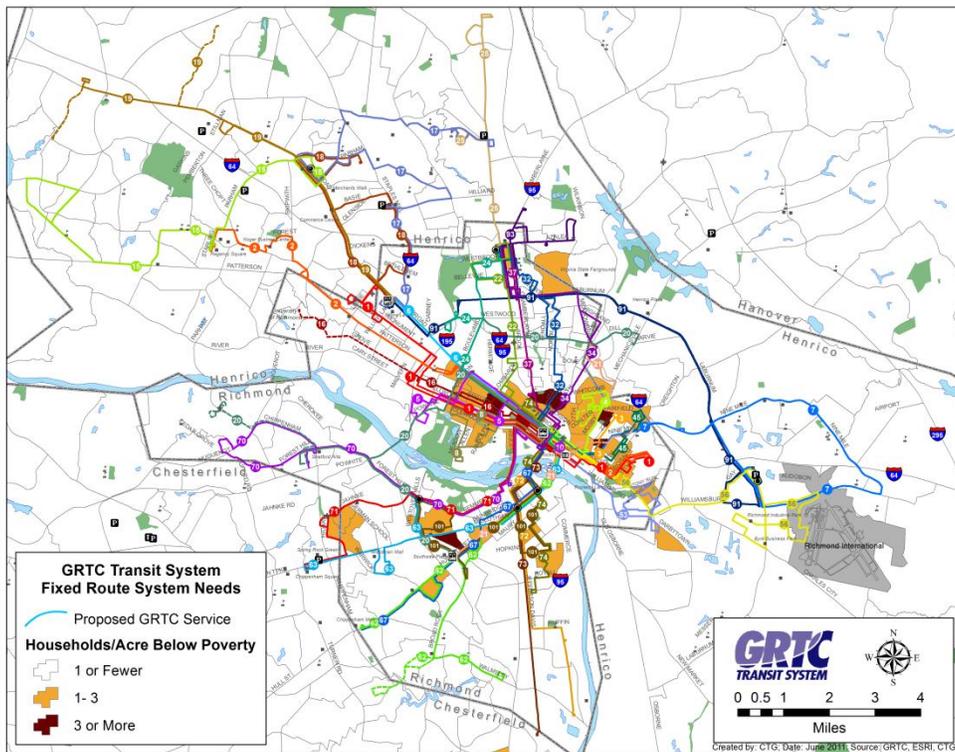
**DISADVANTAGED POPULATION NEEDS (TITLE VI)**

In keeping with GRTC's Title VI requirements, the following maps show the impact of the proposed needs plan on disadvantaged populations identified in **Chapter 3** as minority populations, populations age 65 and up, households with income below poverty and households with no access to a vehicle. None of these populations are adversely affected by the needs identified in this Chapter, as shown in **Figures 4-50** through **4-53**. Due to census data changes, data on persons with disabilities is not available at the time of this TDP; however, future updates should include this group as well.

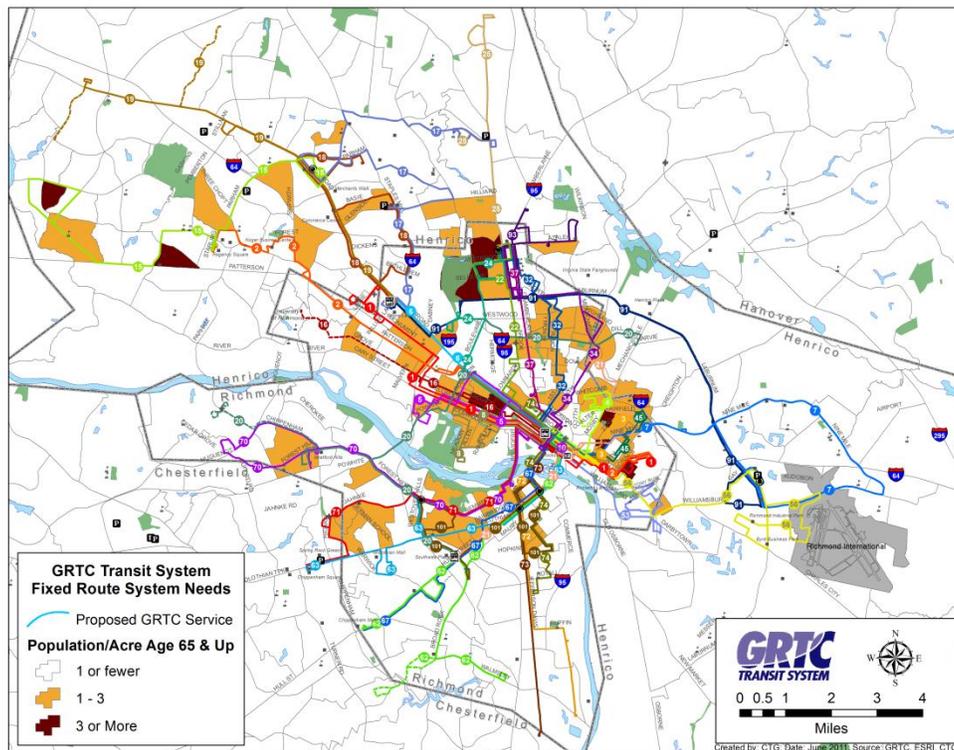
**FIGURE 4-50: DISADVANTAGED POPULATION NEEDS – MINORITY POPULATIONS PER ACRE**



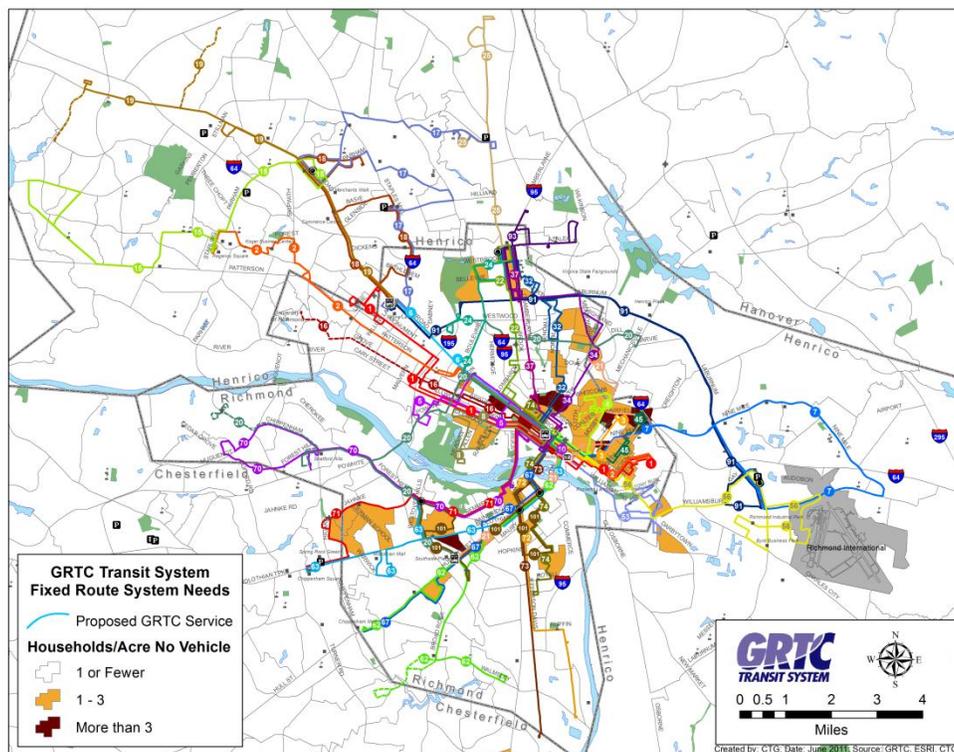
**FIGURE 4-51: DISADVANTAGED POPULATION NEEDS - LOW INCOME HOUSEHOLDS**



**FIGURE 4-52: DISADVANTAGED POPULATION NEEDS – PERSONS AGE 65 AND UP**



**FIGURE 4-53: DISADVANTAGED POPULATION NEEDS – HOUSEHOLDS WITH NO ACCESS TO A VEHICLE.**



## 4.2 FACILITY AND EQUIPMENT NEEDS

This section outlines facility and equipment needs considered for inclusion in this TDP.

### VEHICLE FLEET

**GRTC Bus Replacement Program:** GRTC should continue to replace its vehicle fleet based on the agency's current fleet replacement program. During the timeframe of the TDP, 92 fixed-route vehicles will be due for replacement. Due to lack of funding, only 38 of these vehicles are programmed for replacement over the TDP timeframe. As a result, GRTC will be operating an aging fleet. Thus, this TDP identifies a need for additional funding sources for replacement vehicles. GRTC should also continue to assess right-sizing routes to smaller buses with lower ridership to help control costs. Candidate routes for rightsizing include: Routes 10, 11, 21, 22, 24, 93 and 101. Additionally, GRTC may consider using smaller buses on any expansion routes until demand is sufficient for large size vehicles.

**CNG Fuel Fleet Conversion:** During the timeframe of this TDP, GRTC may consider replacing its fleet with Compressed Natural Gas (CNG) vehicles. If GRTC decides to move from diesel to CNG, capital cost related to infrastructure would be incurred by the City of Richmond, with reimbursement paid by GRTC through a fuel surcharge. This conversion would require replacing both the fixed-route and paratransit vehicles at a higher vehicle cost. Should GRTC choose the CNG option, vehicles would be replaced as they reach the end of their normal life span. This TDP presents estimated costs for both the diesel and CNG scenarios.

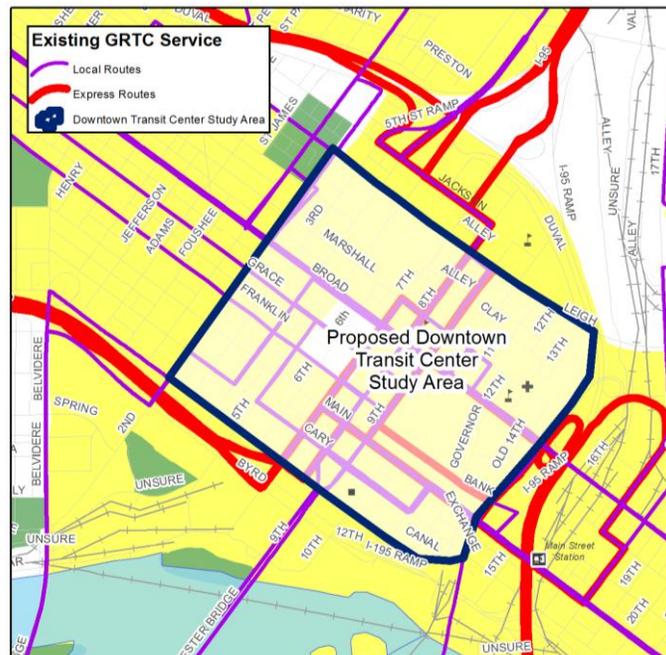
**Expansion Vehicles:** Any expansion of service would require the purchase of additional vehicles. This TDP identifies needs for service that would result in 111 additional peak vehicles. This estimate is on the high end, as it assumes each route operates independently and no interlining occurs.

This TDP assumes a range of \$48,000,000 to \$53,000,000 of capital costs for the GRTC Bus Replacement Program over the FY2012-2018 time frame, dependent on whether diesel or CNG fuel buses are used. Capital costs for any expansion vehicles would also be incurred in addition to this amount.

### TRANSFER CENTERS

**Downtown Transit Center:** GRTC is currently in the planning stages for a Transit Center in Downtown Richmond. **Figure 4-54** shows study area boundary. This TDP assumes that service will be rerouted to serve a downtown transit center with a neutral cost impact. Capital costs, however, will be incurred for land acquisition and improvement of the site. This TDP assumes a range of \$25,000,000 to \$30,000,000 in capital costs for a downtown transfer center.

FIGURE 4-54: PROPOSED DOWNTOWN TRANSIT CENTER STUDY AREA

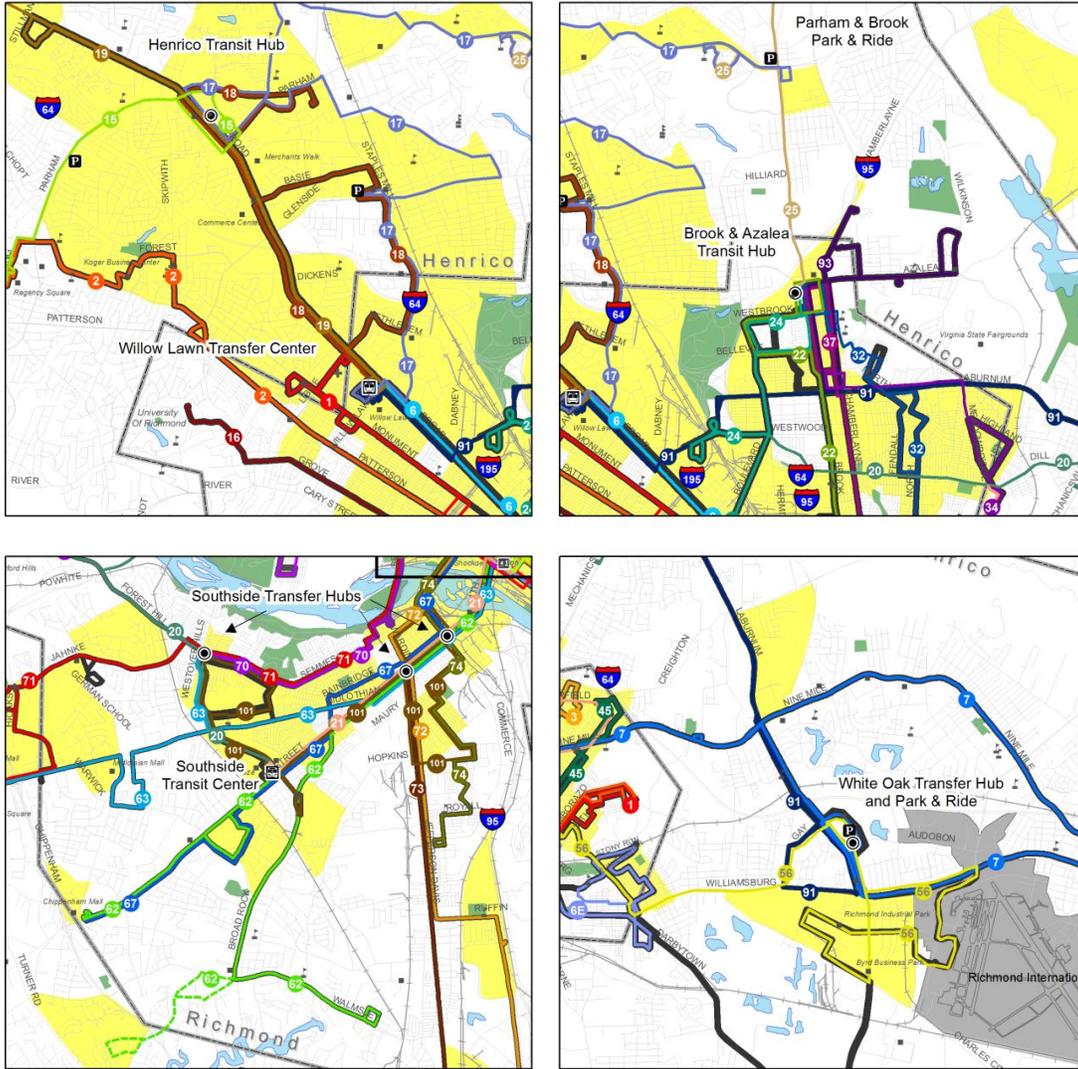


**Secondary Transfer Hubs:** Other locations throughout the service area presently function as secondary transfer hubs and warrant further capital investment to provide passenger amenities, shelter and safety. These are classified as Transit Centers and Transit Hubs as shown in **Figure 4-55**. The secondary transit centers identified in this TDP include Willow Lawn and Southside Plaza. Although these locations have shelters and some passenger amenities, greater capital investment may be warranted in amenities such as a larger shelter, benches, electronic bus arrival information, systemwide bus schedule information, designated bus lanes and parking. Transfer hubs are locations with multiple connecting routes where passengers are likely to make transfers. These locations would warrant shelter, lighting, benches and schedule information. Locations identified in this TDP include Brook & Azalea, Hull Street & Cowardin, Hull Street & Commerce, Forest Hill & Westover Hills, White Oak Village Shopping Center and Parham & Broad.

**PARK-AND-RIDES**

In addition to the existing park and rides, stakeholders expressed a need for a park-and-ride in the vicinity of Staples Mill & Broad with the opening of the Broad Street BRT. Other park-and-ride needs described in the previous section include a designated site in Chester to replace the temporary location at John Tyler University, and an additional park-and-ride near Tollway 895/Chippenham.

**FIGURE 4-55: PROPOSED GRTC TRANSFER CENTERS AND TRANSFER HUBS**



**BUS STOPS**

Systemwide, upgrades to bus stop signage is needed to include the routes serving the stop and the arrival times. Additionally, GRTC should continue to pursue electronic bus stop signs and kiosks at stops with greater ridership activity. GRTC should also pursue accessibility improvements at bus stops (i.e., sidewalks, ADA curb cuts, crosswalks with pedestrian crossing signals) with local governments.

**BROAD STREET BRT**

Capital costs associated with the Broad Street BRT project include costs associated with specially designed vehicles, infrastructure improvements to roadways and construction of stations along the alignment. Currently, capital costs are assumed to be \$70,000,000. This project is still in the planning stages, and future updates to this TDP should include any changes to these estimates.

#### ADMIN./MAINTENANCE FACILITY

GRTC recently moved into its new facility, and thus, no additional capital needs are assumed to the maintenance facility during the timeframe of this TDP. GRTC relocated all of its paratransit vehicles to this new facility in summer 2011 and is in the process of purchasing the adjoining property to permanently house the paratransit fleet. Should GRTC move to a CNG fleet, as previously described, the maintenance facility will need to be retrofitted and a fueling center will need to be added.

#### TECHNOLOGY

GRTC should continue to pursue technology to ensure efficient delivery of service and to reduce costs for both local and demand response service. The following software needs are included in GRTC's Long Range Capital Plan for FY12 – FY18:

- Great Plains Upgrade, Maintenance and Year End;
- Hastus Upgrade and Maintenance;
- Route Match Maintenance; and
- Clever Device Maintenance and Database Management.

#### MARKETING

GRTC discussions and stakeholder outreach revealed a need for greater marketing of GRTC's transit services, including the marketing of express bus services in outlying communities and park-and-ride locations. Since the Richmond region is more automobile-oriented, a public awareness campaign about the benefits of transit may also be of value.

#### 4.3 FUNDING REQUIREMENTS

Potential costs were estimated for the service and facility unconstrained needs identified above in FY2011 dollars. **Tables 4-36 to 4-38** provides a summary of the unconstrained service needs described in this chapter, this is followed by estimated operating costs and capital cost estimates. Potential funding requirements are based on the following assumptions:

- Operating costs are assumed at \$7.68 per revenue mile(FY2011) for fixed-route service and \$45.48 per revenue hour for paratransit/deviated fixed-route service;
- Revenue vehicle costs are assumed at \$350,000 per vehicle;
- Paratransit vehicles are assumed at \$80,000 per vehicle;
- Weekday service is assumed at 250 days per year; Saturday service is 52 days per year; Sunday & Holiday service is 63 days per year.

**TABLE 4-36: SUMMARY OF PROPOSED SERVICE IMPROVEMENTS**

Route	Jurisdiction	Summary
<b>New Fixed Route/Local Bus Service</b>		
Route 5-Belmont	City of Richmond	Monday - Sunday: 5:17 a.m. - 12:55 p.m. 15 min peak/20 min base; Saturday: 6:06 a.m. - 12:45 a.m. 30 min.; Sunday: 6:06 a.m. - 12:48 a.m. 30 min.
Route 8 - West End	City of Richmond	Monday - Sunday: 5:30 a.m. - 12:30 a.m. 15 minute peak on weekdays, 30-minute base weekdays, Saturday and Sunday
Route 15 - West Henrico	Henrico County	Monday - Friday: 5:00 a.m. - 11:00 p.m. 20 min peak/30 min base; Saturday: 6:00 a.m. - 11:00 p.m. 60 min; Sunday: 6:00 a.m. - 10:00 p.m. 60 min
Route 17 -West Henrico/Laurel	Henrico County	Monday - Friday: 5:00 a.m. - 11:00 p.m. 20 min peak/30 min base; Saturday 6:00 a.m. -11:00 p.m. 30 min; Sunday 6:00 a.m. - 10 :00 p.m. 60 min.
Route 20 - Richmond West Connector	City of Richmond	Monday - Friday: 5:00 a.m. - 11:00 p.m. 30 min peak/30 min base; Saturday 6:00 a.m. -11:00 p.m. 60 min; Sunday 6:00 a.m. - 10 :00 p.m. 60 min.
Route 21 - Richmond East Connector	City of Richmond	Monday - Friday: 5:00 a.m. - 11:00 p.m. 30 min peak/30 min base; Saturday 6:00 a.m. -11:00 p.m. 60 min; Sunday 6:00 a.m. - 10 :00 p.m. 60 min.
Route 25 - Route 1 North Henrico	Henrico County	Monday - Friday: 5:00 a.m. - 11:00 p.m. 20 min peak/30 min base; Saturday 6:00 a.m. -11:00 p.m. 30 min; Sunday 6:00 a.m. - 10 :00 p.m. 60 min.
Route 1 North - Henrico/Ashland	Henrico County/Town of Ashland	Extension of proposed Route 1 North Local Bus to Town of Ashland. Monday - Friday: 6:00 a.m. - 11:00 p.m. 30 min peak/30 min base; Saturday 6:00 a.m. - 11:00 p.m. 60 min; Sunday 6:00 a.m. - 10 :00 p.m. 60 min.
Route 5 Corridor Local Bus	Henrico County	Local bus service on Route 5, Monday - Friday: 6:00 a.m. - 11:00 p.m. 30 min peak/30 min base; Saturday 6:00 a.m. -11:00 p.m. 60 min; Sunday 6:00 a.m. - 10 :00 p.m. 60 min.
Broad Street BRT Feeder Routes	City of Richmond	Eight Circulator Routes feeding Broad Street BRT; Monday - Saturday, 6:00 a.m. - 12:00 a.m., 30 min; Sunday, 6:00 a.m. - 11:00 p.m. 60 min.
Route 1 South - Jefferson Davis	Chesterfield County	Monday - Friday, 6:00 a.m. - 12:00 a.m., 30 min.; Saturday, 6:00 a.m. - 11:00 p.m., 30 min; Sunday, 6:00 a.m. - 10:00 p.m. , 60 min.
Route 288 Crosstown	Chesterfield County	Monday - Friday, 6:00 a.m. - 12:00 a.m., 20 min. peak/60 min. off peak; Saturday, 6:00 a.m. - 11:00 p.m., 60 min; Sunday, 6:00 a.m. - 10:00 p.m. , 60 min.
Hull Street (Route 360)	Chesterfield County	Monday - Friday, 6:00 a.m. - 12:00 a.m., 30 min.; Saturday, 6:00 a.m. - 11:00 p.m., 30 min; Sunday, 6:00 a.m. - 10:00 p.m. , 60 min.
Midlothian	Chesterfield County	Monday - Friday, 6:00 a.m. - 12:00 a.m., 30 min.; Saturday, 6:00 a.m. - 11:00 p.m., 30 min; Sunday, 6:00 a.m. - 10:00 p.m. , 60 min.
Chesterfield County Local Routes	Chesterfield County	Two local bus routes operating Monday - Friday, 6:00 a.m. - 12:00 a.m., 30 min.; Saturday, 6:00 a.m. - 11:00 p.m., 30 min; Sunday, 6:00 a.m. - 10:00 p.m. , 60 min.
Town of Ashland Circulator Route	Town of Ashland	Monday - Friday: 7:00 a.m. - 6:00 p.m., 45 min.; Saturday, 10:00 a.m. - 5:00 p.m. , 30 min.
Mechanicsville Area Local Bus Service	Hanover County	Three local routes: Monday - Friday, 6:00 a.m. - 12:00 a.m. , 30 min., Saturday, 6:00 a.m. - 11:00 p.m., 30 min.; Sunday, 6:00 a.m. - 10:00 p.m., 60 min.

**TABLE 4-37: SUMMARY OF PROPOSED SERVICE IMPROVEMENTS CONTINUED**

Route	Jurisdiction	Summary
<b>Existing Fixed Route Changes: Increased Headways, Hours, Rerouting</b>		
All Routes	City of Richmond/Henrico County	Clock Headways proposed for all routes
Route 1-Monument/Patterson/Church Hill	City of Richmond	Realigned aligned route to serve Main & Carey
Route 3 - Fairfield	City of Richmond	Truncated route at Broad & Monroe
Route 4 - Whitcomb	City of Richmond	Truncated route downtown, realigned eastern segment
Route 6 - Broad Street	City of Richmond	Split into two Routes 6 & 53; reduced headways when BRT is implemented
Route 11 - Oliver Hill/17th	City of Richmond	This route is eliminated, coverage provided by other routes
Route 7 - Seven Pines	City of Richmond/Henrico County	Expanded service hours on Weekdays, Saturday and Sunday
Route 56 - South Laburnum	City of Richmond/Henrico County	Realigned Route, expanded service hours and frequencies on Weekdays, Saturday and Sunday.
Route 19 - Pemberton Road	Henrico County	Truncated east to end at Willow Lawn, extended west to Short Pump Mall, expanded service hours and frequencies on Weekdays, Saturday and Sunday
Route 22 - Hermitage: Downtown Westbrook	City of Richmond	Realigned route to serve Brook
Route 24 - Crestwood/Westbrook	City of Richmond	Realigned route to serve Azalea Transfer Hub
Route 32 - Ginter Park	City of Richmond	Extended Route to Azalea Transfer Hub
Route 34 - Highland Park	City of Richmond	Extended Route to Raceway and Brook/Laburnum
Route 62 - Hull	City of Richmond	Added limited stop north of Southside Transfer Center
Route 63 - Midlothian	City of Richmond	Modified Westover Hills Alignment
Route 67 - Chippenham	City of Richmond	Added weekday off peak, Saturday and Sunday service
Route 71 - Forest Hill	City of Richmond	Extended Route to Chippenham Square, eliminated Glenway Court
Route 101 - Southside Plaza/Belt Connector	City of Richmond	Added Manchester & VA hospital circulation, increased service hours and frequencies, added Saturday and Sunday Service
Route 91 - Laburnum Connector	City of Richmond	Expanded span of service on Weekdays, Saturday and Sunday
<b>Existing Express Service</b>		
Express Routes 26, 27 & 29	Henrico County	Reduced frequency by adding larger Coach buses to routes
Route 95 - Richmond/Petersburg	City of Richmond/Petersburg	Added stop at Tollway 895/Chippenham
Route 82 - Commonwealth 20/Swift Creek	Chesterfield County	Needs funding source to continue operating

**TABLE 4-38: SUMMARY OF PROPOSED SERVICE IMPROVEMENTS CONTINUED**

Route	Jurisdiction	Summary
<b>New Express Service</b>		
Richmond International Airport Limited Stop Bus	City of Richmond & Henrico County	Monday - Saturday, 6:00 a.m. - 11:00 p.m., 30 min.; Sunday, 6:00 a.m. - 10:00 p.m. 60 min.
Midlothian Commuter Bus	Chesterfield County	AM Peak: 4 inbound and 1 outbound trip; PM Peak 4 outbound and 1 inbound trip;
I-95 Ashland Commuter Bus	Town of Ashland	AM Peak: 4 inbound; PM Peak: 4 outbound; midday: 1 round-trip
I-64 East Commuter Bus	New Kent County	AM Peak: 4 inbound and 1 outbound trip; PM Peak 4 outbound and 1 inbound trip;
I-64 West Commuter Bus	Goochland County	AM Peak: 4 inbound and 1 outbound trip; PM Peak 4 outbound and 1 inbound trip;
Powhatan Corridor	Powhatan & Chesterfield Counties	AM Peak: 4 inbound and 1 outbound trip; PM Peak 4 outbound and 1 inbound trip;
<b>VCU</b>		
Henrico County to VCU Monroe Park Campus	VCU	Peak Period Express Bus Service to VCU
Alternative Funding Options	VCU	Eliminating route in Fall, need for alternative funding options
<b>CARE CVAN</b>		
CARE - Expanded Service	City of Richmond, Henrico, Hanover, & Chesterfield	Expand service to destinations in Hanover and Chesterfield Counties
Access Chesterfield - Funding Source	Chesterfield County	Need for alternative funding sources to serve transit dependent populations
<b>Other</b>		
Western Henrico (South of Broad) Flex Route	Henrico County	On Call or deviated fixed route service south of Broad
Western Henrico (North of Broad) Flex Route	Henrico County	On Call or deviated fixed route service north of Broad
Eastern Henrico Flex Route	Henrico County	On Call or deviated fixed route service in Eastern Henrico
Broad Street BRT	City of Richmond	Bus Rapid Transit on Broad Street
Downtown Street Car	City of Richmond	Street Car System in Downtown Richmond & Manchester
<b>Outside Region</b>		
Richmond/Fredericksburg	City of Richmond, City of Fredericksburg	Commuter bus/intercity rail service
Short Pump/Charlottesville-JAUNT	Henrico County, JAUNT	Commuter bus to Short Pump
Richmond/Williamsburg	Richmond, New Kent, Williamsburg	Commuter bus/intercity rail service

Tables 4-39 through 4-41 show the assumed operating statistics for the unconstrained needs identified for the existing GRTC service area. This includes local, express and VCU recommendations for weekdays, Saturday and Sunday. It is important to note that assumptions do not take into account interlining or other shared uses of vehicles.

**TABLE 4-39: PROPOSED GRTC SERVICE AREA NEEDS WEEKDAY OPERATING STATISTICS**

Rte. #	Route Pattern	Rnd Trip?	Service Frequency				Daily Trips	One-Way Distance (Miles)	Average Weekday		Peak Buses
			Base Period	AM Period	PM Period	Early/Late Period			Rev. Hrs.	Rev. Miles	
1	Monument	N	30	15	15	30	96	10.27	96.0	985.4	8.00
2	Patterson	N	30	10	10	30	120	10.77	120.0	1292.9	12.00
3	Fairfield	N	30	15	15	30	96	2.97	48.0	284.6	4.00
4	Whitcomb	N	60	30	30	60	48	2.13	24.0	102.1	2.00
4	Whitcomb	N	60	30	30	60	48	2.96	24.0	142.0	2.00
5	Belmont	N	20	15	15	30	110	4.77	82.5	524.7	6.00
6	Broad - West	N	12	10	10	30	162	4.80	99.0	777.6	7.00
8	New Route	N	30	15	15	60	86	3.20	43.0	274.8	4.00
7	Seven Pines/Nine Mile	N	30	15	15	60	86	9.51	67.0	818.1	6.00
15	New Route	N	60	30	30	60	48	10.63	66.0	510.0	5.00
16	Grove	N	60	15	15	n/a	62	6.77	50.0	419.5	6.00
17	New Route	N	30	30	30	60	62	15.94	80.0	988.3	5.00
18	Henrico Gov't Center	N	60	60	60	n/a	26	6.58	13.0	171.0	1.00
19	Pemberton	N	60	30	30	60	48	9.21	48.0	442.1	4.00
19	Pemberton	N	60	30	30	n/a	38	12.85	38.0	488.3	4.00
20	New Route	N	30	30	30	30	72	15.33	108.0	1103.8	6.00
20	New Route-Select Trips	N	n/a	120	120	n/a	6	23.25	12.0	139.5	2.00
21	Richmond East Connector	N	30	30	30	30	72	8.92	54.0	642.2	3.00
22	Hermitage	N	60	60	60	60	36	7.44	36.0	267.7	2.00
24	Crestwood/Westbrook	N	30	30	30	60	62	7.41	62.0	459.3	4.00
25	New Route	N	30	15	15	30	96	7.77	96.0	745.4	8.00
32	Ginter Park	N	15	10	10	30	148	6.47	111.0	958.1	9.00
34	Highland Park	N	15	10	10	30	148	6.12	111.0	906.0	9.00
37	Chamberlayne	N	30	15	15	30	96	5.24	72.0	503.1	6.00
45	Jefferson	N	30	30	30	30	72	3.24	36.0	233.3	2.00
53	Broad - East	N	30	15	15	30	96	5.15	66.0	494.4	5.00
56	Laburnum	n	60	30	30	60	48	9.77	48.0	469.0	4.00
62	Hull street	n	15	15	15	60	114	6.95	57.0	792.6	4.00
63	Midlothian	n	30	15	15	60	86	10.58	105.0	909.5	10.00
67	Chippenham	n	30	15	15	60	86	10.58	105.0	909.5	10.00
70	Forest Hill	n	30	15	15	60	86	9.78	64.5	841.5	6.00
71	Forest Hill	n	30	15	15	60	86	8.99	64.5	773.3	6.00
72	Ruffin Road	n	30	30	30	60	62	7.29	46.5	452.2	3.00
73	Amphill	n	30	15	15	60	86	7.02	43.0	603.6	4.00
74	Oak Grove	n	30	15	15	60	86	6.41	67.0	551.6	6.00
91	Laburnum Connector	n	60	60	60	60	36	12.88	36.0	463.8	2.00
93	Azalea Connector	n	30	30	30	n/a	52	4.21	26.0	218.9	2.00
101	Belt Boulevard Connector	n	30	30	30	60	62	8.04	49.0	498.3	3.00
								<b>2374.0</b>	<b>22158.1</b>	<b>192.00</b>	
21Exp.	Mechanicsville Express	N	n/a	30	30	n/a	8	12.97	3.7	103.8	2.00
23	Glenside/Parham Express	Y	n/a	n/a	15	n/a	2	13.00	1.2	26.0	2.00
26	Parham Express	Y	n/a	20	20	n/a	13	11.16	6.5	145.1	2.00
27	Glenside Express	Y	n/a	20	20	n/a	13	8.31	6.5	108.1	2.00
28	White Oaks Village	N	n/a	30	30	n/a	4	7.20	1.5	28.8	2.00
29	Gaskins Express	y	n/a	20	20	n/a	17	13.01	8.5	221.1	3.00
64	Stony Point Express	N	n/a	15	15	n/a	24	8.37	10.9	200.9	3.00
66	Spring Rock Green Express	N	n/a	15	15	n/a	9	7.90	4.3	71.1	3.00
81	Chesterfield Express	N	n/a	30	30	n/a	14	13.31	9.5	186.3	3.00
82	Commonwealth 20 Swift Creek	N	n/a	20	20	n/a	11	19.77	8.2	217.5	3.00
95	Richmond/Petersburg	N	90	17	16	n/a	27	20.29	14.8	547.9	4.00
								<b>75.6</b>	<b>1856.6</b>	<b>29.00</b>	
84	VCU Campus Connector	N	20	20	20	100	84	1.96	24.6	164.9	2.00
86	VCU Medical Center	N	8	8	8	10	255	0.85	29.6	216.1	2.00
87	VCU Gateway Express	N	9.5	6.5	6.5	12.5	246	0.76	28.6	186.1	3.00
XP	Express Service to Monroe Campu	N	90	90	90	n/a	8	13.49	6.0	107.9	1.00
								<b>88.8</b>	<b>675.0</b>	<b>8.00</b>	
<b>Total</b>								<b>2,538.40</b>	<b>24,689.59</b>	<b>229.00</b>	

**TABLE 4-40: PROPOSED GRTC SERVICE AREA NEEDS SATURDAY OPERATING STATISTICS**

Rte. #	Route Pattern	Service Frequency		Daily Trips	One-Way Distance (Miles)	Average Saturday		Peak Buses
		Base Period	Early/Late Period			Rev. Hrs.	Rev. Miles	
1	Monument	30	30	80	10.27	80.0	821.2	4.00
2	Patterson	30	30	80	10.77	80.0	862.0	4.00
3	Fairfield	30	30	80	2.97	40.0	237.6	2.00
4	Whitcomb	30	60	74	2.13	20.0	157.6	1.00
5	Belmont	30	30	80	4.77	60.0	381.6	3.00
6	Broad - West	30	30	80	4.80	60.0	384.0	3.00
7	Seven Pines/Nine Mile	60	n/a	34	9.51	34.0	323.4	2.00
8	New Route	30	60	74	3.20	37.0	236.8	2.00
15	New Route	60	n/a	34	10.63	51.0	361.3	3.00
17	New Route	30	n/a	68	15.94	85.0	1083.9	5.00
19	Pemberton	30	n/a	68	9.21	68.0	626.3	4.00
20	New Route	60	n/a	34	15.33	51.0	521.2	3.00
21	Richmond East Connector	60	n/a	34	8.92	34.0	303.3	2.00
22	Hermitage	60	n/a	34	7.44	34.0	252.8	2.00
24	Crestwood/Westbrook	60	n/a	34	7.41	34.0	251.9	2.00
25	New Route	30	n/a	68	7.77	68.0	528.0	4.00
32	Ginter Park	20	30	114	6.47	77.0	738.0	4.00
34	Highland Park	20	30	114	6.12	77.0	697.9	4.00
37	Chamberlayne	30	30	80	5.24	60.0	419.3	3.00
45	Jefferson	30	30	80	3.24	40.0	259.2	2.00
53	Broad - East	30	30	80	5.15	60.0	412.0	3.00
56	Laburnum	60	n/a	34	9.77	34.0	332.2	2.00
62	Hull street	30	n/a	68	6.95	34.0	472.8	2.00
63	Midlothian	30	60	74	10.58	91.0	782.6	5.00
67	Chippenham	60	n/a	34	10.58	34.0	359.6	2.00
70	Forest Hill	60	n/a	34	9.78	34.0	332.7	2.00
71	Forest Hill	60	n/a	34	8.99	34.0	305.7	2.00
72	Ruffin Road	60	60	40	7.29	40.0	291.7	2.00
73	Amphill	30	60	74	7.02	37.0	519.4	2.00
74	Oak Grove	30	60	74	6.41	57.0	474.7	3.00
91	Laburnum Connector	60	n/a	34	12.88	34.0	438.1	2.00
101	Belt Boulevard Connector	30	n/a	68	8.04	51.0	546.6	3.00
						<b>1,630.01</b>	<b>14,715.15</b>	<b>89.00</b>
84	VCU Campus Connector	25	180	84	1.96	24.6	164.9	2.00
						<b>2076</b>	<b>24.6</b>	<b>164.9</b>
						<b>1,654.62</b>	<b>14,880.05</b>	<b>91.00</b>

**TABLE 4-41: PROPOSED GRTC SERVICE AREA NEEDS SUNDAY OPERATING STATISTICS**

Rte. #	Route Pattern	Service Frequency		Daily Trips	One-Way Distance (Miles)	Average Sunday		Peak Bus	
		Base Period	Early/Late Period			Rev. Hrs.	Rev. Miles		
1	Monument	30	30	76	10.27	76.0	780.1	4.00	
2	Patterson	30	30	76	10.77	76.0	818.9	4.00	
3	Fairfield	30	30	76	2.97	38.0	225.7	2.00	
4	Whitcomb	30	60	70	2.13	35.0	149.1	2.00	
5	Belmont	30	30	76	4.77	57.0	362.5	3.00	
6	Broad - West	30	30	76	4.80	57.0	364.8	3.00	
7	Seven Pines/Nine Mile	60	n/a	32	9.51	32.0	304.4	2.00	
8	New Route	30	60	70	3.20	35.0	224.0	2.00	
15	New Route	60	n/a	32	10.63	48.0	340.0	3.00	
17	New Route	60	n/a	32	15.94	48.0	510.1	3.00	
19	Pemberton	60	n/a	32	9.21	32.0	294.7	2.00	
20	New Route	60	n/a	32	15.33	48.0	490.6	3.00	
21	Richmond East Conne	60	n/a	32	8.92	32.0	285.4	2.00	
22	Hermitage	60	n/a	32	7.44	32.0	238.0	2.00	
24	Crestwood/Westbrook	60	n/a	32	7.41	32.0	237.1	2.00	
25	New Route	30	n/a	64	7.77	64.0	497.0	4.00	
32	Ginter Park	20	30	108	6.47	73.0	699.2	4.00	
34	Highland Park	20	30	108	6.12	73.0	661.2	4.00	
37	Chamberlayne	30	30	76	5.24	57.0	398.3	3.00	
45	Jefferson	30	30	76	3.24	38.0	246.2	2.00	
53	Broad - East	60	60	38	5.15	38.0	195.7	2.00	
56	Laburnum	60	n/a	32	9.77	32.0	312.6	2.00	
62	Hull street	60	n/a	32	6.95	16.0	222.5	1.00	
63	Midlothian	60	60	38	10.58	38.0	401.9	2.00	
67	Chippenham	60	n/a	32	10.58	32.0	338.4	2.00	
70	Forest Hill	60	n/a	32	9.78	32.0	313.1	2.00	
71	Forest Hill	60	n/a	32	8.99	32.0	287.7	2.00	
72	Ruffin Road	60	60	38	7.29	38.0	277.2	2.00	
73	Amphill	30	60	70	7.02	35.0	491.3	2.00	
74	Oak Grove	30	60	70	6.41	54.0	449.0	3.00	
91	Laburnum Connector	60	n/a	32	12.88	32.0	412.3	2.00	
101	Belt Boulevard Connect	60	n/a	32	8.04	32.0	257.2	2.00	
						<b>1,394.01</b>	<b>12,086.12</b>	<b>80.00</b>	
84	VCU Campus Connect	25	50	84	1.96	24.6	164.9	2.00	
						<b>1770</b>	<b>24.6</b>	<b>164.9</b>	<b>2.00</b>
						<b>1,418.62</b>	<b>12,251.02</b>	<b>82.00</b>	

Estimated costs for the existing FY2011 GRTC fixed-route service and the proposed unconstrained needs are provided in **Tables 4-42** and **4-43**. This is followed by **Table 4-44**, which includes estimated operating costs for regional projects described in this TDP and **4-45**, which includes estimated unconstrained paratransit service expansion costs.

**TABLE 4-42: EXISTING GRTC SERVICE AREA FIXED ROUTE ESTIMATED OPERATING COSTS**

<b>Local</b>	<b>Daily Revenue Miles</b>	<b>Daily Revenue Hours</b>	<b>Annual Revenue Miles</b>	<b>Annual Revenue Hours</b>	<b>Operating Cost</b>	<b>Total Peak Vehicles</b>
Weekday	12,068.50	1,132.38	3,017,124.50	283,094.77	\$ 23,171,516.16	96.00
Saturday	5,939.27	549.58	308,842.04	28,578.27	\$ 2,371,906.87	38.00
Sunday	5,597.57	497.87	352,647.10	31,365.60	\$ 2,708,329.72	31.00
<b>Total Existing</b>			<b>3,678,613.64</b>	<b>343,038.64</b>	<b>\$ 28,251,752.75</b>	

<b>Express</b>	<b>Daily Revenue Miles</b>	<b>Daily Revenue Hours</b>	<b>Annual Revenue Miles</b>	<b>Annual Revenue Hours</b>	<b>Operating Cost</b>	<b>Total Peak Vehicles</b>
Weekday	2,274.67	92.39	568,666.75	23,097.33	\$ 4,367,360.64	32.00
Saturday						
Sunday						
<b>Total Existing</b>			<b>568,666.75</b>	<b>23,097.33</b>	<b>\$ 4,367,360.64</b>	

<b>VCU</b>	<b>Daily Revenue Miles</b>	<b>Daily Revenue Hours</b>	<b>Annual Revenue Miles</b>	<b>Annual Revenue Hours</b>	<b>Operating Cost</b>	<b>Total Peak Vehicles</b>
Weekday	633.87	93.06	158,467.25	23,265.27	\$ 1,217,028.48	9.00
Saturday	164.89	24.61	8,574.38	1,279.76	\$ 65,851.27	2.00
Sunday	164.89	24.61	10,388.20	1,550.48	\$ 79,781.35	2.00
<b>Total Existing</b>			<b>177,429.83</b>	<b>26,095.50</b>	<b>\$ 1,362,661.09</b>	

<b>Total GRTC Existing</b>	<b>Daily Revenue Miles</b>	<b>Daily Revenue Hours</b>	<b>Annual Revenue Miles</b>	<b>Annual Revenue Hours</b>	<b>Operating Cost</b>	<b>Total Peak Vehicles</b>
Weekday	14,977.03	1,317.83	3,744,258.50	329,457.36	\$ 28,755,905.28	137.00
Saturday	6,104.16	574.19	317,416.42	29,858.03	\$ 2,437,758.14	40.00
Sunday	5,762.47	522.48	363,035.30	32,916.08	\$ 2,788,111.07	33.00
<b>Total Existing</b>			<b>4,424,710.22</b>	<b>392,231.47</b>	<b>\$ 33,981,774.48</b>	

**TABLE 4-43: UNCONSTRAINED GRTC SERVICE AREA FIXED ROUTE NEEDS PLAN ESTIMATED OPERATING COSTS**

<b>Local</b>	<b>Daily Revenue Miles</b>	<b>Daily Revenue Hours</b>	<b>Annual Revenue Miles</b>	<b>Annual Revenue Hours</b>	<b>Operating Cost</b>	<b>Total Peak Vehicles</b>
Weekday	22,158.06	2,374.00	5,539,515.80	593,501.25	\$ 42,543,481.31	192.00
Saturday	14,715.15	1,630.01	765,188.01	84,760.38	\$ 5,876,643.95	89.00
Sunday	12,086.12	1,394.01	761,425.86	87,822.46	\$ 5,847,750.64	80.00
<b>Total Local</b>			<b>7,066,129.67</b>	<b>766,084.09</b>	<b>\$ 54,267,875.90</b>	

<b>Express</b>	<b>Daily Revenue Miles</b>	<b>Daily Revenue Hours</b>	<b>Annual Revenue Miles</b>	<b>Annual Revenue Hours</b>	<b>Operating Cost</b>	<b>Total Peak Vehicles</b>
Weekday	1,856.55	75.56	464,137.80	18,888.78	\$ 3,564,578.29	29.00
Saturday	-	-	-	-	\$ -	0
Sunday	-	-	-	-	\$ -	0
<b>Total Express</b>			<b>464,137.80</b>	<b>18,888.78</b>	<b>\$ 3,564,578.29</b>	

<b>VCU Routes</b>	<b>Daily Revenue Miles</b>	<b>Daily Revenue Hours</b>	<b>Annual Revenue Miles</b>	<b>Annual Revenue Hours</b>	<b>Operating Cost</b>	<b>Total Peak Vehicles</b>
Weekday	674.97	90.84	168,742.75	22,711.03	\$ 1,295,944.32	8.00
Saturday	164.89	24.61	8,574.38	1,279.76	\$ 65,851.27	2.00
Sunday	164.89	24.61	10,388.20	1,550.48	\$ 79,781.35	2.00
<b>Total VCU</b>			<b>187,705.33</b>	<b>25,541.26</b>	<b>\$ 1,441,576.93</b>	

<b>Total GRTC Needs</b>	<b>Daily Revenue Miles</b>	<b>Daily Revenue Hours</b>	<b>Annual Revenue Miles</b>	<b>Annual Revenue Hours</b>	<b>Operating Cost</b>	<b>Total Peak Vehicles</b>
Weekday	24,689.59	2,540.40	6,172,396.34	635,101.06	\$ 47,404,003.92	229.00
Saturday	14,880.05	1,654.62	773,762.40	86,040.14	\$ 5,942,495.22	91.00
Sunday	12,251.02	1,418.62	771,814.06	89,372.94	\$ 5,927,531.98	82.00
<b>Total Needs</b>			<b>7,717,972.80</b>	<b>810,514.14</b>	<b>\$ 59,274,031.13</b>	

<b>% Increase</b>	<b>Daily Revenue Miles</b>	<b>Daily Revenue Hours</b>	<b>Annual Revenue Miles</b>	<b>Annual Revenue Hours</b>	<b>Operating Cost</b>	<b>Total Peak Vehicles</b>
Weekday	65%	93%	65%	93%	65%	67%
Saturday	144%	188%	144%	188%	144%	128%
Sunday	113%	172%	113%	172%	113%	148%
<b>Total Needs</b>			<b>74%</b>	<b>107%</b>	<b>74%</b>	

**TABLE 4-44: OTHER UNCONSTRAINED SERVICE NEEDS ESTIMATED OPERATING COSTS**

New Fixed Route/Local Bus Service		Peak Vehicles	Estimated Annual Mileage	Estimated Operating Cost
Route 1 North - Virginia Commons to Ashland	Town of Ashland	5	148,117.92	\$ 1,137,545.63
Route 5 Corridor Local Bus	Henrico County	3	163,065.60	\$ 1,252,343.81
Route 1 South - Jefferson Davis	Chesterfield County	5	326,131.20	\$ 2,504,687.62
Hull Street (Route 360)	Chesterfield County	3	172,124.80	\$ 1,321,918.46
Town of Ashland circulator Route	Town of Ashland	1	53,272.80	\$ 409,135.10
New Fixed Route/Local Bus Service		Peak Vehicles	Estimated Annual Mileage	Estimated Operating Cost
Richmond International Airport Limited Stop Bus	City of Richmond & Henrico County	2	151,536.00	\$ 1,163,796.48
Midlothian Commuter Bus	Chesterfield County	4	68,800.00	\$ 528,384.00
I-95 Ashland Commuter Bus	Town of Ashland	5	75,200.00	\$ 577,536.00
I-64 East Commuter Bus	New Kent County	4	109,200.00	\$ 838,656.00
I-64 West Commuter Bus	Goochland County	4	99,200.00	\$ 761,856.00
Powhatan Corridor	Powhatan & Chesterfield Counties	4	136,400.00	\$ 1,047,552.00
<b>Total</b>		<b>58</b>	<b>1,503,048.32</b>	<b>\$ 11,543,411.10</b>

**TABLE 4-45: ESTIMATED UNCONSTRAINED PARATRANSIT SERVICE NEEDS OPERATING COSTS**

CARE Destinations	Avg. Trips per Sq. Mi.	Service Area Sq. Mi.	Total Annual Trips	Cost/Trip	Total Annual Cost
Hanover	529	30.4	16,083	\$27.56	\$ 443,286
Chesterfield	529	72.6	38,395	\$27.56	\$1,058,289
<b>Total</b>		<b>103.0</b>	<b>54,478</b>		<b>\$1,501,575</b>

Extended Paratransit Hours	Cost per Hour	Add'l Annual Service Hours	Total Vehicles	Total Annual Cost
Henrico County	\$45.48	913	5	\$207,503

Henrico County Deviated Fixed Route	Cost Per Hour	Annual Service Hours	Total Vehicles	Total Annual Cost
Eastern Henrico	\$45.48	6,642	2	\$604,156
Western Henrico North of Broad	\$45.48	6,642	2	\$604,156
Eastern Henrico South of Broad	\$45.48	6,642	2	\$604,156
<b>Total</b>		<b>19,926</b>	<b>6</b>	<b>\$1,812,469</b>

Total Paratransit/Deviated Fixed Route Expansion Annual Cost:      **\$3,521,547**

Estimated unconstrained costs for replacement and expansion vehicles are provided in **Tables 4-46** and **4-48**. This is followed by estimated costs for other unconstrained capital needs described in this chapter in **Table 4-49**.

**TABLE 4-46: ESTIMATED EXISTING VEHICLE REPLACEMENT PROGRAM NEEDS**

Service Vehicle Needs	Low Estimate	High Estimate
GRTC Bus Replacement Program Outstanding funding need FY2012-2018	\$48,000,000	\$53,000,000

**TABLE 4-47: ESTIMATED FIXED ROUTE EXPANSION VEHICLE NEEDS**

Expansion Vehicle Needs	Peak Vehicles
Peak GRTC Expansion Vehicle Needs	109
Regional Needs Expansion Vehicles	58
<i>Total Expansion Vehicles</i>	<i>167</i>
Spare Ratio	0.2
Total Expansion Vehicles	167
Vehicle Cost	\$350,000
<b>Total Expansion Vehicles (2011 dollars)</b>	<b>\$58,450,000</b>

**TABLE 4-48: ESTIMATED PARATRANSIT/DEVIATED/FLEX ROUTE EXPANSION VEHICLE NEEDS**

Paratransit/Deviation Expansion Vehicle Needs	Peak Vehicles
Paratransit Expansion Vehicles	23
Deviated/Flex Route Vehicles	6
<i>Total Expansion Vehicles</i>	<i>29</i>
Vehicle Cost	\$80,000
<b>Total Expansion Paratransit Vehicles (2011 dollars)</b>	<b>\$2,351,520</b>

**TABLE 4-49: OTHER UNCONSTRAINED CAPITAL NEEDS**

Other Capital Needs	Estimated Costs
<b>GRTC Downtown Transit Center</b>	
Estimate Range - Low	\$25,000,000
Estimate Range - High	\$30,000,000
<b>Secondary Transfer Center Needs:</b> Addition of Shelters, Benches, lighting and other Amenities to Primary Transfer Points throughout the service area	
Willow Lawn Transfer Center Upgrades	\$100,000
Southside Transfer Center Upgrades	\$100,000
6 Transfer Hub Upgrades	\$120,000
<b>Bus Rapid Transit</b>	
Broad Street BRT	\$70,000,000
<b>Maintenance Facility</b>	
Retrofit Maintenance Facility for CNG	\$2,500,000
Additional Fueling Facility for CNG	\$6,000,000
Modification of GRTC Maintenance and Operations Facility	\$1,250,000
<b>Technology Needs</b>	
<b>Software</b>	<b>2012-2017 Total</b>
Great Plains Maintenance	\$149,982
Hastus Maintenance	\$449,947
Hastus Upgrade	\$1,070,000
Route Match Maintenance	\$224,973
Clever Device Maintenance	\$1,499,822
Clever Device Database Mgt.	\$149,982
Great Plains Year End	\$7,499
Great Plains Upgrade	\$56,000
<b>Hardware</b>	<b>2012-2017 Total</b>
Professional Services	\$300,000
Hardware Replacement	\$180,000
<b>Other Capital Needs (2012-2017)</b>	
Miscellaneous Support Equipment	\$60,000
Management Training	\$30,000
Shop Tools & Equipment	\$300,000

## 5.0 SERVICE AND FACILITY RECOMMENDATIONS

This chapter identifies service and facility needs that are recommended for inclusion in the six-year TDP time period (FY2012 through FY2017). Potential service and facility needs were previously identified in **Chapter 4** of this TDP. Recommended service and facility improvements that are presented in this chapter are based on anticipated available funding during the TDP time period.

### 5.1 SERVICE RECOMMENDATIONS

**Chapter 4** of this TDP identified the following potential service needs for consideration over the TDP's six-year time period.

1. **New Fixed Route/Local Bus Service:** Route 8-West End, Route 15 – West Henrico, Route 17 – West Henrico/Laurel, Route 20 – Richmond West Connector, Route 21 – Richmond East Connector, Route 25 – Route 1 North Henrico, Route 1 North – Henrico/Ashland, Route 5 Corridor Local Bus, Broad Street BRT Feeder Routes, Route 1 South – Jefferson Davis, Route 288 Crosstown, Hull Street – Route 360, Midlothian, Chesterfield County – Local Routes, Town of Ashland Circulator Route, and Mechanicsville Area Local Bus Service.
2. **Existing Fixed Route/Local Bus Service Improvements:** Route realignments, service frequencies, span of service and clock headways for all fixed-routes.
3. **Existing Express Bus Service:** Reduce frequency on express routes by adding larger Coach buses, add stop on Route 95 – Richmond/Petersburg, and funding needed for Route 82 – Commonwealth 20/Swift Creek.
4. **New Express Bus Service:** Richmond International Airport Limited Stop Bus, Midlothian Commuter Bus, I-95 Ashland Commuter Bus, I-64 East Commuter Bus, I-64 West Commuter Bus, and Powhatan Corridor Commuter Bus.
5. **VCU:** Elimination of some routes beginning fall 2011, and need for alternate funding source. Addition of express Route from Henrico County to Monroe Park Campus.
6. **CARE/C-VAN:** Expanded service hours and expanded service area to include destinations in Chesterfield and Hanover Counties.
7. **Other:** Western Henrico (South of Broad) Flex Route, Western Henrico (North of Broad) Flex Route, Eastern Henrico Flex Route, Broad Street BRT, and Downtown Richmond Streetcar.
8. **Outside Region:** Richmond Fredericksburg Commuter Bus/Intercity Rail; Short Pump/Charlottesville Commuter Bus, and Richmond/New Kent/Williamsburg Commuter Bus/Intercity Rail.

The following projects were not considered priorities during the timeframe of this TDP, and thus, are not included in the six-year operating plan. Should conditions change or alternate funding sources become available, these projects may be moved forward in future updates to this TDP.

1. **New Fixed Route/Local Bus Service:** Route 15 – West Henrico, Route 17 – West Henrico/Laurel, Route 20 – Richmond West Connector, Route 21 – Richmond East Connector, Route 25 – Route 1 North Henrico, Route 1 North – Henrico/Ashland, Route 5 Corridor Local Bus, Broad Street BRT Feeder Routes, Route 1 South – Jefferson Davis, Route 288 Crosstown, Hull Street – Route 360,

Midlothian, Chesterfield County Local Routes, Town of Ashland Circulator Route, and Mechanicsville Area Local Bus Service.

2. **Existing Fixed Route/Local Bus Service Improvements:** Route realignments, service frequencies and span of service improvements, and clock headways for Routes 7, 11, 16, 18, 19, 56, 91, and 93.
3. **Existing Express Routes:** Extra stop on Express Route 95 – Petersburg.
4. **New Express Bus Service:** Richmond International Airport Limited Stop Bus, Midlothian Commuter Bus, I-95 Ashland Commuter Bus, I-64 East Commuter Bus, I-64 West Commuter Bus, and Powhatan Corridor.
5. **CARE/C-VAN:** Expanded service hours and expanded service area to include destinations in Chesterfield and Hanover Counties.
6. **Other:** Eastern & Western Henrico County Flex Routes and Downtown Richmond Streetcar.
7. **Outside Region:** Richmond/Fredericksburg Commuter Bus/Intercity Rail; Short Pump/Charlottesville Commuter Bus, and Richmond/New Kent/Williamsburg Commuter Bus/Intercity Rail.

Priorities for the six-year TDP are based on identified needs with the greatest potential for implementation and success based on projected funding available over the next six years. These sources are based on GRTC’s FY2012 operating budget at \$45,087,319, which includes the following funding sources.

Operating Revenues

- Customer Revenue - Fixed Route: \$9,390,839
- Customer Revenue – CARE: \$645,404
- Charter Revenue: \$125,000
- Advertising Revenue: \$390,000
- Other Operating Revenue: \$12,000
- VCU Shuttle: \$1,675,880
- VCU Pass Program: \$325,000
- City Contribution – Senior Fares: \$175,000

Federal

- Federal Funds & Other Funds: \$7,350,146

State

- State Funds: \$8,223,029

Local

- City of Richmond: \$11,000,000
- Henrico County – Purchase of Services: \$3,272,190
- Petersburg – Purchase of Services: \$150,000
- Henrico County CARE - Purchase of Services: \$1,727,810

Other

- C-VAN – Purchase of Services: \$500,022
- RideFinders-leased personnel: \$422,470
- Interest/Non Transportation Income: \$125,000

In developing the service plan and operating statistics for the fixed-route service, the following assumptions were made: FY2012 total annual fixed-route revenue miles are estimated to be 4,408,016 miles, and fixed total revenue hours are estimated to be 389,677 hours. Route travel times are based on existing service speeds as reported by GRTC. The cost per each revenue mile of service is assumed to be \$7.32. The cost for premium BRT bus service is also assumed to be \$7.32 per hour (in FY2012 dollars) Complete fixed-route operating statistics for each year of this TDP are provided in **Appendix G**.

GRTC faces challenges with limited funding sources available to meet the growing regional demand for transit services. Because of the current financial environment, this TDP does not propose any service expansion projects during the first two years. For the remaining four years, two scenarios are presented in this TDP, a BRT Scenario and No BRT Scenario. The two scenarios have been defined because a final decision on the Broad Street BRT project has not yet been made at the time this TDP has been prepared. Should the Broad Street BRT project be implemented, the BRT Scenario includes the BRT and minor growth to GRTC service. The No BRT Scenario is intended to keep costs down in a no growth scenario. Following are service plan descriptions for both scenarios (BRT and No BRT).

**BRT SCENARIO**

The first scenario, the BRT Scenario, assumes the BRT service has a local funding source, and is implemented in FY2015. It also assumes minimal service growth on some Richmond routes, but with no headway improvements or span of service improvements other than clock headways. Under this scenario, total revenue miles are increased by 1.8 percent (not including the BRT revenue miles) and 15.2 percent including BRT revenue miles. Costs increase 28 percent from \$45,509,789 in FY2012 to \$58,440,484 in FY2017.

Span of service assumptions are as follows:

- Weekday: AM Peak: 6:00 a.m. – 9:00 a.m.; PM Peak: 3:00 p.m. – 6:00 p.m.; Base: 9:00 a.m. – 3:00 p.m.; Evening: 6:00 p.m. – 11:00 p.m.; Early/Late: 5:00 a.m. – 6:00 a.m./11:00 p.m. – 12:00 a.m.; Total Hours: 18
- Saturday: Base: 6:00 a.m. – 6:00 p.m.; Late: 6:00 p.m. – 1:00 a.m.; Total Hours: 19
- Sunday: Base: 6:00 a.m. – 9:00 p.m.; Late: 9:00 p.m. – 1:00 a.m.; Total Hours: 19

**FY2012**

- Beginning in the fall of 2011, the VCU service will be reduced, with only Routes 84, 86 and 87 operating. No other changes are proposed to GRTC's existing service in FY2012. This change results in an overall reduction of .4 percent in the annual revenue miles to an estimated 4,408,016 revenue miles.

**FY2013**

- This TDP identifies a need to reroute the express service in Downtown Richmond, as shown in **Chapter 4**. This TDP assumes these changes occur in FY2013 with a cost neutral impact.
- In July 2012, funding for Route 82 – Chesterfield Express service will run out. This service will need a new funding source or other alternatives will need to be considered, such as a reduction in the level of service or elimination of the route.

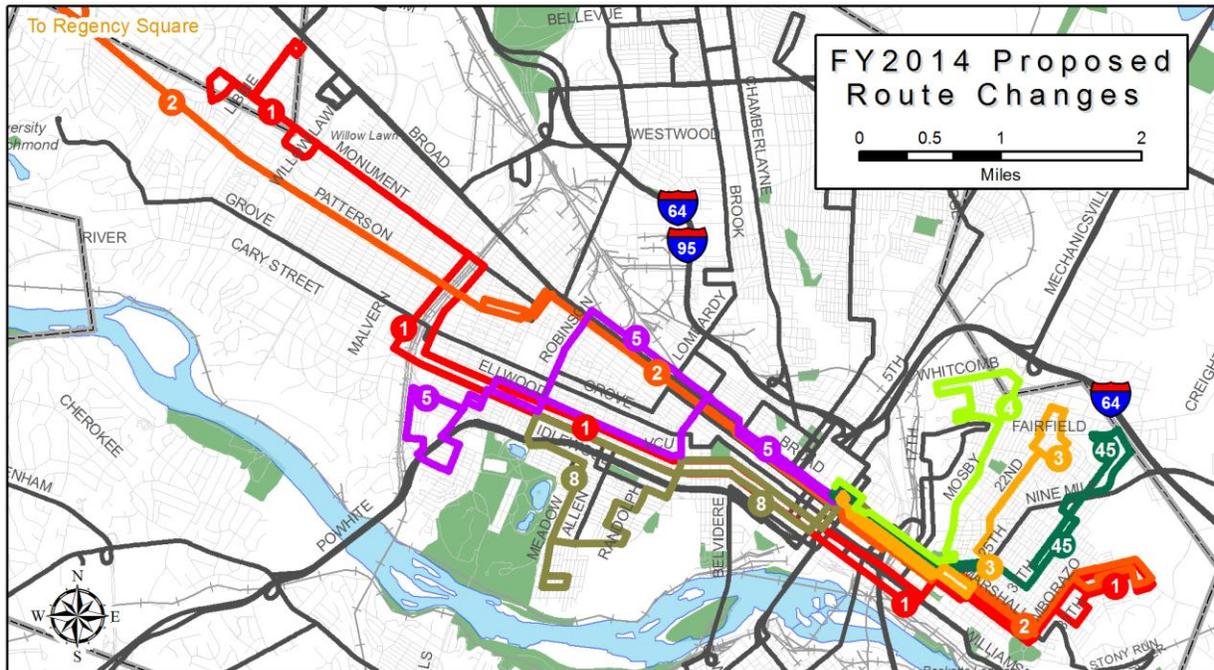
**FY2014**

Service modifications in FY2014 are focused on restructuring routes that serve Downtown Richmond, including Routes 1, 2, 3, 4 and 45 as well as adding new Routes 5 and 8. Route 8 will replace the existing Route 10. The following summarizes the proposed route changes in FY2014. **Figure 5-1** shows the proposed route alignments, as described in **Chapter 4**. **Chapter 4** provides more detail of the specific route alignments.

- **Route 1-Monument:** This route is separated from Route 2 and realigned as described in **Chapter 4**. These changes result in an increase in annual revenue miles by 58,808 and an increase in cost by \$430,471 (FY2012).
- **Route 2-Patterson:** No changes are proposed to the route alignment; however, the Route 2 schedule is proposed to operate separately from Route 1 on clock headways. These changes increase annual revenue miles by 23,628 and increase costs by \$172,898 (FY2012).
- **Route 3-Fairfield:** This route is restructured to eliminate the western portion of the route and to separate the schedule from Route 4 with clock headways. This would result in a decrease in annual revenue miles by 114,575 and a decrease in cost by \$836,690 (FY2012).
- **Route 4-Whitcomb:** This route is restructured to eliminate the eastern portion of the route and to separate the schedule from Route 3 with clock headways. The result is a decrease in annual revenue miles by 144,604 and a decrease in cost by \$1,058,499 (FY2012).
- **Route 5-Belmont:** This is a new route alignment, as described in **Chapter 4**, to cover portions of Route 4 that are realigned in FY2014. This route would increase annual revenue miles by 33,014 and increase cost by \$241,661 (FY2012).
- **Route 8-West End:** This is a new route that covers portions of existing Routes 3, 4, and 10. This route would increase revenue miles by 119,449 and increase costs by \$874,363 (FY2012).
- **Route 10-Riverview:** This route is eliminated and becomes portions of Routes 5 and 8. The revenue mile and cost changes are reflected in the Route 5 statistics.
- **Route 45-Jefferson:** This route is modified to end in Downtown Richmond with clock headways. These changes would result in a decrease in revenue miles by 23,279 and a decrease in cost by \$170,401.

Total additional peak vehicles needed: 2

FIGURE 5-1: PROPOSED FY2014 ROUTE CHANGES



The following service headways and operating statistics for Routes 1, 2, 3, 4, 5, 8 and 45 are provided in Tables 5-1 through 5-3.

TABLE 5-1: FY2014 RECOMMENDED WEEKDAY SERVICE CHANGES

Rte. # Route Pattern	Rnd Trip?	Service Frequency					Daily Trips	Distance (Miles)	Average Weekday		Peak Buses
		Base Period	AM Peak	PM Peak	Evening Period	Early/Late Period			Rev. Hrs.	Rev. Miles	
1 Monument	N	30	20	20	60	120	71	10.27	71.0	728.8	6.00
2 Patterson	N	30	20	20	30	60	82	10.77	82.0	883.5	6.00
3 Fairfield	N	30	20	20	60	120	71	2.97	35.5	210.5	3.00
4 Robinson	N	20	20	20	60	120	83	2.13	29.5	176.6	2.00
5 Belmont	N	30	20	20	30	60	82	4.77	58.5	391.1	4.00
8 West End (New Route)	N	30	20	20	30	30	84	4.19	42.0	352.0	3.00
45 Jefferson	N	30	20	20	30	60	82	3.24	41.5	265.7	3.00
<b>FY2014 Weekday Total</b>							<b>555.0</b>	<b>38.3</b>	<b>360.0</b>	<b>3,008.2</b>	<b>27.00</b>
							Existing FY2011		324.6	3,205.7	25.0
							% Change		11%	-6%	8%

TABLE 5-2: FY2014 RECOMMENDED SATURDAY SERVICE CHANGES

Rte. # Route Pattern	Service Frequency		Daily Trips	Average Saturday		Peak Bus	
	Base Period	Late Period		Rev. Hrs.	Rev. Miles		
1 Monument	30	n/a	48	48.0	492.7	4.00	
2 Patterson	60	120	31	31.0	334.0	2.00	
3 Fairfield	30	60	62	31.0	184.1	2.00	
4 Whitcomb	30	60	62	15.5	132.1	1.00	
5 Belmont	30	60	62	46.5	295.7	3.00	
8 West End (New Route)	30	60	62	31.0	259.8	2.00	
45 Jefferson	30	60	62	31.0	200.9	2.00	
<b>FY 2014 Saturday Total</b>			<b>389.0</b>	<b>234.0</b>	<b>1,899.3</b>	<b>16.0</b>	
			Existing FY2011		214.1	2,081.1	14.0
			% Change		9%	-9%	14%

**TABLE 5-3: FY2014 RECOMMENDED SUNDAY SERVICE CHANGES**

Rte. #	Route Pattern	Service Frequency			Average Sunday		Peak Buses
		Base Period	Late Period	Daily Trips	Rev. Hrs.	Rev. Miles	
1	Monument	30	n/a	60	60.0	615.9	4.00
2	Patterson	60	120	34	34.0	366.3	2.00
3	Fairfield	45	60	48	18.0	142.6	1.00
4	Whitcomb	45	60	48	12.0	102.2	1.00
5	Belmont	30	60	68	50.0	324.4	3.00
8	West End (New Route)	30	60	68	34.0	284.9	2.00
45	Jefferson	30	60	68	34.0	220.3	2.00
<b>FY 2014 Sunday Total</b>				<b>394.0</b>	<b>242.0</b>	<b>2,056.6</b>	<b>15.0</b>
<i>Existing FY2011</i>					<i>188.8</i>	<i>1,878.1</i>	<i>12.0</i>
<i>% Change</i>					<i>28%</i>	<i>10%</i>	<i>25%</i>

**VCU Express Route:** In addition to changes in the Richmond fixed-route service described above, FY2014 is also the proposed year for implementation of the VCU express route service from park-and-rides in Western Henrico County to the VCU Monroe Park Campus as described in **Chapter 4**. This service would require one vehicle to operate two AM peak period, one midday, and two PM peak period trips. This change would result in an increase of revenue miles of 26,980 and an increase in cost by \$197,494 (FY2012).

The VCU Express Route and the Richmond fixed-route changes result in a .5 percent overall decrease in GRTC’s total annual revenue miles from FY2013 to FY2014.

**FY2015**

FY2015 is the proposed opening year for the first phase of the Broad Street BRT. The Broad Street BRT is assumed to operate on Monday through Sunday, with 10-minute frequencies during weekday peak periods, 15- to 30-minute frequencies during the midday, evening, Saturday and Sunday hours. This TDP assumes the seven mile stretch from Willow Lawn to Rockett’s Landing opens in FY2015, with the extension to Short Pump occurring outside the timeframe of the TDP. Beginning in FY2015, the Broad Street BRT will require 13 premium bus BRT vehicles to operate 591,058 annual vehicle miles and 496,210 annual vehicle hours. As the Broad Street BRT study progresses, future updates to this TDP should include the final service recommendations. **Tables 5-4** through **5-6** show the proposed daily operating statistics for the Broad Street BRT.

**TABLE 5-4: BROAD STREET BRT WEEKDAY OPERATING STATISTICS**

Premium Bus		Service Frequency					Daily Trips	Average Weekday		Peak Buses
Rte. #	Route Pattern	Base Period	AM Peak	PM Peak	Evening Period	Early/Late Period		Rev. Hrs.	Rev. Miles	
BRT	Broad Street BRT	15	10	10	15	30	164	41.0	1,148.0	3.00
<b>FY2015 Weekday Total</b>							<b>164.0</b>	<b>41.0</b>	<b>1,148.0</b>	<b>3.0</b>

**TABLE 5-5: BROAD STREET BRT SATURDAY OPERATING STATISTICS**

Premium Bus		Service Frequency			Daily Trips	Average Saturday		Peak Buses
Rte. #	Route Pattern	Base Period	Late Period	Rev. Hrs.		Rev. Miles		
BRT	Broad Street BRT	15	30	144	36.0	1,008.0	2.00	
<b>FY2015 Saturday Total</b>					<b>144.0</b>	<b>36.0</b>	<b>1,008.0</b>	<b>2.00</b>

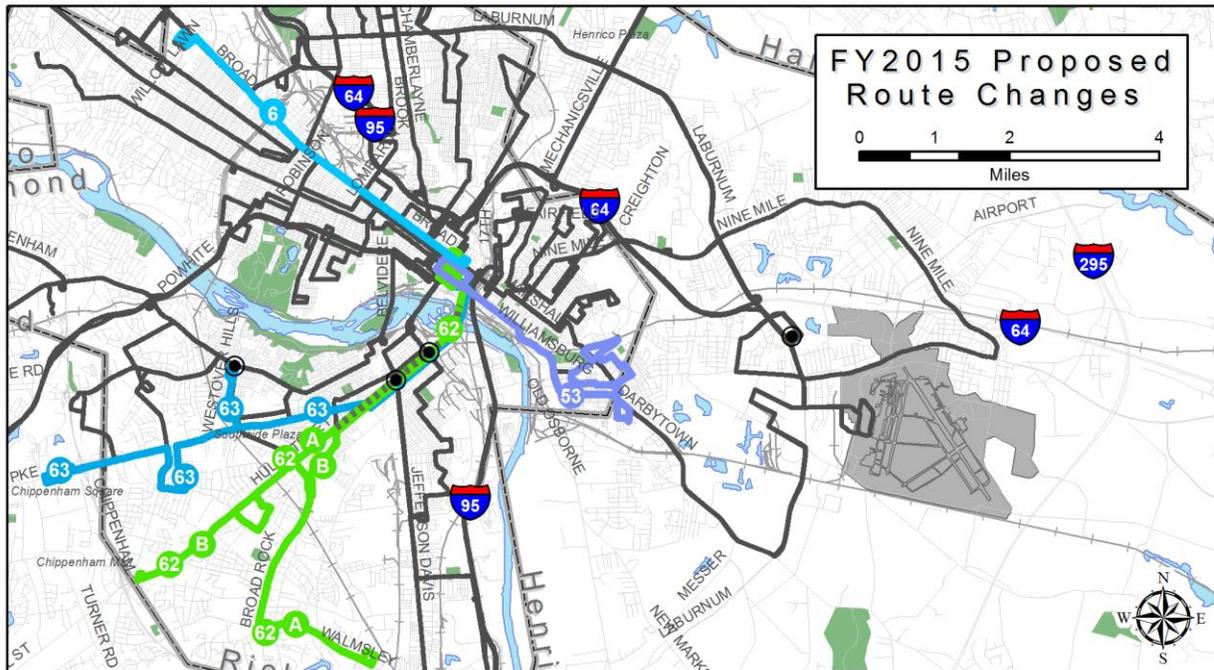
TABLE 5-6: BROAD STREET BRT SUNDAY OPERATING STATISTICS

Premium Bus		Service Frequency			Average Sunday		Peak Buses
		Base Period	Late Period	Daily Trips	Rev. Hrs.	Rev. Miles	
Rte. #	Route Pattern						
BRT	Broad Street	30	30	76	19.0	532.0	1.00
<b>FY2015 Sunday Total</b>				<b>76.0</b>	<b>19.0</b>	<b>532.0</b>	<b>1.0</b>

To coincide with the opening of the Broad Street BRT, the proposed changes to Route 6 are also programmed for FY2015. Additionally, modifications to Routes 62 and 63 are included to simplify the alignments and schedules for these two Southside routes. **Figure 5-2** shows the proposed modifications to Routes 6, 62 and 63 in FY2015. The following summarizes the service changes proposed for FY2015 in this TDP.

- Route 6-Broad:** Route 6 is split into two routes (53-East of Downtown Richmond and 6-West of Downtown Richmond) as described in **Chapter 4**. Additionally, the frequencies are reduced on these routes as this TDP assumes the Broad Street BRT will also begin operating in FY2015. These changes reduce miles by 114,049, with a cost savings of \$834,840.
- Route 62- Hull:** This TDP identifies two route patterns for Route 62. Route 62a operates from Downtown Richmond to Southside Plaza with limited stops, including the VA hospital, and continues to Chippenham Square. Route 62B operates from Downtown Richmond to Southside Plaza with limited stops and continues to the VA Hospital and Broad Rock. These changes result in an increase in revenue miles by 244,969 and an increase in costs by \$258,583.
- Route 63-Midlothian:** This route is simplified to operate in only one route pattern, as described in **Chapter 4**. These changes result in an increase in revenue miles by 258,252 and an increase in costs by \$635,572.
- Total additional peak vehicle needs: 1

**FIGURE 5-2: PROPOSED FY2015 ROUTE CHANGES**



Changes to headways and operating statistics for Routes 6, 62 and 63 are provided in **Tables 5-7 through 5-9**. Overall, these changes would increase GRTC’s annual revenue miles by .2 percent from FY2014 to FY2015.

**TABLE 5-7: RECOMMENDED FY2015 WEEKDAY SERVICE CHANGES**

Fixed Route		Service Frequency					Daily Trips	Distance (Miles)	Average Weekday		
Rte. #	Route Pattern	Base Period	AM Peak	PM Peak	Evening Period	Early/Late Period			Rev. Hrs.	Rev. Miles	Peak Buses
53	Broad - East	30	20	20	30	120	81	5.15	58.0	417.2	4.00
6	Broad - West	30	20	20	30	120	81	4.80	58.0	388.8	4.00
62A	Hull - Chippenham Square	60	30	30	60	90	47	8.06	26.5	378.8	2.00
62B	Hull - Broad Rock	60	30	30	60	90	47	8.81	38.0	414.1	3.00
63	Midlothian	30	20	20	30	60	82	10.58	99.0	867.2	7.00
<b>FY2015 Weekday Total</b>							<b>338.0</b>		<b>279.5</b>	<b>2,466.0</b>	<b>20.0</b>
<i>Existing FY2011</i>									249.5	2471.0	19.0
<i>% Change</i>									12%	0%	5%

**TABLE 5-8: RECOMMENDED FY2015 SATURDAY SERVICE CHANGES**

Fixed Route		Service Frequency			Average Saturday		Peak Buses	
Rte. #	Route Pattern	Base Period	Late Period	Daily Trips	Rev. Hrs.	Rev. Miles		
53	Broad - East	60	60	38	28.5	195.7	2.00	
6	Broad -West	60	60	38	28.5	182.4	2.00	
62A	Hull - Chippenham Square	90	120	23	19.0	185.4	1.00	
62B	Hull - Broad Rock	90	120	23	19.0	202.6	1.00	
63	Midlothian	60	90	33	37.5	349.0	2.00	
<b>FY2015 Saturday Total</b>				<b>155.0</b>		<b>1,115.1</b>	<b>8.0</b>	
<i>Existing FY2011</i>						96.2	1,106.5	6.0
<i>% Change</i>						38%	1%	33%

TABLE 5-9: RECOMMENDED FY2015 SUNDAY SERVICE CHANGES

Fixed Route		Service Frequency			Average Sunday		Peak Buses	
		Base Period	Late Period	Daily Trips	Rev. Hrs.	Rev. Miles		
Rte. #	Route Pattern							
53	Broad - East	60	60	38	19.0	195.7	1.00	
6	Broad - West	60	60	38	28.5	182.4	2.00	
62A	Hull - Chippenham Square	90	90	25	20.0	201.5	1.00	
62B	Hull - Broad Rock	90	90	25	20.0	220.3	1.00	
63	Midlothian	60	90	35	37.5	370.1	2.00	
<b>FY2015 Sunday Total</b>					<b>161.0</b>	<b>125.0</b>	<b>1,170.0</b>	<b>7.0</b>
					<i>Existing FY2011</i>	88.3	1,028.6	5.0
					<i>% Change</i>	42%	14%	40%

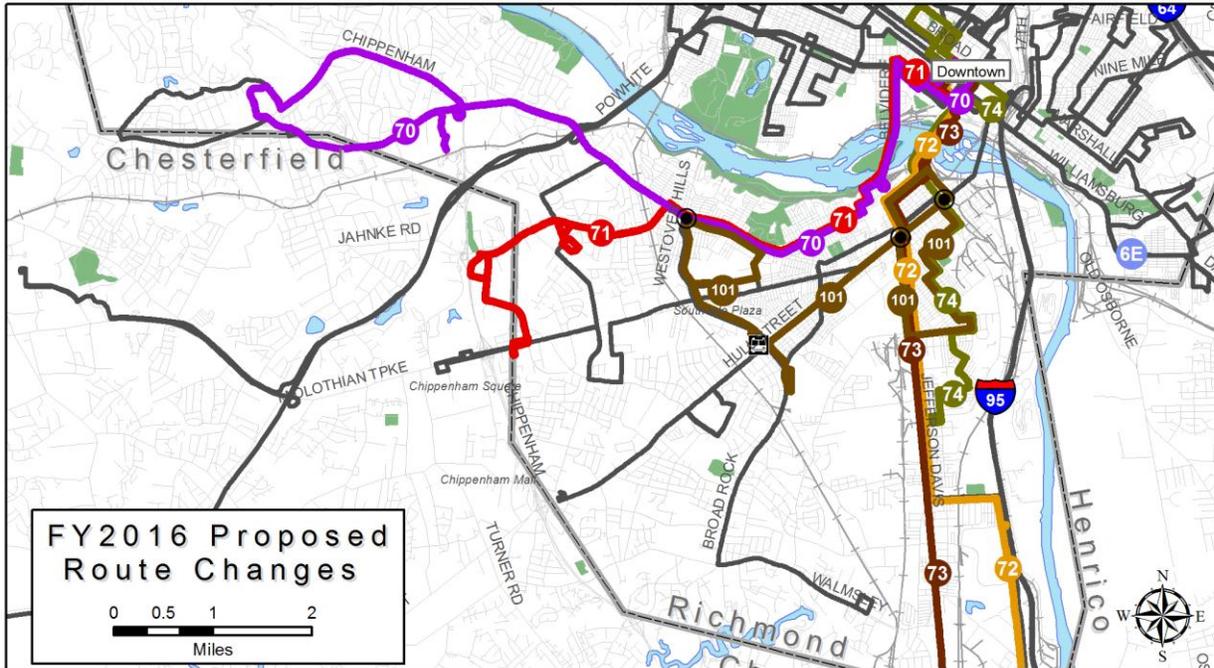
**FY2016**

In FY2016, this TDP focuses on simplifying the schedules to clock headways on the Southside of Richmond, and an expansion of Route 101 to Manchester. **Figure 5-3** shows the proposed route modifications for FY2016.

The following summarizes the route specific changes proposed for the Southside routes in FY2016.

- **Route 70-Forest Hill:** No changes are proposed to the alignment of this route. Headways are modified to be clock headways, and the schedule is proposed to be separated from Route 71. These changes result in a reduction of revenue miles by 479 and a reduced cost of \$3,509.
- **Route 71-Forest Hill:** No changes are proposed to the alignment of Route 71. This route is proposed to operate with clock headways, and the schedule is separated from Route 70. These changes reduce revenue miles by 3,909 and reduce costs by \$28,617.
- **Route 72-Ruffin Road:** No changes are proposed to the alignment of Route 72. Clock headways and a separate schedule from Route 73 are included. These changes reduce revenue miles by 1,823 and reduce costs by \$13,347.
- **Route 73-Amphill:** This TDP does not include alignment changes to Route 73; however, clock headways are proposed. These changes increase revenue miles by 7,064 and increase costs by \$51,709.
- **Route 74-Oak Grove:** No alignment changes are proposed for Route 74. Clock headways and improved frequencies are included. These changes result in an increase in revenue miles by 5,439 and an increase in cost by \$39,816.
- **Route 101-Belt Boulevard Connector:** This route is extended to serve Hull Street, the Manchester community and VA Hospital. No weekend service is assumed. This change results in an increase in revenue miles by 80,899 and an increase in costs by \$592,179.
- Total additional peak vehicles: 2

**FIGURE 5-3: PROPOSED FY2016 ROUTE CHANGES**



The following headways and service statistics in **Tables 5-10 to 5-12** are proposed for the Southside route changes in FY2016. Overall, these route changes increase GRTC’s total annual revenue miles by two percent from FY2015 to FY2016.

**TABLE 5-10: RECOMMENDED FY2016 WEEKDAY SERVICE CHANGES**

Rte. #	Route Pattern	Service Frequency					Daily Trips	Distance (Miles)	Average Weekday		Peak Buses
		Base Period	AM Peak	PM Peak	Evening Period	Early/Late Period			Rev. Hrs.	Rev. Miles	
70	Forest Hill	45	30	30	75	n/a	48	9.78	36.0	469.6	3.00
71	Forest Hill	45	30	30	n/a	n/a	40	8.67	30.0	346.9	3.00
72	Ruffin Road	60	60	60	n/a	n/a	24	7.29	12.0	175.0	1.00
73	Amphill	30	20	20	60	60	72	7.02	48.0	505.3	4.00
74	Oak Grove	30	30	30	30	30	72	6.41	54.0	461.8	3.00
101	Belt Boulevard Connector	30	30	30	n/a	n/a	48	8.04	36.0	385.8	3.00
<b>FY2016 Weekday Total</b>							<b>304.0</b>		<b>216.0</b>	<b>2,344.6</b>	<b>17.0</b>
							<i>Existing FY2011</i>		155.9	2,013.1	15.0
							<i>% Change</i>		39%	16%	13%

**TABLE 5-11: RECOMMENDED FY2016 SATURDAY SERVICE CHANGES**

Rte. #	Route Pattern	Service Frequency			Daily Trips	Average Saturday		Peak Buses
		Base Period	Late Period	Rev. Hrs.		Rev. Miles		
70	Forest Hill	75	75	30	18.7	250.8	1.00	
71	Forest Hill	60	n/a	24	12.0	178.8	1.00	
73	Amphill	30	60	62	37.0	447.1	3.00	
74	Oak Grove	30	60	62	37.0	402.4	2.00	
<b>FY2016 Saturday Total</b>					<b>178.0</b>	<b>104.8</b>	<b>1,279.1</b>	<b>7.0</b>
					<i>Existing FY2011</i>	91.6	1285.9	6.0
					<i>% Change</i>	14%	-1%	17%

TABLE 5-12: RECOMMENDED FY2016 SUNDAY SERVICE CHANGES

Rte. #	Route Pattern	Service Frequency			Average Sunday		Peak Buses
		Base Period	Late Period	Daily Trips	Rev. Hrs.	Rev. Miles	
70	Forest Hill	75	75	30	18.8	257.4	1.00
71	Forest Hill	75	n/a	24	15.0	184.1	1.00
73	Amphill	30	60	68	34.0	490.3	2.00
74	Oak Grove	30	60	68	34.0	441.4	2.00
<b>FY2016 Sunday Total</b>				<b>190.0</b>	<b>101.8</b>	<b>1,373.2</b>	<b>6.0</b>
				<i>Existing FY2011</i>	90.1	1298.9	6.0
				<i>% Change</i>	13%	6%	0%

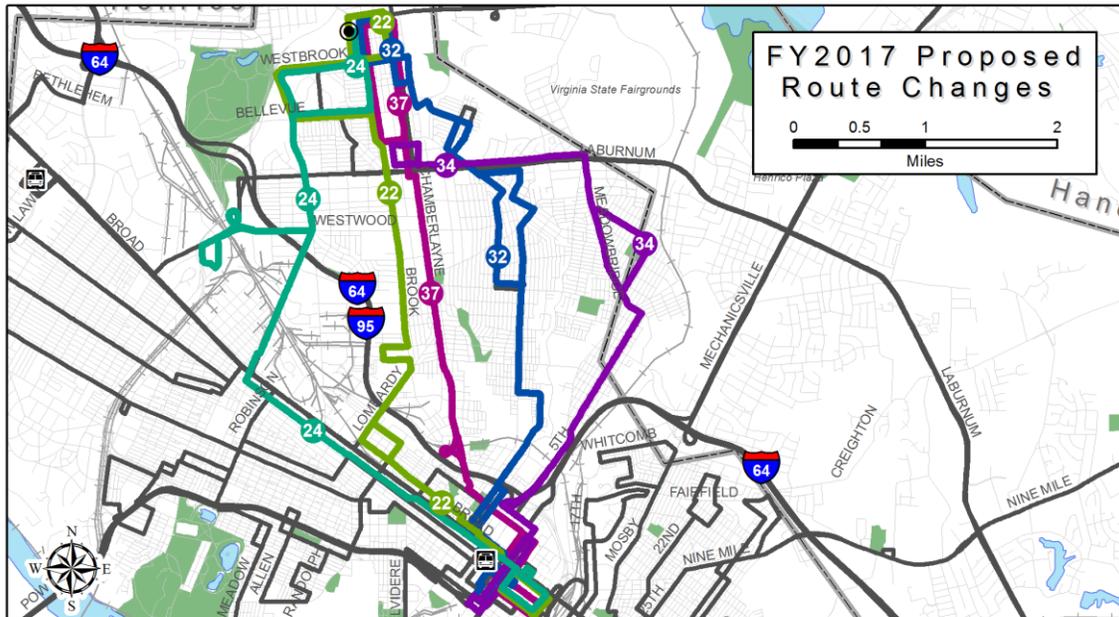
**FY2017**

Service modifications in FY2017 are focused on the Northside of Richmond, with route alignments serving a transfer point at Brook & Azalea. Modifications are proposed for Routes 22, 24, 32, 34 and 37. Other than changing schedules to clock headways, no span of service or frequency improvements are included. In some cases, the headways may be less to allow clock headways on routes. Although not programmed for this TDP, should funding sources become available, this would also be a good year to implement the new Route 25 in Henrico County from Brook & Azalea to J. Sargeant Reynolds Community College and Virginia Center. **Figure 5-4** shows the proposed Northside route modifications for FY2017. The following summarizes the proposed fixed-route alignment changes to the Northside routes in FY2017.

- **Route 22-Hermitage:** This route is modified to eliminate multiple routing on Fauquier and extended to serve a transfer hub at Brook & Azalea as described in **Chapter 4**. This route is modified to have clock headways. The result of this change is a decrease in annual revenue miles by 5,559 and a decrease in cost by \$40,690.
- **Route 24-Crestwood/Westbrook:** This route is extended to the transfer hub at Brook & Azalea. The schedule is modified to clock headways. This change increases annual revenue miles by 15,161 and increases cost by \$110,980.
- **Route 32-Ginter Park:** This route is extended to serve John Marshall High School and the Transfer Center at Brook & Azalea, as described in **Chapter 4**. Headways are modified to clock headways. The result is a reduction in revenue miles by 31,967 and a reduction in costs by \$233,999.
- **Route 34-Highland Park:** This route is extended to serve the Raceway and to travel along Laburnum to connect to routes serving Brook & Chamberlayne, as described in **Chapter 4**. Headways are modified to be clock headways. The result is an increase in annual revenue miles by 33,131 and an increase in cost by \$242,517.
- **Route 37-Chamberlayne:** This route is modified in the Downtown Richmond area to serve Leigh Street and continues to connect to other Northside routes at Brook & Azalea, as described in **Chapter 4**. The schedule is changed to provide clock headways. The result of this change is a decrease in revenue miles by 6,927 and a decrease in cost by \$50,709.
- Total additional peak vehicle needs: 4

FY2017 is also the year that the Downtown Transfer Center is assumed to open; thus, all routes serving downtown will need to be restructured to serve this location. This TDP assumes that the impact will be a cost neutral, if not a cost savings, scenario. Because the location is still undetermined, specific routing changes are not included in this chapter.

**FIGURE 5-4: PROPOSED FY2017 ROUTE CHANGES**



This TDP identifies the following headways and operating statistics in **Tables 5-13 through 5-15** for the changes to the Northside Routes 22, 24, 32, 34 and 37. Overall, these route modifications would increase GRTC’s total annual revenue miles by .1 percent.

**TABLE 5-13: RECOMMENDED FY2017 WEEKDAY SERVICE CHANGES**

Rte. #	Route Pattern	Service Frequency					Daily Trips	Distance (Miles)	Average Weekday		Peak Buses
		Base Period	AM Peak	PM Peak	Evening Period	Early/Late Period			Rev. Hrs.	Rev. Miles	
22	Hermitage	n/a	60	60	n/a	n/a	12	7.44	9.0	89.2	1.50
24	Crestwood/Westbrook	60	30	30	60	60	48	7.41	40.5	355.6	3.50
32	Ginter Park	30	15	15	30	30	96	6.47	72.0	621.5	6.00
34	Highland Park	30	15	15	30	30	96	6.12	72.0	587.7	6.00
37	Chamberlayne	30	15	15	30	30	96	5.24	72.0	503.1	6.00
<b>FY2017 Weekday Total</b>							<b>348.0</b>		<b>265.5</b>	<b>2,157.2</b>	<b>23.00</b>
							<i>Existing FY2011</i>		243.4	2290.3	19.0
							<i>% Change</i>		9%	-6%	21%

**TABLE 5-14: RECOMMENDED FY2017 SATURDAY SERVICE CHANGES**

Rte. #	Route Pattern	Service Frequency			Average Saturday		Peak Buses
		Base Period	Late Period	Daily Trips	Rev. Hrs.	Rev. Miles	
22	Hermitage	n/a	n/a	12	9.0	89.2	2.00
24	Crestwood/Westbrook	60	n/a	34	25.5	251.9	1.50
32	Ginter Park	30	30	76	57.0	492.0	3.00
34	Highland Park	20	30	110	74.0	673.4	4.00
37	Chamberlayne	30	45	73	46.2	382.6	2.50
<b>FY2017 Saturday Total</b>				<b>305.0</b>	<b>211.8</b>	<b>1,889.1</b>	<b>13.0</b>
				<i>Existing FY2011</i>	145.5	1,444.2	11.0
				<i>% Change</i>	46%	31%	18%

**TABLE 5-15: RECOMMENDED FY2017 SUNDAY SERVICE CHANGES**

Rte. #	Route Pattern	Service Frequency			Average Sunday		Peak Buses	
		Base Period	Late Period	Daily Trips	Rev. Hrs.	Rev. Miles		
22	Hermitage	n/a	n/a	12	9.0	89.2	1.50	
24	Crestwood/Westbrook	60	n/a	30	22.5	222.2	1.50	
32	Ginter Park	30	30	76	47.5	465.3	2.50	
34	Highland Park	30	30	76	47.5	465.3	2.50	
37	Chamberlayne	30	45	71	45.7	372.1	2.50	
45	Jefferson	30	60	68	49.5	350.2	3.00	
<b>FY2017 Sunday Total</b>				<b>265.0</b>	<b>172.2</b>	<b>1,614.1</b>	<b>10.5</b>	
				<i>Existing FY2011</i>		130.6	1,392.0	8.0
				<i>% Change</i>		32%	16%	31%

**BRT SCENARIO: SUMMARY OF SERVICE CHANGES FY2012-FY2017**

The following **Table 5-16** shows all of the proposed service expansion projects by year of implementation and the estimated change in operating costs based on the FY2012 cost per revenue mile at \$7.32. **Chapter 7** provides a complete financial plan in year of expenditure dollars for FY2012 through FY2017.

**TABLE 5-16: PROPOSED SERVICE EXPANSIONS – BRT SCENARIO BY YEAR OF IMPLEMENTATION**

FY2012	Jurisdiction	Route	Existing Rev. Mi.	Change in Rev. Mi.	Total Rev. Mi.	Additional Cost	Add'l Vehicles
Eliminate VCU Route 89	VCU	89	16,695	(16,695)	0	(\$122,204)	-2
<b>Total</b>			16,695	(16,695)	0	(\$122,204)	-2
FY 2013	Jurisdiction	Route	Existing Rev. Mi.	Change in Rev. Mi.	Total Rev. Mi.	Additional Cost	Add'l Vehicles
No Changes	n/a		199,579	0	199,579	\$0	0.0
<b>Total</b>			199,579	0	199,579	\$0	0.0
FY 2014	Jurisdiction	Route	Existing Rev. Mi.	Change in Rev. Mi.	Total Rev. Mi.	Additional Cost	Add'l Vehicles
Route Alignment, Schedule Changes	Richmond	1	187,819	58,808	246,627	\$430,471	2.0
Route Alignment, Schedule Changes	Richmond	2	237,704	23,620	261,324	\$172,898	0.0
Route Alignment, Schedule Changes	Richmond	3	185,760	(114,575)	71,185	(\$838,690)	-2.0
Route Alignment, Schedule Changes	Richmond	4	202,058	(144,604)	57,454	(\$1,058,499)	-3.0
Route Alignment, Schedule Changes	Richmond	45	114,025	(23,279)	90,746	(\$170,401)	0.0
New Route (Replaces Route 10)	Richmond	5	100,584	33,014	133,598	\$241,661	2.0
New Route	Richmond	8	0	119,449	119,449	\$874,363	3.0
VCU Express Service to Monroe Park	VCU	XP	0	26,980	26,980	\$197,494	1.0
<b>Total</b>			1,027,950	(\$20,588)	1,007,362	(\$150,703)	3.0
FY 2015	Jurisdiction	Route	Existing Rev. Mi.	Change in Rev. Mi.	Total Rev. Mi.	Additional Cost	Add'l Vehicles
<i>Broad Street BRT</i>	Richmond	BRT	0	591,058	591,058	\$4,326,545	13.0
Route 6 is split into two Route, reduced frequencies	Richmond	6/53	359,018	(114,049)	244,969	(\$834,840)	-1.0
Simplified Routing, limited stop, Schedule Changes	Richmond	62	209,644	35,326	244,969	\$258,583	-1.0
Simplified Routing, Limited Stop	Richmond	63	171,425	86,827	258,252	\$635,572	3.0
<b>Total</b>			740,087	8,103	1,015,465	\$59,315	1.0
FY 2016	Jurisdiction	Route	Existing Rev. Mi.	Change in Rev. Mi.	Total Rev. Mi.	Additional Cost	Add'l Vehicles
Schedule Changes	Richmond	70	147,147	(479)	146,667	(\$3,509)	0.00
Schedule Changes	Richmond	71	111,528	(3,909)	107,618	(\$28,617)	-1.00
Schedule Changes	Richmond	72	45,585	(1,823)	43,762	(\$13,347)	0.00
Schedule Changes	Richmond	73	173,408	7,064	180,472	\$51,709	1.00
Schedule Changes	Richmond	74	158,756	5,439	164,195	\$39,816	0.00
Extended to serve Manchester, Schedule Changes	Richmond	101	15,551	80,899	96,450	\$592,179	2.00
<b>Total</b>			651,975	87,190	1,102,655	\$638,231	2.0
FY 2017	Jurisdiction	Route	Existing Rev. Mi.	Change in Rev. Mi.	Total Rev. Mi.	Additional Cost	Add'l Vehicles
Extended to Brook & Azalea, Sched Changes	Richmond	22	38,130	(5,559)	32,572	(\$40,690)	0.50
Extended to Brook & Azalea, Schedule Changes	Richmond	24	100,836	15,161	115,997	\$110,980	0.50
Extended to Brook & Azalea, Schedule Changes	Richmond	32	242,237	(31,967)	210,269	(\$233,999)	0.00
Extended to Laburnum & Brook, Schedule Changes	Richmond	34	178,123	33,131	211,254	\$242,517	1.00
Modified to serve Leigh Street, Schedule Changes	Richmond	37	176,051	(6,927)	169,124	(\$50,709)	2.00
Restructure all DT routes to serve Transit Center	All	All	n/a	n/a	n/a	n/a	n/a
<b>Total</b>			735,378	3,839	739,216	\$28,099	4.0

**NO BRT SCENARIO**

Under this scenario, the financial plan assumes no funding is obtained for BRT service, and thus, it is not implemented in FY2015. It also assumes no growth in GRTC service; thus, the only changes to service are those that have minimal cost impacts. This scenario assumes Routes 6 and 53 are split, but without reducing the frequencies on the route. Because this scenario is intended to be the lowest cost scenario, it does not assume any changes to Routes 62, 63 and 101. All other changes identified in the BRT scenario apply to this scenario. From FY2012 to FY2017, this scenario results in a 1.2 percent reduction

in revenue miles. Costs increase 15 percent from \$45,509,789 to \$52,307,679 from FY2012 to FY2017. This is primarily due to the three percent inflation rate beginning in FY2013.

Span of service assumptions for the No BRT scenario are the same as noted for the BRT scenario and are as follows:

- Weekday: AM Peak: 6:00 a.m. – 9:00 a.m.; PM Peak: 3:00 p.m. – 6:00 p.m.; Base: 9:00 a.m. – 3:00 p.m.; Evening: 6:00 p.m. – 11:00 p.m.; Early/Late: 5:00 a.m. – 6:00 a.m./11:00 p.m. – 12:00 a.m.: Total Hours: 18
- Saturday: Base: 6:00 a.m. – 6:00 p.m.; Late: 6:00 p.m. – 1:00 a.m.: Total Hours: 19
- Sunday: Base: 6:00 a.m. – 9:00 p.m.; Late: 9:00 p.m. – 1:00 a.m.: Total Hours: 19

**FY2012-2013 Service Plan:** No changes from what was described for the BRT Scenario.

**FY2015:** This scenario assumes the BRT is not implemented in FY2015. It still includes the split to Routes 6 and 53, but at similar service levels as are provided today and at clock headways as shown in **Tables 5-17** through **5-19**. Changes to Routes 62 and 63 are not included in this scenario.

- **Split Routes 6 & 53:** This scenario proposes splitting Routes 6 and 53 and applying clock headways. The result is a reduction in miles by 42,644 and a cost savings (in F2012 Dollars) of \$312,158.
- Total additional peak vehicles: 1

**TABLE 5-17: FY2015 WEEKDAY SERVICE STATISTICS**

Fixed Route		Service Frequency					Daily Trips	Distance (Miles)	Average Weekday		Peak Buses
		Base Period	AM Peak	PM Peak	Evening Period	Early/Late Period			Rev. Hrs.	Rev. Miles	
Rte. #	Route Pattern										
53	Broad - East	60	30	30	60	n/a	46	5.15	31.5	236.9	3.00
6	Broad - West	10	10	10	30	120	165	4.80	103.5	792.0	7.00
<b>FY2015 Weekday Total</b>							<b>399.0</b>	<b>23.7</b>	<b>135.0</b>	<b>1,028.9</b>	<b>10.0</b>
							<i>Existing FY2011</i>		127.1	1175.9	9.0
							<i>% Change</i>		6%	-13%	11%

**TABLE 5-18: FY2015 SATURDAY SERVICE STATISTICS**

Fixed Route		Service Frequency			Daily Trips	Average Saturday		Peak Buses
		Base Period	Late Period			Rev. Hrs.	Rev. Miles	
Rte. #	Route Pattern							
53	Broad - East	60	60		38	19.0	195.7	1.00
6	Broad -West	30	60		62	31.0	297.6	2.00
<b>FY2015 Saturday Total</b>					<b>100.0</b>	<b>50.0</b>	<b>493.3</b>	<b>3.0</b>
					<i>Existing FY2011</i>	49.2	522.5	3.0
					<i>% Change</i>	2%	-6%	0%

**TABLE 5-19: FY2015 SUNDAY SERVICE STATISTICS**

Fixed Route		Service Frequency				Daily Trips	Average Sunday		Peak Buses
		Base Period	AM Period	PM Period	Late Period		Rev. Hrs.	Rev. Miles	
Rte. #	Route Pattern								
53	Broad - East	60	n/a	n/a	60	38	19.0	195.7	1.00
6	Broad - West	30	n/a	n/a	60	70	35.0	336.0	2.00
<b>FY2015 Sunday Total</b>						<b>183.0</b>	<b>54.0</b>	<b>531.7</b>	<b>3.0</b>
<i>Existing FY2011</i>							<i>50.9</i>	<i>601.0</i>	<i>3.0</i>
<i>% Change</i>							<i>6%</i>	<i>-12%</i>	<i>0%</i>

**FY2016:** This scenario addresses changes to the Southside Routes 70, 71, 72, 73 and 74 as described in the BRT Scenario. Route 101 alignment changes to Manchester are not included in this scenario to keep cost down. This scenario includes an increase in annual revenue miles by 6,291 and an increase in cost (FY2012) of \$46,052. No additional peak vehicles are required for this scenario.

**FY2017:** This scenario includes realignments of the Northside routes to Brook & Azalea as described in the BRT Scenario. These changes result in an overall increase in annual revenue miles of 3,839 and increase in costs to \$28,099 (FY2012).

**NO BRT SCENARIO: SUMMARY OF SERVICE CHANGES FY2012-FY2017**

**Table 5-20** shows all of the proposed service expansion projects by year of implementation and the estimated change in operating costs based on the FY2012 cost per revenue mile at \$7.32 for the No BRT Scenario. **Chapter 7** provides a complete financial plan in year of expenditure dollars for FY2012 through FY2017

**TABLE 5-20: PROPOSED SERVICE EXPANSIONS – BRT SCENARIO BY YEAR OF IMPLEMENTATION**

FY2012	Jurisdiction	Route	Existing Rev. Mi.	Change in Rev. Mi.	Total Rev. Mi.	Additional Cost	Add'l Vehicles
Eliminate VCU Route 89	VCU	89	16,695	(16,695)	0	(\$122,204)	-2
<b>Total</b>			16,695	(16,695)	0	(\$122,204)	-2
FY 2013	Jurisdiction	Route	Existing Rev. Mi.	Change in Rev. Mi.	Total Rev. Mi.	Additional Cost	Add'l Vehicles
No Changes	n/a		199,579	0	199,579	\$0	0.0
<b>Total</b>			199,579	0	199,579	\$0	0.0
FY 2014	Jurisdiction	Route	Existing Rev. Mi.	Change in Rev. Mi.	Total Rev. Mi.	Additional Cost	Add'l Vehicles
Route Alignment, Schedule Changes	Richmond	1	187,819	58,808	246,627	\$430,471	2.0
Route Alignment, Schedule Changes	Richmond	2	237,704	23,620	261,324	\$172,898	0.0
Route Alignment, Schedule Changes	Richmond	3	185,760	(114,575)	71,185	(\$838,690)	-2.0
Route Alignment, Schedule Changes	Richmond	4	202,058	(144,604)	57,454	(\$1,058,499)	-3.0
Route Alignment, Schedule Changes	Richmond	45	114,025	(23,279)	90,746	(\$170,401)	0.0
New Route (Replaces Route 10)	Richmond	5	100,584	33,014	133,598	\$241,661	2.0
New Route	Richmond	8	0	119,449	119,449	\$874,363	3.0
VCU Express Service to Monroe Park	VCU	XP	0	26,980	26,980	\$197,494	1.0
<b>Total</b>			1,027,950	(\$20,588)	1,007,362	(\$150,703)	3.0
FY 2015	Jurisdiction	Route	Existing Rev. Mi.	Change in Rev. Mi.	Total Rev. Mi.	Additional Cost	Add'l Vehicles
Route 6 is split into two Route, Clock Headways	Richmond	6/53	359,018	(42,644)	316,374	(\$312,158)	1.0
No Changes	Richmond	62	209,644	0	209,644	\$0	0.0
No Changes	Richmond	63	171,425	0	171,425	\$0	0.0
<b>Total</b>			740,087	(42,644)	697,443	(\$312,158)	1.0
FY 2016	Jurisdiction	Route	Existing Rev. Mi.	Change in Rev. Mi.	Total Rev. Mi.	Additional Cost	Add'l Vehicles
Clock Headways	Richmond	70	147,147	(479)	146,667	(\$3,509)	0.00
Clock Headways	Richmond	71	111,528	(3,909)	107,618	(\$28,617)	-1.00
Clock Headways	Richmond	72	45,585	(1,823)	43,762	(\$13,347)	0.00
Clock Headways	Richmond	73	173,408	7,064	180,472	\$51,709	1.00
Clock Headways	Richmond	74	158,756	5,439	164,195	\$39,816	0.00
No Changes	Richmond	101	15,551	0	15,551	\$0	0.00
<b>Total</b>			651,975	6,291	658,266	\$46,052	0.0
FY 2017	Jurisdiction	Route	Existing Rev. Mi.	Change in Rev. Mi.	Total Rev. Mi.	Additional Cost	Add'l Vehicles
Extended to Brook & Azalea, Schedule Changes	Richmond	22	38,130	(5,559)	32,572	(\$40,690)	0.50
Extended to Brook & Azalea, Schedule Changes	Richmond	24	100,836	15,161	115,997	\$110,980	0.50
Extended to Brook & Azalea, Schedule Changes	Richmond	32	242,237	(31,967)	210,269	(\$233,999)	0.00
Extended to Laburnum & Brook, Schedule Changes	Richmond	34	178,123	33,131	211,254	\$242,517	1.00
Modified to serve Leigh Street, Schedule Changes	Richmond	37	176,051	(6,927)	169,124	(\$50,709)	2.00
Restructure all DT routes to serve Transit Center	All	All	n/a	n/a	n/a	n/a	n/a
<b>Total</b>			735,378	3,839	739,216	\$28,099	4.0

## 5.2 VEHICLE AND FACILITY RECOMMENDATIONS

This TDP has identified the following vehicle and facility improvements for consideration over the TDP's six-year time period. It is important to note that this list encompasses all vehicles needed for replacement and expansion based on the recommended life of vehicles. **Chapter 6** provides a detailed capital improvement program for the six-year TDP time period, which includes a schedule for vehicle replacement and expansion with available funding.

### **FY2012**

- Forty fixed-route and 20 paratransit vehicles are eligible for replacement in FY2012.
- No expansion vehicles are proposed for FY2012.
- Bus stop shelters, signs and bench replacement are assumed to be replaced as needed.

### **FY2013**

- Seventeen fixed-route and 15 paratransit vehicles are eligible for replacement in FY2013.
- No expansion vehicles are proposed for FY2013.
- Bus stop shelters, signs and bench replacement are assumed to be replaced as needed.

### **FY2014**

- Nineteen paratransit vehicles are eligible for replacement in FY2014.
- Three expansion vehicles are proposed for service improvements in FY2014 for both scenarios.
- Bus stop shelters, signs and bench replacement are assumed to be replaced as needed.

### **FY2015**

- Thirty-six fixed-route and 19 paratransit vehicles are eligible for replacement in FY2015.
- One expansion vehicle is proposed for FY2015 for both the BRT and No BRT Scenario.
- In the BRT Scenario, the Broad Street BRT is assumed to begin operating in FY2015, with associated capital requirements identified in **Chapter 4** and **Chapter 6**. This includes 13 premium BRT vehicles.
- Bus stop shelters, signs and bench replacement are assumed to be replaced as needed.

### **FY2016**

- Twenty paratransit vehicles are eligible for replacement in FY2016.
- Two expansion vehicles are proposed for service improvements in FY2016 for the BRT Scenario. The No BRT Scenario requires one expansion vehicle.
- Bus stop shelters, signs and bench replacement are assumed to be replaced as needed.

### **FY2017**

- Fifteen paratransit vehicles are eligible for replacement in FY2017.
- Four expansion vehicles are proposed for service improvements in FY2017 for both the BRT and No BRT Scenarios.
- Bus stop shelters, signs and bench replacement as needed.

## 6.0 CAPITAL IMPROVEMENT PROGRAM

This chapter of the TDP describes the capital programs required to carry out the operations and services set forth in the TDP service and facility recommendations that were presented in the prior chapter. GRTC TDP capital improvement recommendations for FY2012 through FY2017 are consistent with the GRTC Long Range FY2012-2018 Capital Plan and the Virginia Department of Rail and Public Transportation Six-Year Improvement Program (SYIP). Capital improvement projects presented in this program are categorized into four types: vehicles, maintenance facility improvements, passenger facility improvements, and other capital improvements.

### 6.1 VEHICLE REPLACEMENT AND EXPANSION PROGRAM

The following section outlines the TDP's six-year vehicle replacement and expansion program. Estimated vehicle costs are provided by GRTC and include a five percent inflation rate.

#### REVENUE VEHICLE REPLACEMENT PROGRAM

##### FIXED-ROUTE REVENUE VEHICLES

GRTC currently owns and operates 166 transit buses for fixed-route revenue service. The proposed fixed-route revenue service fleet replacement costs are presented in **Table 6-1**. The complete schedule is presented at the end of this section in **Table 6-6**. Although 92 fixed-route GRTC vehicles are eligible for replacement in the FY2012-2017 time period, due to lack of funding, only 38 fixed-route vehicles can be replaced: 13 in FY2012, six in FY2013, five in FY2014, four in FY2015, five in FY2016, and five in FY2017. Generally, these vehicles should be replaced every 12 years, but some remain as carryovers from previous years. With the current replacement plan, the average bus fleet age in FY2011 is estimated grow from seven years to an estimated average fleet age in FY2017 of 10 years. In FY2017, GRTC will have 55 vehicles operating in the fleet that are past their useful life. This aging fleet may also result in additional maintenance costs for GRTC.

The replacement GRTC fixed-route revenue fleet could be powered by diesel engines or by Compressed Natural Gas (CNG). Two possible scenarios are considered in calculating vehicle replacement cost estimates, with an assumption that replacement diesel buses would cost \$367,500 per vehicle in FY2012 dollars, while CNG buses would cost \$417,000 per vehicle in FY2012 dollars. These vehicle cost estimates are adjusted for inflation for future years. The existing GRTC vehicle fleet would not all be replaced at one time nor would they be retrofitted with CNG technology – rather, diesel vehicles are assumed to be used through their normal life span and converted to CNG as they are replaced. As shown in **Table 6-1**, the 38 replacement fixed-route buses would cost approximately \$17.1 million if they were powered by natural gas and \$15.4 million if they were powered by diesel engines.

#### **PARATRANSIT REVENUE VEHICLES**

GRTC currently owns and operates 75 transit vehicles for paratransit (CARE) revenue service. The proposed paratransit revenue service fleet replacement schedule is presented at the end of this section in **Table 6-7**. **Table 6-2** provides the schedule of costs. In total, 108 paratransit service vehicles are scheduled to be replaced during the timeframe of the TDP: 20 in FY2012, 15 in FY2013, 19 in FY2014, 19 in FY2015, 20 in FY2016, and 15 in FY2017. Some of the existing 75 vehicles would be replaced more than once during the six-year TDP period since generally GRTC paratransit vehicles are replaced every four years. With the current replacement plan, the average vehicle fleet age in FY2011 is 3.44 years and is estimated to decline to 1.58 years by FY2017.

The cost of replacing 108 paratransit vehicles in the FY2012-2017 timeframe is estimated at approximately \$9.3 million, as shown in **Table 6-2**. The estimated replacement cost per vehicle is approximately \$80,000 in FY2011 dollars, for both CNG and diesel powered vehicles.

GRTC has traditionally used federal funding sources (80%) and state and local funding (20%) for new vehicles, and thus, the same is assumed for this TDP for all revenue vehicle replacements. If federal and state funding becomes unavailable for vehicle replacement, GRTC must find alternative sources of funding to cover the cost of vehicle replacement.

#### **NON-REVENUE VEHICLE REPLACEMENT PROGRAM**

GRTC has 28 non-revenue service vehicles. This TDP does not assume any of these vehicles will be replaced during the six-year time frame of the TDP, as shown in **Tables 6-3** and **6-8**. The average non-revenue vehicle fleet age in FY2012 is estimated at 7.11 years, increasing to 12.11 years in FY2017.

**TABLE 6-1: REVENUE VEHICLE REPLACEMENT COSTS: FIXED ROUTES**

Total		2012	2013	2014	2015	2016	2017
Total Vehicles Eligible for Replacement	R	40	17	0	36	0	0
Carryover from Previous Fiscal Year		0	27	38	33	65	60
<b>Total Vehicles to be Purchased</b>		<b>13</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>5</b>	<b>5</b>
<i>Cumulative Vehicles Remaining to be Purchased</i>		27	38	33	65	60	55
Cost per 40' CNG Bus		\$417,000	\$424,463	\$445,686	\$467,970	\$491,368	\$515,937
<b>Total Vehicle Needs Replacement Cost - CNG Buses</b>		<b>\$16,680,000</b>	<b>\$7,215,863</b>	<b>\$0</b>	<b>\$16,846,917</b>	<b>\$0</b>	<b>\$0</b>
Total Vehicle Programed Replacement Cost - CNG Buses		\$5,421,000	\$2,546,775	\$2,228,428	\$1,871,880	\$2,456,842	\$2,579,684
Cost per 40' Diesel Bus		\$367,500	\$385,875	\$405,169	\$425,427	\$446,699	\$469,033
<b>Total Vehicle Need Replacement Cost - Diesel Buses</b>		<b>\$14,700,000</b>	<b>\$6,559,875</b>	<b>\$0</b>	<b>\$15,315,379</b>	<b>\$0</b>	<b>\$0</b>
Total Vehicle Programmed Replacement Cost - Diesel Buses		\$4,777,500	\$2,315,250	\$2,025,844	\$1,701,709	\$2,233,493	\$2,345,167

**TABLE 6-2: REVENUE VEHICLE REPLACEMENT COSTS: PARATRANSIT**

Total		2012	2013	2014	2015	2016	2017
<b>Total Vehicles Eligible for Replacement</b>	R	<b>20</b>	<b>15</b>	<b>19</b>	<b>19</b>	<b>20</b>	<b>15</b>
Carryover from Previous Fiscal Year		0	0	0	0	0	0
<b>Total Vehicles to be Purchased</b>		<b>20</b>	<b>15</b>	<b>19</b>	<b>19</b>	<b>20</b>	<b>15</b>
<i>Cumulative Vehicles Remaining to be Purchased</i>		0	0	0	0	0	0
Cost per Cutaway (CNG or Diesel)		\$80,000	\$82,400	\$84,872	\$87,418	\$90,041	\$92,742
<b>Total Vehicle Replacement Cost</b>		<b>\$1,600,000</b>	<b>\$1,236,000</b>	<b>\$1,612,568</b>	<b>\$1,660,945</b>	<b>\$1,800,814</b>	<b>\$1,391,129</b>

**TABLE 6-3: NON-REVENUE VEHICLE REPLACEMENT COSTS**

Total	2012	2013	2014	2015	2016	2017
Total Vehicles Replaced (R)	0	0	0	0	0	0
<i>Average Vehicle Age</i>	7.11	8.11	9.11	10.11	11.11	12.11
Cost per Replacement Vehicle	\$31,500	\$33,075	\$34,729	\$36,465	\$38,288	\$40,203
<b>Total Vehicle Replacement Cost</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>

#### VEHICLE EXPANSION PROGRAM - NON-BRT VEHICLES

Tables 6-4 and 6-5 provide a summary of GRTC non-BRT vehicle expansion needs by scenario. Two alternative options are presented with expansion vehicles powered by CNG costing \$417,000 each and regular diesel buses at \$367,500 each (in FY2012 dollars).

- **BRT Scenario:** A total of nine expansion vehicles are needed to operate fixed-route service improvements during the six-year time frame of the TDP (with no expansion vehicles required for operating the agency's paratransit services). The cost of fleet expansion by nine vehicles is estimated at approximately \$4.5 million if CNG vehicles will be purchased and \$4.1 million if diesel vehicles are purchased. While no new expansion buses will be required in FY2012 through FY2015, four buses will be needed in FY2016, and five buses in FY2016. The spare ratio is assumed to be 20 percent. If no expansion vehicles are purchased throughout the TDP timeframe, by 2017, GRTC's spare ratio would be 16 percent with the service changes proposed in the TDP.
- **No BRT Scenario:** A total of seven expansion vehicles are needed to operate fixed-route service improvements during the six-year time frame of the TDP (with no expansion vehicles required for operating the agency's paratransit services). The cost of fleet expansion by seven vehicles is estimated at approximately \$3.6 million if CNG vehicles will be purchased and \$3.2 million if diesel vehicles are purchased. While no new expansion buses will be required in FY2012 through FY2015, two buses will be needed in FY2016, and five buses in FY2016. The spare ratio is assumed to be 20 percent. If no expansion vehicles are purchased throughout the TDP timeframe, by 2017, GRTC's spare ratio would be 17 percent with the service changes proposed in the TDP.

GRTC has traditionally used federal funding sources (80%) and state/local funding (20%) for new vehicles, and thus, the same is assumed for this TDP. Should funding be unavailable, GRTC would need to seek alternative funding sources for expansion vehicles.

#### BROAD STREET BRT VEHICLES

In addition to replacement vehicles and expansion vehicles for regular fixed-route service, GRTC could need to purchase 16 BRT vehicles in FY2015 for the Broad Street Corridor if the locally preferred alternative is adopted and small starts funding is secured from FTA. This includes 13 vehicles required for peak service and three spare vehicles. The cost per vehicle is assumed to be \$1,000,000 per vehicle. This \$16,000,000 cost is included in **Table 6-9** under the FY2015 capital cost for BRT service.

TABLE 6-4: BRT SCENARIO EXPANSION VEHICLE SCHEDULE

Expansion Vehicles	2012	2013	2014	2015	2016	2017
Total Expansion Vehicles	0	0	0	0	4	5
<i>Vehicles For Base Service</i>	135	135	138	138	142	146
<i>Total Vehicles Available</i>	166	166	166	166	170	175
Total Fleet Spare Ratio	23%	23%	20%	20%	20%	20%
Cost per 40'CNG Bus	\$417,000	\$424,463	\$445,686	\$467,970	\$491,368	\$515,937
<b>Total CNG Vehicle Expansion Cost</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,965,474</b>	<b>\$2,579,684</b>
Cost per 40'Diesel Bus	\$367,500	\$385,875	\$405,169	\$425,427	\$446,699	\$469,033
<b>Total Diesel Vehicle Expansion Cost</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$1,786,794</b>	<b>\$2,345,167</b>

TABLE 6-5: NO BRT SCENARIO EXPANSION VEHICLE SCHEDULE

Expansion Vehicles	2012	2013	2014	2015	2016	2017
Total Expansion Vehicles	0	0	0	0	2	5
<i>Vehicles For Base Service</i>	135	135	138	138	140	144
<i>Total Vehicles Available</i>	166	166	166	166	168	173
Total Fleet Spare Ratio	23%	23%	20%	20%	20%	20%
Cost per 40'CNG Bus	\$417,000	\$424,463	\$445,686	\$467,970	\$491,368	\$515,937
<b>Total CNG Vehicle Expansion Cost</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$982,737</b>	<b>\$2,579,684</b>
Cost per 40'Diesel Bus	\$367,500	\$385,875	\$405,169	\$425,427	\$446,699	\$469,033
<b>Total Diesel Vehicle Expansion Cost</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$893,397</b>	<b>\$2,345,167</b>

**TABLE 6-6: REVENUE VEHICLE REPLACEMENT SCHEDULE: FIXED ROUTES**

Unit Number	Unit Year	Make/Model	Length (ft)	Type	Projected Replacement Date	2012	2013	2014	2015	2016	2017
						Vehicle Age/Replacement Year (R)					
<b>Existing Vehicles</b>											
501	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
502	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
503	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
504	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
506	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
507	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
508	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
509	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
510	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
511	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
512	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
513	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
514	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
515	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
516	2000	Gillig Low Floor	40	40' Standard Bus	FY2012	R	1	2	3	4	5
601	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
602	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
603	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
604	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
605	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
606	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
607	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
608	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
609	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
610	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
611	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
612	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
613	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
614	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5

Unit Number	Unit Year	Make/Model	Length (ft)	Type	Projected Replacement Date	2012	2013	2014	2015	2016	2017
615	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
616	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
617	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
618	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
619	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
620	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
621	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
622	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
623	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
624	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
625	2000	Gillig Phantom	40	40' Standard Bus	FY2012	R	1	2	3	4	5
701	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
702	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
703	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
704	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
705	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
706	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
707	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
708	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
709	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
710	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
711	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
713	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
715	2001	Gillig Low Floor	40	40' Standard Bus	FY2013	11	R	1	2	3	4
1601	2007	Ford E 450	25	Cutaway	FY2013	5	R	1	2	3	4
1602	2007	Ford E 450	25	Cutaway	FY2013	5	R	1	2	3	4
1603	2007	Ford E 450	25	Cutaway	FY2013	5	R	1	2	3	4
1604	2007	Ford E 450	25	Cutaway	FY2013	5	R	1	2	3	4
101	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
102	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2

Unit Number	Unit Year	Make/Model	Length (ft)	Type	Projected Replacement Date	2012	2013	2014	2015	2016	2017
103	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
104	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
105	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
106	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
107	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
108	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
109	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
110	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
111	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
112	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
113	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
114	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
115	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
116	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
117	2003	Gillig Low Floor	40	40' Standard Bus	FY2015	9	10	11	R	1	2
801	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
802	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
803	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
804	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
805	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
806	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
807	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
808	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
809	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
810	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
811	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
812	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
813	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
814	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
815	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2

Unit Number	Unit Year	Make/Model	Length (ft)	Type	Projected Replacement Date	2012	2013	2014	2015	2016	2017
816	2003	Gillig Phantom	40	40' Standard Bus	FY2015	9	10	11	R	1	2
1201	2003	Bluebird Excel	35	35' Standard Bus	FY2015	9	10	11	R	1	2
1202	2003	Bluebird Excel	35	35' Standard Bus	FY2015	9	10	11	R	1	2
1203	2003	Bluebird Excel	35	35' Standard Bus	FY2015	9	10	11	R	1	2
301	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
302	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
303	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
304	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
305	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
306	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
307	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
308	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
309	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
310	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
311	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
312	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
313	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
314	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
315	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
316	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
317	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
318	2008	Gillig Low Floor	40	40' Standard Bus	FY2020	4	5	6	7	8	9
1501	2008	MCI D 4500CT	45	45' Commuter Coach	FY2020	4	5	6	7	8	9
1502	2008	MCI D 4500CT	45	45' Commuter Coach	FY2020	4	5	6	7	8	9
1503	2008	MCI D 4500CT	45	45' Commuter Coach	FY2020	4	5	6	7	8	9
901	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8
902	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8
903	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8
904	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8
905	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8

Unit Number	Unit Year	Make/Model	Length (ft)	Type	Projected Replacement Date	2012	2013	2014	2015	2016	2017
906	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8
907	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8
908	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8
909	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8
910	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8
911	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8
912	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8
913	2009	Gillig Low Floor	40	40' Standard Bus	FY2021	3	4	5	6	7	8
1701	2009	Chevy C 5500	29	Mini-Bus	FY2019	3	4	5	6	7	8
1702	2009	Chevy C 5500	29	Mini-Bus	FY2019	3	4	5	6	7	8
1703	2009	Chevy C 5500	29	Mini-Bus	FY2019	3	4	5	6	7	8
1704	2009	Chevy C 5500	29	Mini-Bus	FY2019	3	4	5	6	7	8
1705	2009	Chevy C 5500	29	Mini-Bus	FY2019	3	4	5	6	7	8
1706	2009	Chevy C 5500	29	Mini-Bus	FY2019	3	4	5	6	7	8
1707	2009	Chevy C 5500	29	Mini-Bus	FY2019	3	4	5	6	7	8
1708	2009	Chevy C 5500	29	Mini-Bus	FY2019	3	4	5	6	7	8
1504	2010	MCI D 4500CT	45	45' Commuter Coach	FY2022	2	3	4	5	6	7
1505	2010	MCI D 4500CT	45	45' Commuter Coach	FY2022	2	3	4	5	6	7
1506	2010	MCI D 4500CT	45	45' Commuter Coach	FY2022	2	3	4	5	6	7
1507	2010	MCI D 4500CT	45	45' Commuter Coach	FY2022	2	3	4	5	6	7
1508	2010	MCI D 4500CT	45	45' Commuter Coach	FY2022	2	3	4	5	6	7

**TABLE 6-7: REVENUE VEHICLE REPLACEMENT SCHEDULE: PARATRANSIT**

Unit Number	Unit Year	Make/Model	Length (ft)	Type	Projected Replacement Date	2012	2013	2014	2015	2016	2017
<b>Existing Vehicles</b>						<b>Vehicle Age/Replacement Year (R)</b>					
1322	2006	Chevrolet Supreme	n/a	Cutaway	FY2012	R	1	2	3	R	1
1323	2006	Chevrolet Supreme	n/a	Cutaway	FY2012	R	1	2	3	R	1
1324	2006	Chevrolet Supreme	n/a	Cutaway	FY2012	R	1	2	3	R	1
1325	2006	Chevrolet Supreme	n/a	Cutaway	FY2012	R	1	2	3	R	1
1408	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1409	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1410	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1411	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1412	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1413	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1414	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1415	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1416	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1417	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1418	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1419	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1420	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1421	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1422	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1423	2006	Chevrolet Supreme	21	Cutaway	FY2012	R	1	2	3	R	1
1424	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1425	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1426	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1427	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1428	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1429	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1430	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1431	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1432	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R

Unit Number	Unit Year	Make/Model	Length (ft)	Type	Projected Replacement Date	2012	2013	2014	2015	2016	2017
1433	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1434	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1435	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1436	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1437	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1438	2006	Chevrolet Supreme	21	Cutaway	FY2012	6	R	1	2	3	R
1801	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1802	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1803	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1804	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1805	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1806	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1807	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1808	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1809	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1810	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1811	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1812	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1813	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1814	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1815	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1816	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1817	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1818	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1819	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	R	1	2	3
1820	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1821	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1822	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1823	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1824	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2

Unit Number	Unit Year	Make/Model	Length (ft)	Type	Projected Replacement Date	2012	2013	2014	2015	2016	2017
1825	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1826	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1827	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1828	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1829	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1830	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1831	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1832	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1833	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1834	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1835	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1836	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1837	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2
1838	2009	Ford E-350 StarTrans	n/a	Cutaway	FY2015	3	4	5	R	1	2

**TABLE 6-8: NON-REVENUE VEHICLE REPLACEMENT SCHEDULE**

Unit Number	Unit Year	Make/Model	Length (ft)	Type	Projected Replacement Date	2012	2013	2014	2015	2016	2017
<b>Existing Vehicles</b>											
T-302	1991	Ford LN9000	n/a	HT	n/a	21	22	23	24	25	26
M-50	1997	GMC Sierra	n/a	LT	n/a	15	16	17	18	19	20
M-51	1997	GMC Sierra	n/a	MT	n/a	15	16	17	18	19	20
M-56	1998	Ford E350	n/a	MiniVan	n/a	14	15	16	17	18	19
MR-01	1999	Dodge Ram 1500	n/a	MiniVan	n/a	13	14	15	16	17	18
M-52	2000	Dodge Ram 1500	n/a	MiniVan	n/a	12	13	14	15	16	17
V-25	2000	Jeep Cherokee	n/a	SUV	n/a	12	13	14	15	16	17
T-303	2003	International 7600	n/a	HT	n/a	9	10	11	12	13	14
V-29	2004	GMC Sierra	n/a	MiniVan	n/a	8	9	10	11	12	13
V-40	2004	Ford Explorer	n/a	SUV	n/a	8	9	10	11	12	13
V-41	2004	Ford Explorer	n/a	SUV	n/a	8	9	10	11	12	13
V-30	2006	Ford Explorer	n/a	SUV	n/a	6	7	8	9	10	11
V-31	2006	Ford Explorer	n/a	SUV	n/a	6	7	8	9	10	11
V-32	2006	Ford Explorer	n/a	SUV	n/a	6	7	8	9	10	11
M-53	2007	GMC Sierra	n/a	LT	n/a	5	6	7	8	9	10
MC-1	2007	Chevy C5500	n/a	HT	n/a	5	6	7	8	9	10
V-33	2007	Chevy Impala	n/a	Sedan	n/a	5	6	7	8	9	10
V-34	2007	Chevy Impala	n/a	Sedan	n/a	5	6	7	8	9	10
V-35	2007	Ford Explorer	n/a	SUV	n/a	5	6	7	8	9	10
V-36	2007	Ford Explorer	n/a	SUV	n/a	5	6	7	8	9	10
M-54	2010	Chevy Silverado	n/a	LT	n/a	2	3	4	5	6	7
MR-60	2010	Chevy Impala	n/a	Sedan	n/a	2	3	4	5	6	7
T-61	2010	Ford Escape	n/a	SUV	n/a	2	3	4	5	6	7
T-62	2010	Ford Escape	n/a	SUV	n/a	2	3	4	5	6	7
T-63	2010	Ford Escape	n/a	SUV	n/a	2	3	4	5	6	7
T-64	2010	Ford Escape	n/a	SUV	n/a	2	3	4	5	6	7
T-65	2010	Ford Escape	n/a	SUV	n/a	2	3	4	5	6	7
T-66	2010	Ford Escape	n/a	SUV	n/a	2	3	4	5	6	7

## 6.2 CAPITAL IMPROVEMENTS PROGRAM FOR FACILITIES

In addition to the replacement and expansion of vehicles to the fleet, GRTC has a number of capital projects (described below) that are required to maintain and enhance the system. The facilities improvement program and other capital needs scheduled during the time frame of this TDP are listed in **Tables 6-9** and **6-10**.

### MAINTENANCE FACILITY IMPROVEMENT PROGRAM

This TDP assumes GRTC will need to retrofit the maintenance and fueling facility should GRTC choose to convert its fleet to Compressed Natural Gas. If GRTC opts to use CNG vehicles for its fleet replacement and expansion needs, the agency will use the proposed capital facilities to accommodate those vehicles. As shown in **Table 6-9**, the implementation phase for retrofitting the maintenance facility and adding CNG fueling capability is scheduled for FY2012-2013, with the cost estimated at \$2.5 million to retrofit the maintenance facility for CNG, and an additional \$6.0 million for the fueling facility. In addition to the CNG facilities, this TDP includes a modification of the GRTC maintenance facility to accommodate storage of the paratransit fleet on a lot adjacent to the GRTC facility. This is estimated to cost \$1.25 million in FY2012.

### PASSENGER FACILITY IMPROVEMENT PROGRAM

The following two major passenger capital improvement projects, Broad Street Bus Rapid Transit (BRT) and Downtown Transfer Center, are also included in this six-year TDP.

#### **BROAD STREET BRT**

Broad Street BRT is a major effort to develop a high capacity transit corridor in the GRTC service area. When implemented in FY2015, BRT service along Broad Street will connect Willow Lawn, MCV and VCU, State Office Buildings, Greater Richmond Convention Center, Main Street Station, and Eastern Main St/Route 5 Corridor. Broad Street BRT has the potential to alleviate congestion on the Broad Street and I-64 corridors. Broad Street BRT would consist of one main trunk route providing fast, reliable and frequent service. The improved travel times along the BRT corridor are expected to benefit existing riders and attract new riders. As shown in **Table 6-9**, this capital project is estimated to cost \$70 million, with federal funding (50%) and local funding (50%) split.

#### **DOWNTOWN TRANSFER CENTER**

GRTC has identified a new Downtown Transfer Center as a high priority capital improvement. Existing GRTC transfers in the Downtown Richmond area mainly take place along Broad Street. The current arrangement of GRTC's downtown service presents several challenges for the bus system users: there are few passenger amenities in the downtown area; no functional rest areas for drivers; and conflicts between transit users boarding and deboarding GRTC buses and pedestrians are common. Though the location of the transfer center was previously focused on Main Street Station, other options in the downtown area are being considered as well. The proposed Downtown Transfer Center is assumed to open in FY2017. As shown in **Table 6-9**, this capital project is estimated to cost in the range of \$25 million to \$30 million.

**OTHER PASSENGER FACILITIES**

This TDP also identifies several other locations where transfer hubs with better transit infrastructure, shelter, and amenities are needed, including Brook & Azalea, Southside Plaza, Willow Lawn, White Oak and other transfer points throughout the service area. GRTC will also need to continue to upgrade and replace existing bus stop infrastructure as needed. This TDP assumes regularly programmed stop level enhancements and replacement will continue throughout the six-year timeframe of this TDP, with upgraded transit hubs falling outside of this TDP timeframe. GRTC should continue to pursue local support and funding to provide transit infrastructure throughout the service area.

**TABLE 6-9: CAPITAL IMPROVEMENT PROGRAM FOR FACILITIES**

Project	FY	Total Estimated Cost	Federal 50-80%	Non Federal Match – 20-50%	VDRPT -% of non-federal match	City - % of non-federal match
Retrofit Maintenance Facility for CNG	2013	\$2,500,000	\$0	\$0	\$0	\$2,500,000
Additional Fueling Facility	2013	\$6,000,000	\$0	\$0	\$0	\$6,000,000
Modification of GRTC Maintenance Facility	2012	\$1,250,000	\$800,000	\$0	\$0	\$450,000
Bus Rapid Transit	2015	\$70,000,000	\$35,000,000	\$35,000,000	\$17,500,000	\$17,500,000
GRTC Downtown Transfer Center	2017	\$25,000,000	\$20,000,000	\$5,000,000	\$2,500,000	\$2,500,000
		\$30,000,000	\$24,000,000	\$6,000,000	\$3,000,000	\$3,000,000
<b>Total low range estimate</b>		<b>\$104,750,000</b>	<b>\$55,800,000</b>	<b>\$40,000,000</b>	<b>\$20,000,000</b>	<b>\$28,950,000</b>
<b>Total high range estimate</b>		<b>\$109,750,000</b>	<b>\$59,800,000</b>	<b>\$41,000,000</b>	<b>\$20,500,000</b>	<b>\$29,450,000</b>

Source: Six-Year Improvement Program (SYIP) and GRTC Long Range Capital Plan.

**6.3 OTHER CAPITAL IMPROVEMENTS**

**Chapter 4** identifies a range of technology needs to ensure GRTC continues to operate efficiently and effectively. These include upgrades and maintenance of Great Plains, Hastus, and Clever Devices software and hardware. The following capital improvements are identified for inclusion in this TDP to be consistent with the GRTC FY2012-2018 Long Range Capital Plan:

- ADP hardware and software
- Transit enhancements
- Transit security
- Administrative capital costs:
  - ADA administration
  - Contracting
  - Project administration
  - Management training
- Maintenance
  - Preventive maintenance, shop tools and equipment, and other support equipment

These capital needs are shown in **Table 6-10**. The total estimated cost in the FY2012-2017 time period is nearly \$50 million, with preventive maintenance alone estimated at over \$35 million.

**TABLE 6-10: OTHER CAPITAL NEEDS**

Project	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	TOTAL FY2012-2017
ADP Hardware	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000	\$480,000
ADP Software	\$275,000	\$410,174	\$402,333	\$822,449	\$472,572	\$465,750	\$2,848,278
Transit Enhancements	\$119,700	\$120,897	\$122,106	\$123,327	\$124,560	\$125,805	\$736,394
Transit Security	\$119,700	\$120,897	\$122,106	\$123,327	\$124,560	\$125,805	\$736,394
ADA Administration	\$1,196,996	\$1,208,966	\$1,221,056	\$1,233,266	\$1,245,599	\$1,258,055	\$7,363,937
Capital Cost of Contracting	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$900,000
Project Administration	\$239,399	\$241,793	\$244,211	\$246,653	\$249,120	\$251,611	\$1,472,787
Management Training	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$30,000
Preventive Maintenance	\$5,700,000	\$5,754,678	\$5,812,224	\$5,870,347	\$5,929,050	\$5,988,341	\$35,054,640
Shop Tools & Equipment	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$300,000
Miscellaneous Support Equipment	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$60,000
<b>Total Other Capital Needs</b>	<b>\$7,945,794</b>	<b>\$8,152,404</b>	<b>\$8,219,035</b>	<b>\$8,714,368</b>	<b>\$8,440,460</b>	<b>\$8,510,368</b>	<b>\$49,982,429</b>

Source: GRTC Long Range Capital Plan.

## 7.0 FINANCIAL PLAN

The financial plan is a principal objective of the TDP. It is in this chapter that an agency demonstrates its ability to provide a sustainable level of transit service over the TDP time period, including the rehabilitation and replacement of capital assets. This chapter identifies potential revenue sources for annual operating and maintenance costs, and funding requirements and revenue sources for bus and service vehicle purchases, and other capital improvements. As noted in Chapters 5 and 6, two service scenarios have been defined for this TDP – a BRT and a No BRT scenario. A final decision on the Broad Street BRT project has not yet been made at the time this TDP has been prepared. Therefore, financial plans have been prepared for both scenarios.

### 7.1 OPERATING AND MAINTENANCE COSTS AND FUNDING SOURCES

This section identifies the revenue sources and projected funding available for operating and maintenance costs over the timeframe of the TDP. This TDP uses GRTC's FY2012 Operating Budget to estimate revenues and costs. Funding sources are identified using the current DRPT State Transit Improvement Program (STIP) (July 15, 2011) for FY2012. Future funding is projected based on the percentage of growth in DRPT's FY2012 Six-Year Improvement Plan (SYIP) projections for state operating assistance and FTA state administered program funds.

#### Farebox Revenues

Farebox revenues are estimated from the FY2012 budget based on the farebox recovery ratio per revenue mile for fixed-route and the Broad Street BRT, and revenue hour for CARE service as described below. **Table 7-1** shows the projected farebox recovery by year of the TDP.

- **Fixed Route Service:** This TDP assumes a farebox recovery ratio of 24.2 percent throughout the TDP timeframe. This is based on GRTC's FY2012 budgeted fares per mile for fixed-route service, and the estimated annual revenue miles in FY2012. This TDP does not assume a fare increase during the FY2012 to FY2017 timeframe. Ridership and fare revenue is assumed to increase and decrease in conjunction with changes in revenue miles. This TDP does assume a three percent rate of inflation beginning in FY2013.
- **Paratransit:** This TDP assumes a farebox recovery of 9.6 percent for CARE service with no increase in fares. This is based on GRTC's FY2012 budgeted fare revenues per hour for CARE service and the estimated annual revenue hours for CARE service in FY2012. This TDP does not assume a fare increase. No increase in CARE revenue hours are assumed for this TDP. A three percent inflation rate is assumed beginning in FY2013.
- **Broad Street BRT:** In the BRT Scenario, the Broad Street BRT is assumed to have the same farebox recovery ratio as fixed-route service at 24.05 percent. A three percent inflation rate is assumed beginning in FY2016.

**TABLE 7-1: PROJECTED FAREBOX RECOVERY RATIO FY2012 – FY2017**

Farebox Recovery	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
O&M Fixed Route Cost Per Mile	\$7.32	\$7.54	\$7.77	\$8.00	\$8.24	\$8.49
<i>Fixed Route Farebox Recovery Ratio</i>	24.2%	24.2%	24.2%	24.2%	24.2%	24.2%
<b>Fixed Route Farebox Revenue/Rev. Mile</b>	<b>\$1.77</b>	<b>\$1.83</b>	<b>\$1.88</b>	<b>\$1.94</b>	<b>\$2.00</b>	<b>\$2.06</b>
O&M Paratransit Cost per Hour	\$45.48	\$46.84	\$48.25	\$49.70	\$51.19	\$52.72
<i>Paratransit Farebox Recovery Ratio</i>	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%
<b>Paratransit Route Farebox Revenue/Rev. Hour</b>	<b>\$4.35</b>	<b>\$4.48</b>	<b>\$4.61</b>	<b>\$4.75</b>	<b>\$4.89</b>	<b>\$5.04</b>

### State/Federal Sources

The following state and federal funding sources are assumed for the six-year TDP timeframe.

- **Federal Funds:** In FY2012, GRTC budgeted \$7,350,146 in Federal Funds and Prior Surpluses. This TDP assumes GRTC will continue to receive federal funding for fixed-route service. This amount is projected to grow based on the DRPT FY2012 Six-Year Improvement Program allocation for FTA administered funds, which are projected to grow at a rate of 2.6 percent in FY2013 and 2.0 percent per year from FY2014 to FY2017.
- **Federal CMAQ Funds:** This TDP includes a CMAQ grant in FY2012 for \$315,000 and FY2013 for \$324,000, which provides operating assistance for the Mechanicsville Express.
- **Other Federal Funds:** No other federal operating funding sources are identified in this TDP.
- **State Operating Assistance Grants:** This TDP assumes GRTC will continue to receive state operating assistance, with changes in these funding levels based on DRPT’s FY2012 SYIP projections for state operating assistance. In FY2013, GRTC’s state funds for operating are projected to grow 14 percent over FY2011; which is a -1.7 percent decrease from FY2012. From FY2013, state funds are projected to grow 3.5 percent in FY2014, 5.7 percent in FY2015, 3.6 percent in FY2016, and 3.6 percent in FY2017. These projections are based on the state’s overall projected growth in the Mass Transit Trust Fund, which is updated annually. If actual state funds received are lower than projected, local or other funding sources could be needed to make up any shortfalls.

### Other Operating Revenues

In addition to farebox revenues, and state and federal grants, GRTC receives operating revenue from other sources. These sources are identified as follows with future year projections from the GRTC Transit System Projected Operating Budget for FY2011 – FY2015 included in *Appendix F* of the *Richmond MPO Transportation Improvement Program (TIP)*. No new sources of “other funds” are identified in this TDP.

- **City of Richmond Contribution-Senior Fares:** In FY2012, the City of Richmond provided \$175,000 for Senior Fares. This amount is assumed to be consistent from FY2012 to FY2017 at \$175,000.
- **Charter Revenue:** In FY2012, GRTC budgeted \$125,000 in charter service revenue. This amount is projected to grow each year by five percent from FY2013 to FY2017.

- **Advertising Revenue:** In FY2012, GRTC budgeted \$390,000 in advertising revenue. This TDP assumes this revenue will grow each year by five percent.
- **Other Operating Revenue:** GRTC budgeted \$12,000 for other operating revenue in FY2011. This amount is assumed to remain constant from FY2012 to FY2017 at \$12,000.
- **VCU Shuttle Revenues:** In FY2012, GRTC budgeted \$1,675,880 in VCU shuttle revenues. This amount is assumed to grow based on the growth in costs for the VCU service from FY2013 to FY2017. The cost for express service in FY2014 is allocated to this category; however, federal or state grants may be pursued to fund this project.
- **VCU Pass Program:** The VCU Pass Program was budgeted at \$325,000 in FY2012. This revenue source is projected to grow three percent each year from FY2013 to FY2017.

### Local Sources

GRTC also receives funding from the City of Richmond and other municipalities to support existing transit service. When shortfalls from federal, state and farebox revenues do not cover the cost of transit service, local funding sources are needed to fund the difference. The following local sources are identified in this six-year TDP.

- **Richmond:** In FY2012, GRTC budgeted \$11,000,000 in operating funds from the City of Richmond. This TDP includes minor increases and decreases in fixed-route (non-BRT) service levels. Revenues from the City of Richmond are projected to remain flat from FY2012 to FY2017 at \$11,000,000.
- **Broad Street BRT:** In the Broad Street BRT Scenario, this TDP assumes a local revenue source is identified to fund BRT operating costs beginning in FY2015. BRT funding is projected to grow based on a three percent inflation rate in FY2016 and FY2017.
- **Henrico County:** In FY2012, GRTC budgeted \$3,272,190 from Henrico County for fixed-route service and \$1,727,810 for paratransit service. This TDP assumes fixed-route funding from Henrico County will remain flat. CARE funding from Henrico County is also assumed to remain flat each year. No new service is included for Henrico County during the timeframe of this TDP.
- **Chesterfield County:** Although GRTC provides express Bus service in Chesterfield County, state and federal grants historically funded any shortfalls from fare revenue. These funding sources will end in FY2012. Beginning in FY2012, the Local Funds/Other Grants (need) category includes the cost of this service. Without a local funding source or alternative state and federal grants to continue to fund this service, express bus service in Chesterfield may need to be eliminated or reduced in July 2012.
- **Petersburg:** The City of Petersburg provides funds for express bus service to Richmond, which was budgeted at \$150,000 in FY2012. This funding is projected to remain flat each year from FY2012 to FY2017.
- **Mechanicsville:** The new Mechanicsville express service is funded by a CMAQ grant in FY2012 and FY2013. No local funding source is identified in this TDP beginning in FY2014 when this funding source runs out. Thus, the Local/Other Grant (Need) includes this shortfall beginning in FY2014.

- **Other Interest/Non Transportation Income:** GRTC also budgeted \$125,000 in Interest/Non Transportation Income in FY2012. This TDP assumes this amount remains constant from FY2012 to FY2017.

Key expense and revenue assumptions utilized in the TDP Financial Plan are as follows:

- **Fixed Route Cost per Mile:** This TDP identifies a fixed-route cost per mile in FY2012 of \$7.32. This cost is assumed to increase each year, beginning in FY2013 by an inflation rate of three percent.
- **Broad Street BRT Cost per Mile:** This TDP assumes the cost per mile for BRT service is the same as GRTC's fixed-route cost per mile (\$7.32 in FY2012 dollars, resulting in a year of expenditure cost of \$8.00 in FY2015 when BRT service is proposed to begin). This cost is projected to grow at a three percent inflation factor each year in FY2016 and FY2017.
- **CARE Cost per Hour:** This TDP identifies an FY2012 cost per hour for CARE service at \$45.48. This amount is projected to grow each year by a three percent inflation rate beginning in FY2013.

**Tables 7-2 through 7-5** show the estimated operating costs for the BRT Scenario and the No BRT Scenario described in **Chapter 5**.

- **BRT Scenario:** The BRT Scenario reflects a 28 percent increase in total operating costs from FY2012 to FY2017 (from \$45,509,798 to \$58,440,484), as shown in **Table 7-2**. Using the revenue assumptions described above, a total of \$12,627,883 in additional operating funds will be needed over the FY2012 to FY2017 timeframe to fund fixed-route and paratransit services. An additional \$11,072,514 will be needed to fund the Broad Street BRT service from FY2015 to FY2017, as shown in **Table 7-3**.
- **NO BRT Scenario:** In **Table 7-4**, the No BRT Scenario reflects a 15 percent increase in total operating costs from FY2012 to FY2017 (from \$45,509,798 to \$52,307,697). Using the revenue assumptions described above, an additional \$10,652,015 in operating funds will be needed to fund fixed-route and paratransit services for this scenario over the six-year time period, as shown in **Table 7-5**. Because this is a no growth scenario, much of the increase in costs is related to inflation.

**TABLE 7-2: TDP FINANCIAL PLAN FOR ANNUAL O&M COSTS – BRT SCENARIO (COSTS IN YEAR OF EXPENDITURE DOLLARS)**

TDP Financial Plan for: Service O&M Costs	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
<b>Fixed Route Annual Service-Miles</b>							
<i>Richmond</i>	4,177,520	4,177,520	4,177,520	4,129,952	4,138,056	4,225,246	4,229,084
<i>Henrico</i>	589,398	589,398	589,398	589,398	589,398	589,398	589,398
<i>VCU</i>	213,137	193,083	193,083	220,063	220,063	220,063	220,063
<i>Chesterfield</i>	121,137	121,137	121,137	121,137	121,137	121,137	121,137
<i>Petersburg</i>	182,799	182,799	182,799	182,799	182,799	182,799	182,799
<i>Mechanicsville</i>	31,170	31,170	31,170	31,170	31,170	31,170	31,170
<b>Total Fixed Route Transit Service-Miles</b>	5,315,162	5,295,108	5,295,108	5,274,520	5,282,623	5,369,813	5,373,651
<i>Fixed Route Miles Change</i>		(20,054)	0	(20,588)	8,103	87,190	3,839
<b>Total Fixed Route Costs:</b>	\$ 36,180,799	\$ 38,760,187	\$ 39,922,993	\$ 40,960,802	\$ 42,254,441	\$ 44,240,408	\$ 45,600,194
<b>BRT Annual Service - Miles</b>							
Broad Street BRT	0	0	0	0	591,058	591,058	591,058
<b>Total BRT Costs</b>	\$ -	\$ -	\$ -	\$ -	\$ 4,727,732	\$ 4,869,564	\$ 5,015,651
<b>CARE Annual Service-Hours</b>							
Richmond - CARE	99,345	99,345	99,345	99,345	99,345	99,345	99,345
Henrico - CARE	49,063	49,063	49,063	49,063	49,063	49,063	49,063
<b>Total Paratransit Service Hours</b>	148,408	148,408	148,408	148,408	148,408	148,408	148,408
<b>Total Paratransit Costs</b>	\$ 6,749,602	\$ 6,749,602	\$ 6,952,090	\$ 7,160,653	\$ 7,375,472	\$ 7,596,736	\$ 7,824,638
<b>Projected Costs</b>	\$ 42,930,401	\$ 45,509,789	\$ 46,875,082	\$ 48,121,454	\$ 54,357,645	\$ 56,706,708	\$ 58,440,484
<b>GRTC Operating &amp; Maintenance Costs</b>							
<i>Broad Street BRT</i>	\$ -	\$ -	\$ -	\$ -	\$ 4,727,732	\$ 4,869,564	\$ 5,015,651
<i>Richmond-Fixed</i>	\$ 28,436,768	\$ 30,579,448	\$ 31,496,832	\$ 32,072,335	\$ 33,099,320	\$ 34,810,634	\$ 35,887,527
<i>Richmond-CARE</i>	\$ 4,518,201	\$ 4,518,201	\$ 4,653,747	\$ 4,793,359	\$ 4,937,160	\$ 5,085,275	\$ 5,237,833
<i>Henrico - Fixed</i>	\$ 4,012,088	\$ 4,314,394	\$ 4,443,826	\$ 4,577,141	\$ 4,714,455	\$ 4,855,889	\$ 5,001,566
<i>Henrico - CARE</i>	\$ 2,231,401	\$ 2,231,401	\$ 2,298,343	\$ 2,367,293	\$ 2,438,312	\$ 2,511,461	\$ 2,586,805
<i>VCU</i>	\$ 1,450,841	\$ 1,413,364	\$ 1,455,765	\$ 1,708,959	\$ 1,760,228	\$ 1,813,035	\$ 1,867,426
<i>Chesterfield</i>	\$ 824,592	\$ 886,724	\$ 913,326	\$ 940,726	\$ 968,947	\$ 998,016	\$ 1,027,956
<i>Petersburg</i>	\$ 1,244,333	\$ 1,338,092	\$ 1,378,235	\$ 1,419,582	\$ 1,462,169	\$ 1,506,035	\$ 1,551,216
<i>Mechanicsville</i>	\$ 212,176	\$ 228,164	\$ 235,009	\$ 242,059	\$ 249,321	\$ 256,800	\$ 264,504
<b>Total Projected O&amp;M Costs</b>	\$ 42,930,401	\$ 45,509,789	\$ 46,875,082	\$ 48,121,454	\$ 54,357,645	\$ 56,706,708	\$ 58,440,484

**TABLE 7-3: TDP FINANCIAL PLAN FOR ANNUAL O&M REVENUE – BRT SCENARIO**

TDP Financial Plan for: Service O&M Revenues		FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
<b>Anticipated Funding Sources</b>		<i>GRTC</i>		<i>GRTC</i>				
<b>Federal</b>		\$ 5,112,144	\$ 7,350,146	\$ 7,543,048	\$ 7,363,429	\$ 7,510,697	\$ 7,660,911	\$ 7,814,129
	Federal Funds & Prior Surplus	\$ 5,112,144	\$ 7,035,146	\$ 7,219,048	\$ 7,363,429	\$ 7,510,697	\$ 7,660,911	\$ 7,814,129
	CMAQ (Mechanicsville Express)	\$ -	\$ 315,000	\$ 324,000	\$ -	\$ -	\$ -	\$ -
<b>State</b>		\$ 7,088,661	\$ 8,223,029	\$ 8,082,134	\$ 8,368,856	\$ 8,842,295	\$ 9,160,937	\$ 9,491,060
	State Funds	\$ 7,088,661	\$ 8,223,029	\$ 8,082,134	\$ 8,368,856	\$ 8,842,295	\$ 9,160,937	\$ 9,491,060
<b>Farebox Revenues</b>		\$ 10,332,588	\$ 10,036,243	\$ 10,337,330	\$ 10,608,714	\$ 12,088,116	\$ 12,624,798	\$ 13,011,434
	Farebox Revenues - Fixed Route	\$ 9,705,188	\$ 9,390,839	\$ 9,672,565	\$ 9,924,006	\$ 10,237,429	\$ 10,718,590	\$ 11,048,040
	Farebox Revenues - BRT	\$ -	\$ -	\$ -	\$ -	\$ 1,145,438	\$ 1,179,801	\$ 1,215,195
	Farebox Revenues - CARE	\$ 627,400	\$ 645,404	\$ 664,766	\$ 684,709	\$ 705,250	\$ 726,407	\$ 748,200
<b>Other Operating Revenues</b>		\$ 4,281,994	\$ 3,750,372	\$ 3,565,756	\$ 3,856,030	\$ 3,946,032	\$ 4,039,302	\$ 4,135,966
	Richmond Contribution - Senior Fare	\$ 175,000	\$ 175,000	\$ 175,000	\$ 175,000	\$ 175,000	\$ 175,000	\$ 175,000
	Charter Revenue	\$ 125,000	\$ 125,000	\$ 131,250	\$ 137,813	\$ 144,703	\$ 151,938	\$ 159,535
	Advertising Revenue	\$ 365,000	\$ 390,000	\$ 409,500	\$ 429,975	\$ 451,474	\$ 474,047	\$ 497,750
	Other Operating Revenue	\$ 12,000	\$ 12,000	\$ 12,000	\$ 12,000	\$ 12,000	\$ 12,000	\$ 12,000
	Other Interest/Non Transportation Income	\$ 125,000	\$ 125,000	\$ 125,000	\$ 125,000	\$ 125,000	\$ 125,000	\$ 125,000
	VCU Shuttle Revenue	\$ 2,456,068	\$ 1,675,880	\$ 1,455,765	\$ 1,708,959	\$ 1,760,228	\$ 1,813,035	\$ 1,867,426
	VCU Pass Program	\$ 225,000	\$ 325,000	\$ 334,750	\$ 344,793	\$ 355,136	\$ 365,790	\$ 376,764
	Purchase of Service - CVAN	\$ 288,508	\$ 500,022	\$ 500,022	\$ 500,022	\$ 500,022	\$ 500,022	\$ 500,022
	Ridefinders	\$ 510,419	\$ 422,470	\$ 422,470	\$ 422,470	\$ 422,470	\$ 422,470	\$ 422,470
<b>Local Contributions for O&amp;M</b>		\$ 16,115,014	\$ 16,150,000	\$ 16,150,000	\$ 16,150,000	\$ 19,732,294	\$ 19,839,763	\$ 19,950,456
	Broad Street BRT	\$ -	\$ -	\$ -	\$ -	\$ 3,582,295	\$ 3,689,763	\$ 3,800,456
	Richmond-Fixed/CARE	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000
	Henrico - Fixed	\$ 3,245,104	\$ 3,272,190	\$ 3,272,190	\$ 3,272,190	\$ 3,272,190	\$ 3,272,190	\$ 3,272,190
	Henrico - CARE	\$ 1,719,910	\$ 1,727,810	\$ 1,727,810	\$ 1,727,810	\$ 1,727,810	\$ 1,727,810	\$ 1,727,810
	Chesterfield	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Petersburg	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000
	Mechanicsville	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Local Funds/Other Grants (Need)</b>		\$ -	\$ -	\$ 1,196,814	\$ 1,774,425	\$ 2,238,209	\$ 3,380,997	\$ 4,037,438
<b>Total Projected Operating Revenues</b>		\$ 42,930,401	\$ 45,509,789	\$ 46,875,082	\$ 48,121,454	\$ 54,357,645	\$ 56,706,708	\$ 58,440,484

*Note: This financial plan assumes a dedicated local funding source is committed for the Broad Street BRT project; thus, local funds/other grant needs are for GRTC fixed-route and paratransit services.*

**TABLE 7-4: TDP FINANCIAL PLAN FOR ANNUAL O&M COSTS – NO BRT SCENARIO (COSTS IN YEAR OF EXPENDITURE DOLLARS)**

TDP Financial Plan for: Service O&M Costs	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
<b>Fixed Route Annual Service-Miles</b>							
<i>Richmond</i>	4,177,520	4,177,520	4,177,520	4,129,952	4,087,308	4,093,599	4,097,438
<i>Henrico</i>	589,398	589,398	589,398	589,398	589,398	589,398	589,398
<i>VCU</i>	213,137	193,083	193,083	220,063	220,063	220,063	220,063
<i>Chesterfield</i>	121,137	121,137	121,137	121,137	121,137	121,137	121,137
<i>Petersburg</i>	182,799	182,799	182,799	182,799	182,799	182,799	182,799
<i>Mechanicsville</i>	31,170	31,170	31,170	31,170	31,170	31,170	31,170
<b>Total Fixed Route Transit Service-Miles</b>	<b>5,315,162</b>	<b>5,295,108</b>	<b>5,295,108</b>	<b>5,274,520</b>	<b>5,231,875</b>	<b>5,238,166</b>	<b>5,242,005</b>
<i>Fixed Route Miles Change</i>		(20,054)	0	(20,588)	(42,644)	6,291	3,839
<b>Total Fixed Route Costs:</b>	<b>\$ 36,180,799</b>	<b>\$ 38,760,187</b>	<b>\$ 39,922,993</b>	<b>\$ 40,960,802</b>	<b>\$ 41,848,523</b>	<b>\$ 43,155,810</b>	<b>\$ 44,483,059</b>
<b>CARE Annual Service-Hours</b>							
Richmond - CARE	99,345	99,345	99,345	99,345	99,345	99,345	99,345
Henrico - CARE	49,063	49,063	49,063	49,063	49,063	49,063	49,063
<b>Total Paratransit Service Hours</b>	<b>148,408</b>						
<b>Total Paratransit Costs</b>	<b>\$ 6,749,602</b>	<b>\$ 6,749,602</b>	<b>\$ 6,952,090</b>	<b>\$ 7,160,653</b>	<b>\$ 7,375,472</b>	<b>\$ 7,596,736</b>	<b>\$ 7,824,638</b>
<b>Projected Costs</b>	<b>\$ 42,930,401</b>	<b>\$ 45,509,789</b>	<b>\$ 46,875,082</b>	<b>\$ 48,121,454</b>	<b>\$ 49,223,995</b>	<b>\$ 50,752,546</b>	<b>\$ 52,307,697</b>
<b>GRTC Operating &amp; Maintenance Costs</b>							
<i>Richmond-Fixed</i>	\$ 28,436,768	\$ 30,579,448	\$ 31,496,832	\$ 32,072,335	\$ 32,693,402	\$ 33,726,036	\$ 34,770,391
<i>Richmond-CARE</i>	\$ 4,518,201	\$ 4,518,201	\$ 4,653,747	\$ 4,793,359	\$ 4,937,160	\$ 5,085,275	\$ 5,237,833
<i>Henrico - Fixed</i>	\$ 4,012,088	\$ 4,314,394	\$ 4,443,826	\$ 4,577,141	\$ 4,714,455	\$ 4,855,889	\$ 5,001,566
<i>Henrico - CARE</i>	\$ 2,231,401	\$ 2,231,401	\$ 2,298,343	\$ 2,367,293	\$ 2,438,312	\$ 2,511,461	\$ 2,586,805
<i>VCU</i>	\$ 1,450,841	\$ 1,413,364	\$ 1,455,765	\$ 1,708,959	\$ 1,760,228	\$ 1,813,035	\$ 1,867,426
<i>Chesterfield</i>	\$ 824,592	\$ 886,724	\$ 913,326	\$ 940,726	\$ 968,947	\$ 998,016	\$ 1,027,956
<i>Petersburg</i>	\$ 1,244,333	\$ 1,338,092	\$ 1,378,235	\$ 1,419,582	\$ 1,462,169	\$ 1,506,035	\$ 1,551,216
<i>Mechanicsville</i>	\$ 212,176	\$ 228,164	\$ 235,009	\$ 242,059	\$ 249,321	\$ 256,800	\$ 264,504
<b>Total Projected O&amp;M Costs</b>	<b>\$ 42,930,401</b>	<b>\$ 45,509,789</b>	<b>\$ 46,875,082</b>	<b>\$ 48,121,454</b>	<b>\$ 49,223,995</b>	<b>\$ 50,752,546</b>	<b>\$ 52,307,697</b>

**TABLE 7-5: TDP FINANCIAL PLAN FOR ANNUAL O&M REVENUE – NO BRT SCENARIO**

TDP Financial Plan for: Service O&M Revenues		FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
<b>Anticipated Funding Sources</b>		<i>GRTC</i>		<i>GRTC</i>				
<b>Federal</b>		\$ 5,112,144	\$ 7,350,146	\$ 7,543,048	\$ 7,363,429	\$ 7,510,697	\$ 7,660,911	\$ 7,814,129
	Federal Funds & Prior Surplus	\$ 5,112,144	\$ 7,035,146	\$ 7,219,048	\$ 7,363,429	\$ 7,510,697	\$ 7,660,911	\$ 7,814,129
	CMAQ (Mechanicsville Express)	\$ -	\$ 315,000	\$ 324,000				
<b>State</b>		\$ 7,088,661	\$ 8,223,029	\$ 8,082,134	\$ 8,368,856	\$ 8,842,295	\$ 9,160,937	\$ 9,491,060
	State Funds	\$ 7,088,661	\$ 8,223,029	\$ 8,082,134	\$ 8,368,856	\$ 8,842,295	\$ 9,160,937	\$ 9,491,060
<b>Farebox Revenues</b>		\$ 10,332,588	\$ 10,036,243	\$ 10,337,330	\$ 10,608,714	\$ 10,844,333	\$ 11,182,221	\$ 11,525,579
	Farebox Revenues - Fixed Route	\$ 9,705,188	\$ 9,390,839	\$ 9,672,565	\$ 9,924,006	\$ 10,139,083	\$ 10,455,813	\$ 10,777,380
	Farebox Revenues - CARE	\$ 627,400	\$ 645,404	\$ 664,766	\$ 684,709	\$ 705,250	\$ 726,407	\$ 748,200
<b>Other Operating Revenues</b>		\$ 4,281,994	\$ 3,750,372	\$ 3,565,756	\$ 3,856,030	\$ 3,946,032	\$ 4,039,302	\$ 4,135,966
	Richmond Contribution - Senior Fare	\$ 175,000	\$ 175,000	\$ 175,000	\$ 175,000	\$ 175,000	\$ 175,000	\$ 175,000
	Charter Revenue	\$ 125,000	\$ 125,000	\$ 131,250	\$ 137,813	\$ 144,703	\$ 151,938	\$ 159,535
	Advertising Revenue	\$ 365,000	\$ 390,000	\$ 409,500	\$ 429,975	\$ 451,474	\$ 474,047	\$ 497,750
	Other Operating Revenue	\$ 12,000	\$ 12,000	\$ 12,000	\$ 12,000	\$ 12,000	\$ 12,000	\$ 12,000
	Other Interest/Non Transportation Income	\$ 125,000	\$ 125,000	\$ 125,000	\$ 125,000	\$ 125,000	\$ 125,000	\$ 125,000
	VCU Shuttle Revenue	\$ 2,456,068	\$ 1,675,880	\$ 1,455,765	\$ 1,708,959	\$ 1,760,228	\$ 1,813,035	\$ 1,867,426
	VCU Pass Program	\$ 225,000	\$ 325,000	\$ 334,750	\$ 344,793	\$ 355,136	\$ 365,790	\$ 376,764
	Purchase of Service - CVAN	\$ 288,508	\$ 500,022	\$ 500,022	\$ 500,022	\$ 500,022	\$ 500,022	\$ 500,022
	Ridefinders	\$ 510,419	\$ 422,470	\$ 422,470	\$ 422,470	\$ 422,470	\$ 422,470	\$ 422,470
<b>Local Contributions for O&amp;M</b>		\$ 16,115,014	\$ 16,150,000	\$ 16,150,000	\$ 16,150,000	\$ 16,150,000	\$ 16,150,000	\$ 16,150,000
	Richmond-Fixed/CARE	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000
	Henrico - Fixed	\$ 3,245,104	\$ 3,272,190	\$ 3,272,190	\$ 3,272,190	\$ 3,272,190	\$ 3,272,190	\$ 3,272,190
	Henrico - CARE	\$ 1,719,910	\$ 1,727,810	\$ 1,727,810	\$ 1,727,810	\$ 1,727,810	\$ 1,727,810	\$ 1,727,810
	Chesterfield	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Petersburg	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000
	Mechanicsville	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Local Funds/Other Grants (Need)</b>		\$ -	\$ -	\$ 1,196,814	\$ 1,774,425	\$ 1,930,638	\$ 2,559,176	\$ 3,190,962
<b>Total Projected Operating Revenues</b>		\$ 42,930,401	\$ 45,509,789	\$ 46,875,082	\$ 48,121,454	\$ 49,223,995	\$ 50,752,546	\$ 52,307,697

## 7.2 BUS PURCHASE COSTS AND FUNDING SOURCES

GRTC will need to replace vehicles for fixed-route and paratransit service during the timeframe of this TDP, as well as purchase additional vehicles for any service expansion as described in **Chapter 6** of this TDP. The financial plan includes fixed-route, paratransit and expansion vehicles as identified in the Vehicle Replacement Schedule and Vehicle Expansion Plan provided in **Chapter 6**. The financial plan assumes the cost per 40 foot fixed-route CNG vehicle is \$417,000 in FY2012. This TDP assumes a five percent inflation rate beginning in FY2014. Paratransit vehicle costs are assumed at \$80,000 per van in FY2012, with a three percent rate of inflation beginning in FY2013. BRT vehicle costs are assumed to be \$1,000,000 per vehicle, and are included in the estimated \$70,000,000 capital cost for BRT service. Traditionally, GRTC receives 80 percent of the funding for new vehicles from federal sources, with the balance provided by state and local sources. In FY2011, GRTC received funding for replacement vehicles and new coach buses from the following funding sources as identified in GRTC's Long Range Capital Plan and the STIP:

- FTA 5307 funds: \$3,740,000;
- ARRA/RSTP funds: \$1,680,000;
- RSTP funds: \$3,120,000;
- Livability Grant: 420,000; and
- State Capital Assistance Grants: \$748,000
- Local Contribution: \$292,000

This TDP assumes 80 percent of the funding for new vehicles will come from federal funding, 15 percent state funding and five percent local funding. However, because GRTC has a large fleet of aging vehicles, the need for vehicle replacement funds exceed the growth in funds available from state and federal funding sources. This TDP includes only those vehicles scheduled to be replaced as described in **Chapter 6** based on the anticipated funds available. As a result, GRTC will have 55 vehicles that exceed their useful life by FY2017.

## 7.3 SUPPORT VEHICLE PURCHASE COSTS AND FUNDING SOURCES

This TDP does not assume any support vehicles will be replaced during the timeframe of the TDP. If the need to replace one of these vehicles arises and funding sources are identified, future updates to this TDP will include the addition of support vehicle replacement.

**Table 7-6** shows the Fleet Replacement and Expansion Plan under the BRT Scenario. This includes a total of \$30,951,223 in fixed-route, paratransit, expansion and support vehicles. Broad Street BRT vehicles are included in the Capital Improvement Plan. Based on anticipated revenue sources available, \$1,547,561 in local or other capital funds will be needed from FY2012 to FY2017.

**Table 7-7** shows the Fleet Replacement and Expansion Plan for the No BRT Scenario. This includes a total of \$29,968,468 in fixed-route, paratransit, expansion and support vehicle costs during the timeframe of this TDP. This scenario is projected to need \$1,498,424 in local or other capital funds from FY2012 to FY2017.

**TABLE 7-6: TDP FINANCIAL PLAN FOR FLEET REPLACEMENT AND EXPANSION – BRT SCENARIO (IN YEAR OF EXPENDITURE DOLLARS)**

TDP Financial Plan for:							
Fleet Replacement and Expansion	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
<b>Number of Vehicles</b>							
Replacement Fixed Route	16	13	6	5	4	5	5
Replacement Paratransit	0	20	15	19	19	20	15
Replacement Coach Buses	5						
Expansion	0	0	0	0	0	4	5
Service/Pool Vehicles	0	0	0	0	0	0	0
<b>Total Vehicles</b>	<b>21</b>	<b>33</b>	<b>21</b>	<b>24</b>	<b>23</b>	<b>29</b>	<b>25</b>
<b>Vehicle Costs (CNG)</b>							
Replacement Fixed Route	\$ 6,160,000	\$ 5,421,000	\$ 2,546,775	\$ 2,228,428	\$ 1,871,880	\$ 2,456,842	\$ 2,579,684
Replacement Paratransit	\$ -	\$ 1,600,000	\$ 1,236,000	\$ 1,612,568	\$ 1,660,945	\$ 1,800,814	\$ 1,391,129
Replacement Coach Buses	\$ 2,625,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Expansion	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,965,474	\$ 2,579,684
Service/Pool Vehicles	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Projected Vehicle Costs</b>	<b>\$ 8,785,000</b>	<b>\$ 7,021,000</b>	<b>\$ 3,782,775</b>	<b>\$ 3,840,996</b>	<b>\$ 3,532,825</b>	<b>\$ 6,223,130</b>	<b>\$ 6,550,497</b>
<b>Anticipated Funding Sources</b>							
FTA 5307 (80%)	\$ 3,740,000	\$ 5,616,800	\$ 3,026,220	\$ 3,072,797	\$ 2,826,260	\$ 4,978,504	\$ 5,240,398
State (Capital Assistance Grant) (15%)	\$ 748,000	\$ 1,053,150	\$ 567,416	\$ 576,149	\$ 529,924	\$ 933,469	\$ 982,575
Local/Other Grants (5%)	\$ 4,297,000	\$ 351,050	\$ 189,139	\$ 192,050	\$ 176,641	\$ 311,156	\$ 327,525
<b>Total Vehicle Revenues</b>	<b>\$ 8,785,000</b>	<b>\$ 7,021,000</b>	<b>\$ 3,782,775</b>	<b>\$ 3,840,996</b>	<b>\$ 3,532,825</b>	<b>\$ 6,223,130</b>	<b>\$ 6,550,497</b>

**TABLE 7-7: TDP FINANCIAL PLAN FOR FLEET REPLACEMENT & EXPANSION - NO BRT SCENARIO (IN YEAR OF EXPENDITURE DOLLARS)**

TDP Financial Plan for:							
Fleet Replacement and Expansion	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
<b>Number of Vehicles</b>							
Replacement Fixed Route	16	13	6	5	4	5	5
Replacement Paratransit	0	20	15	19	19	20	15
Replacement Coach Buses	5						
Expansion	0	0	0	0	0	2	5
Service/Pool Vehicles	0	0	0	0	0	0	0
<b>Total Vehicles</b>	<b>21</b>	<b>33</b>	<b>21</b>	<b>24</b>	<b>23</b>	<b>27</b>	<b>25</b>
<b>Vehicle Costs (CNG)</b>							
Replacement Fixed Route	\$ 6,160,000	\$ 5,421,000	\$ 2,546,775	\$ 2,228,428	\$ 1,871,880	\$ 2,456,842	\$ 2,579,684
Replacement Paratransit	\$ -	\$ 1,600,000	\$ 1,236,000	\$ 1,612,568	\$ 1,660,945	\$ 1,800,814	\$ 1,391,129
Replacement Coach Buses	\$ 2,625,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Expansion	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 982,737	\$ 2,579,684
Service/Pool Vehicles	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Projected Vehicle Costs</b>	<b>\$ 8,785,000</b>	<b>\$ 7,021,000</b>	<b>\$ 3,782,775</b>	<b>\$ 3,840,996</b>	<b>\$ 3,532,825</b>	<b>\$ 5,240,393</b>	<b>\$ 6,550,497</b>
<b>Anticipated Funding Sources</b>							
FTA 5307 (80%)	\$ 3,740,000	\$ 5,616,800	\$ 3,026,220	\$ 3,072,797	\$ 2,826,260	\$ 4,192,314	\$ 5,240,398
State (Capital Assistance Grant) (15%)	\$ 748,000	\$ 1,053,150	\$ 567,416	\$ 576,149	\$ 529,924	\$ 786,059	\$ 982,575
Local/Other Grants (5%)	\$ 4,297,000	\$ 351,050	\$ 189,139	\$ 192,050	\$ 176,641	\$ 262,020	\$ 327,525
<b>Total Vehicle Revenues</b>	<b>\$ 8,785,000</b>	<b>\$ 7,021,000</b>	<b>\$ 3,782,775</b>	<b>\$ 3,840,996</b>	<b>\$ 3,532,825</b>	<b>\$ 5,240,393</b>	<b>\$ 6,550,497</b>

#### 7.4 OTHER CAPITAL COSTS AND FUNDING SOURCES

Other capital costs in this TDP include several major capital improvement projects, as well as ongoing capital expenses that occur on an annual basis. Major capital projects assumed to occur during the timeframe of this TDP and their identified costs and funding sources include:

- **CNG Retrofit Maintenance Facility/Add CNG Fueling Facility:** The cost to retrofit the maintenance facility is projected to be \$2,500,000. The cost to add a CNG fueling facility is projected to be \$6,000,000. This TDP assumes capital costs associated with this upgrade are initially incurred by the City of Richmond. GRTC will repay the city over a period of 20 years.
- **Broad Street BRT:** The BRT Scenario in this TDP assumes the Broad Street BRT project will begin in FY2015, with the total capital cost including vehicles projected to be \$70,000,000. This TDP assumes 50 percent of the funding will come from FTA 5309 small starts funding, and 50 percent will come from a local match.
- **Downtown Transit Center:** This TDP assumes a downtown transit center is built in FY2017; however, if GRTC obtains funding for this project prior to FY2017, future updates to this TDP will reflect changes to the opening year as needed. Funding for this project is assumed to come from a mixture of discretionary federal, state, and local sources. Future updates to this TDP will include any additional revenue sources that may arise for this project.

The BRT Scenario includes \$109,750,000 in major capital improvements over the six-year TDP timeframe. Of this total, \$73,950,000 is projected to come from local or other funding sources. The No BRT Scenario includes all of the major same capital improvements described above, minus the Broad Street BRT. In this scenario, major capital improvements total \$37,500,000 over the six-year TDP timeframe. Of this total, \$36,500,000 is projected to come from local or other funding sources.

Minor capital projects are those projects that GRTC budgets for on an annual basis. In FY2011, these costs included:

- **Preventative Maintenance:** In FY2011, preventative maintenance was budgeted to be \$5,400,000. This is projected to grow by 5.6 percent in FY2012 and one percent per year from FY2013 to FY2017 as provided in GRTC's Long Range Capital Plan. It is also worthy to note that without future funding for vehicles, these costs could increase as the fleet ages.
- **ADA Administration:** GRTC budgeted \$1,185,145 in FY2011 for ADA administration. This TDP assumes this amount will increase by one percent each year from 2012 to 2017, which is consistent with GRTC's Long Range Capital Plan.
- **Capital Cost of Contracting:** In FY2011, GRTC budgeted \$150,000 for capital cost of contracting. This TDP assumes this amount will remain constant during the timeframe of this TDP from FY2012 to FY2017.
- **Project Administration:** Project administration was budgeted at \$237,029 in FY2011. This amount is projected to grow by one percent each year during the timeframe of this TDP per GRTC's Long Range Capital Plan.

- **ADP Hardware:** In FY2011, GRTC budgeted \$75,000 for ADP hardware. This is projected to increase to \$80,000 in FY2012 and remain constant from FY2013 to FY2017 at \$80,000.
- **ADP Software:** GRTC budgeted \$275,000 for ADP Software in FY2011. This amount is projected to vary each year based on GRTC’s existing Long Range Capital Plan.
- **Miscellaneous Support Equipment:** In FY2011, GRTC’s budget included \$15,000 for miscellaneous support equipment. From FY2012 to FY2017, this amount is projected to be \$10,000 per year.
- **Transit Enhancements:** GRTC budgeted \$118,514 in FY2011 for transit enhancements. This amount is projected to increase by one percent each year from FY2012 to FY2017 as provided in GRTC’s Long Range Capital Plan.
- **Transit Security:** In FY2011, GRTC budgeted \$118,514 for Transit Security. This amount is projected to increase by one percent each year from FY2012 to FY2017, which is consistent with GRTC’s Long Range Capital Plan.
- **Management Training:** In FY2011, management training was budgeted at \$15,000. This amount is projected to remain steady at \$10,000 from FY2012 to FY2017.
- **Shop Tools and Equipment:** Shop Tools and Equipment are assumed to remain constant throughout the timeframe of this TDP at the FY2011 budget cost of \$50,000.

Funding sources for these capital items are assumed to come from Federal 5307 funds and State Capital Assistance Grants.

- **Federal 5307:** This TDP includes 5307 funds as identified on DRPT’s FY2012 State Transit Improvement Program (STIP) approved on July 18, 2011 which includes projected federal, state and local funding sources for capital projects. This TDP assumes GRTC will continue to receive Federal 5307 capital funds based on growth rates for FTA funds identified in DRPT’s SYIP. Thus, 5307 funds are projected to grow 2.6 percent in FY2013 and 2.0 percent each year after from FY2014 to FY2017.
- **New Freedom/JARC:** In FY2011, GRTC received New Freedom and JARC administrative funds in the amounts of \$56,000 and \$85,000 respectively. This TDP does not include additional funding from these sources in FY2012 through FY2017.
- **State Capital Assistance Grants:** State Capital Assistance Grants as identified in the STIP are assumed to be \$605,000 in FY2012. This amount is projected to increase/decrease each year based on the SYIP state capital assistance budget beginning in FY2013 by -1.7 percent, FY2014 by 3.5 percent, FY2015 by 5.7 percent, FY2016 by 3.6 percent, and FY2017 by 3.6 percent.

These recurring capital expenses are projected to be consistent in both the BRT and No BRT Scenarios. A total capital cost of \$49,982,429 is projected between FY2012 and FY2016. Of these funds, \$3,316,989 is projected to come from local or other funding sources.

**Tables 7-8 and 7-9** show the six-year capital improvement plan for both the BRT and Non BRT Scenarios.

**TABLE 7-8: TDP FINANCIAL PLAN FOR CAPITAL IMPROVEMENT PLAN – BRT SCENARIO (IN YEAR OF EXPENDITURE DOLLARS)**

TDP Financial Plan for:								
Capital Improvements	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	
<b>Major Capital Improvements</b>								
CNG Retrofit Maintenance Facility	\$ -	\$ -	\$ 2,500,000	\$ -	\$ -	\$ -	\$ -	\$ -
CNG Fueling Facility	\$ -	\$ -	\$ 6,000,000	\$ -	\$ -	\$ -	\$ -	\$ -
Modification of GRTC Facility	\$ -	\$ 1,250,000	\$ 0	\$ -	\$ -	\$ -	\$ -	\$ -
Broad Street BRT (Includes BRT Vehicles)	\$ -	\$ -	\$ -	\$ -	\$ 70,000,000	\$ -	\$ -	\$ -
DT Transfer Center	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 30,000,000
<b>Total Major Capital Expenses</b>	<b>\$ -</b>	<b>\$ 1,250,000</b>	<b>\$ 8,500,000</b>	<b>\$ -</b>	<b>\$ 70,000,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 30,000,000</b>
<b>Anticipated Funding Sources</b>								
<b>Federal</b>	<b>\$ -</b>	<b>\$ 800,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 35,000,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
5309 (Small Starts)	\$ -	\$ -	\$ -	\$ -	\$ 35,000,000	\$ -	\$ -	\$ -
Other Federal	\$ -	\$ 800,000	\$ 0	\$ -	\$ -	\$ -	\$ -	\$ -
<b>State</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>				
Capital Assistance Grant	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Local/Discretionary Grants</b>	<b>\$ -</b>	<b>\$ 450,000</b>	<b>\$ 8,500,000</b>	<b>\$ -</b>	<b>\$ 35,000,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 30,000,000</b>
<b>Total Major Capital Revenues</b>	<b>\$ -</b>	<b>\$ 1,250,000</b>	<b>\$ 8,500,000</b>	<b>\$ -</b>	<b>\$ 70,000,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 30,000,000</b>
<b>Projected Facility, Equipment, and Other Capital Improvements</b>								
Preventive Maintenance	\$ 5,400,000	\$ 5,700,000	\$ 5,754,678	\$ 5,812,224	\$ 5,870,347	\$ 5,929,050	\$ 5,988,341	\$ -
ADA Administration	\$ 1,185,145	\$ 1,196,996	\$ 1,208,966	\$ 1,221,056	\$ 1,233,266	\$ 1,245,599	\$ 1,258,055	\$ -
Capital Cost of Contracting *	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000
Project Administration	\$ 237,029	\$ 239,399	\$ 241,793	\$ 244,211	\$ 246,653	\$ 249,120	\$ 251,611	\$ -
ADP Hardware *	\$ 75,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000
ADP Software *	\$ 275,000	\$ 275,000	\$ 410,174	\$ 402,333	\$ 822,449	\$ 472,572	\$ 465,750	\$ -
Miscellaneous Support Equipment *	\$ 15,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000
Transit Enhancements *	\$ 118,514	\$ 119,700	\$ 120,897	\$ 122,106	\$ 123,327	\$ 124,560	\$ 125,805	\$ -
Transit Security *	\$ 118,514	\$ 119,700	\$ 120,897	\$ 122,106	\$ 123,327	\$ 124,560	\$ 125,805	\$ -
Management Training	\$ 15,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
Shop Tools & Equipment *	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000
CNG Facility - Payment to City	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Projected Capital Expenses</b>	<b>\$ 7,639,202</b>	<b>\$ 7,945,794</b>	<b>\$ 8,152,404</b>	<b>\$ 8,219,035</b>	<b>\$ 8,714,368</b>	<b>\$ 8,440,460</b>	<b>\$ 8,510,368</b>	<b>\$ -</b>
<b>Anticipated Capital Funding Sources</b>								
<b>Federal</b>	<b>\$ 6,622,000</b>	<b>\$ 6,755,000</b>	<b>\$ 6,931,579</b>	<b>\$ 7,070,211</b>	<b>\$ 7,211,615</b>	<b>\$ 7,355,847</b>	<b>\$ 7,502,964</b>	<b>\$ -</b>
FTA 5307	\$ 6,481,000	\$ 6,755,000	\$ 6,931,579	\$ 7,070,211	\$ 7,211,615	\$ 7,355,847	\$ 7,502,964	\$ -
CMAQ	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New Freedom	\$ 56,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
JARC	\$ 85,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>State**</b>	<b>\$ 620,000</b>	<b>\$ 605,000</b>	<b>\$ 594,634</b>	<b>\$ 615,729</b>	<b>\$ 650,562</b>	<b>\$ 674,005</b>	<b>\$ 698,294</b>	<b>\$ -</b>
Capital Assistance Grant	\$ 620,000	\$ 605,000	\$ 594,634	\$ 615,729	\$ 650,562	\$ 674,005	\$ 698,294	\$ -
<b>Local/Discretionary Grants</b>	<b>\$ 397,202</b>	<b>\$ 585,794</b>	<b>\$ 626,191</b>	<b>\$ 533,095</b>	<b>\$ 852,192</b>	<b>\$ 410,608</b>	<b>\$ 309,110</b>	<b>\$ -</b>
<b>Total Other Capital Revenues</b>	<b>\$ 7,639,202</b>	<b>\$ 7,945,794</b>	<b>\$ 8,152,404</b>	<b>\$ 8,219,035</b>	<b>\$ 8,714,368</b>	<b>\$ 8,440,460</b>	<b>\$ 8,510,368</b>	<b>\$ -</b>

**TABLE 7-9: TDP FINANCIAL PLAN FOR CAPITAL IMPROVEMENTS - NO BRT SCENARIO (IN YEAR OF EXPENDITURE DOLLARS)**

TDP Financial Plan for:								
Capital Improvements	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	
<b>Major Capital Improvements</b>								
CNG Retrofit Maintenance Facility	\$ -	\$ -	\$ 1,250,000	\$ -	\$ -	\$ -	\$ -	\$ -
CNG Fueling Facility	\$ -	\$ -	\$ 6,000,000	\$ -	\$ -	\$ -	\$ -	\$ -
Paratransit Parking Facility	\$ -	\$ -	\$ 250,000	\$ -	\$ -	\$ -	\$ -	\$ -
Broad Street BRT (Includes BRT Vehicles)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
DT Transfer Center	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 30,000,000
<b>Total Major Capital Expenses</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 7,500,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 30,000,000</b>
<b>Anticipated Funding Sources</b>								
<b>Federal</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 1,000,000</b>	<b>\$ -</b>				
5309 (Small Starts)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Other Federal	\$ -	\$ -	\$ 1,000,000	\$ -	\$ -	\$ -	\$ -	\$ -
<b>State</b>	<b>\$ -</b>							
Capital Assistance Grant	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Local/Discretionary Grants</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 6,500,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 30,000,000</b>
<b>Total Major Capital Revenues</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 7,500,000</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 30,000,000</b>
<b>Projected Facility, Equipment, and Other Capital Improvements</b>								
Preventive Maintenance	\$ 5,400,000	\$ 5,700,000	\$ 5,754,678	\$ 5,812,224	\$ 5,870,347	\$ 5,929,050	\$ 5,988,341	\$ 5,988,341
ADA Administration	\$ 1,185,145	\$ 1,196,996	\$ 1,208,966	\$ 1,221,056	\$ 1,233,266	\$ 1,245,599	\$ 1,258,055	\$ 1,258,055
Capital Cost of Contracting *	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000	\$ 150,000
Project Administration	\$ 237,029	\$ 239,399	\$ 241,793	\$ 244,211	\$ 246,653	\$ 249,120	\$ 251,611	\$ 251,611
ADP Hardware *	\$ 75,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000
ADP Software *	\$ 275,000	\$ 275,000	\$ 410,174	\$ 402,333	\$ 822,449	\$ 472,572	\$ 465,750	\$ 465,750
Miscellaneous Support Equipment *	\$ 15,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000
Transit Enhancements *	\$ 118,514	\$ 119,700	\$ 120,897	\$ 122,106	\$ 123,327	\$ 124,560	\$ 125,805	\$ 125,805
Transit Security *	\$ 118,514	\$ 119,700	\$ 120,897	\$ 122,106	\$ 123,327	\$ 124,560	\$ 125,805	\$ 125,805
Management Training	\$ 15,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
Shop Tools & Equipment *	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000
CNG Facility - Payment to City	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total Projected Capital Expenses</b>	<b>\$ 7,639,202</b>	<b>\$ 7,945,794</b>	<b>\$ 8,152,404</b>	<b>\$ 8,219,035</b>	<b>\$ 8,714,368</b>	<b>\$ 8,440,460</b>	<b>\$ 8,510,368</b>	<b>\$ 8,510,368</b>
<b>Anticipated Capital Funding Sources</b>								
<b>Federal</b>	<b>\$ 6,622,000</b>	<b>\$ 6,755,000</b>	<b>\$ 6,931,579</b>	<b>\$ 7,070,211</b>	<b>\$ 7,211,615</b>	<b>\$ 7,355,847</b>	<b>\$ 7,502,964</b>	<b>\$ 7,502,964</b>
FTA 5307	\$ 6,481,000	\$ 6,755,000	\$ 6,931,579	\$ 7,070,211	\$ 7,211,615	\$ 7,355,847	\$ 7,502,964	\$ 7,502,964
CMAQ	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New Freedom	\$ 56,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
JARC	\$ 85,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>State</b>	<b>\$ 620,000</b>	<b>\$ 605,000</b>	<b>\$ 594,634</b>	<b>\$ 615,729</b>	<b>\$ 650,562</b>	<b>\$ 674,005</b>	<b>\$ 698,294</b>	<b>\$ 698,294</b>
Capital Assistance Grant	\$ 620,000	\$ 605,000	\$ 594,634	\$ 615,729	\$ 650,562	\$ 674,005	\$ 698,294	\$ 698,294
<b>Local/Discretionary Grants</b>	<b>\$ 397,202</b>	<b>\$ 585,794</b>	<b>\$ 626,191</b>	<b>\$ 533,095</b>	<b>\$ 852,192</b>	<b>\$ 410,608</b>	<b>\$ 309,110</b>	<b>\$ 309,110</b>
<b>Total Other Capital Revenues</b>	<b>\$ 7,639,202</b>	<b>\$ 7,945,794</b>	<b>\$ 8,152,404</b>	<b>\$ 8,219,035</b>	<b>\$ 8,714,368</b>	<b>\$ 8,440,460</b>	<b>\$ 8,510,368</b>	<b>\$ 8,510,368</b>

## 8.0 TDP MONITORING AND EVALUATION

This TDP presents a comprehensive evaluation of GRTC's service and cost characteristics. Key elements that have been addressed in this TDP include:

- Development of goals, objectives and performance standards that guide further development of GRTC services;
- A detailed evaluation of existing service characteristics, with identification of system strengths and weaknesses;
- A peer agency review that compares GRTC's service and financial characteristics to other similar-sized systems;
- A summary of rider survey results from a transit on-board survey conducted in October 2009;
- A listing of potential service and facility improvements for consideration in the TDP;
- Recommended service changes and capital improvements for inclusion in the TDP, identified by year; and
- Funding requirements and potential funding sources for recommended service improvements and vehicle purchases.

This TDP reflects an initial step in future service improvements for GRTC. It will be important to coordinate closely with other transportation and land use planning efforts, to continue to monitor service performance, and to provide DRPT with annual updates regarding implementation of TDP service and facility improvements.

### 8.1 COORDINATION WITH OTHER PLANS AND PROGRAMS

Goals and objectives from this TDP should be reviewed and incorporated into the City of Richmond's Comprehensive Plan and its annual budget process. Coordination with Henrico and Chesterfield Counties, as well as with VCU should continue as GRTC implements recommendations in the TDP. Coordination efforts should also continue with the Richmond Area Metropolitan Planning Organization (RAMPO). The service plans set forth in this TDP should be included in the Long Range Transportation Plan (LRTP) and short-range three-year Transportation Improvement Program (TIP). GRTC should also continue dialogue with regional stakeholders to address transit needs throughout the greater Richmond area.

As mentioned in previous chapters of this TDP, several corridors are in the process of being studied in the Richmond region for future transit service. These include the Broad Street BRT and Route 5 Corridor studies. As these and other studies progress, GRTC should continue to monitor the study findings as they relate to the TDP recommendations and make adjustments as needed in the annual update letter to ensure consistency among the various plans.

## 8.2 SERVICE PERFORMANCE AND MONITORING

This TDP identifies specific systemwide service performance benchmarks to ensure GRTC's existing performance characteristics do not degrade substantially. This TDP recommends a monitoring program that could be used for periodic service evaluation as described in **Chapter 2**. In addition to regular reviews, these measures should be reviewed anytime a significant change to a route is planned. Corrective measures are to be taken if these monitoring efforts identify service performance degradation (e.g., through route alignment adjustments, headway and/or span of service adjustments). Performance measures included in **Chapter 2** include the following categories:

- **Service Coverage:** GRTC should continue to monitor service availability, service frequency, span of service, and directness/routing.
- **Patron Convenience:** Patron convenience standards recommended in this TDP include the speed the route travels, maximum loading standards, bus stop standards and service reliability.
- **Fiscal Condition:** Fiscal condition standards at the systemwide and individual route level basis should be monitored through the farebox recovery ratio and productivity measures such as passengers per vehicle hour.
- **Passenger Comfort:** Passenger comfort measures, which include bus stop amenities, access to information, and a clean, well maintained fleet, should continue to be measured through customer satisfaction surveys.

GRTC should also continue to monitor the performance of the CARE service and utilize the existing CARE Advisory Committee as a resource to continue to improve operational efficiency and customer service standards.

Finally, with any service modification, GRTC should address impacts to disadvantaged populations, including minority, disabled, and senior residents as well as low income households as needed through Title VI requirements.

## 8.3 ANNUAL TDP MONITORING

The DRPT requires submittal of an annual letter that provides updates to the contents of this TDP. Recommended contents of this "TDP Update" letter include:

- A summary of ridership trends for the past 12 months.
- A description of TDP goals and objectives that have been advanced over the past 12 months.
- A list of improvements (service and facility) that have been implemented in the past 12 months, including identification of those that were noted in this TDP.
- An update to the TDP's list of recommended service and facility improvements (e.g., identify service improvements that are being shifted to a new year, being eliminated, and/or being added). This update of recommended improvements should be extended one more fiscal year to maintain a six-year planning period.
- A summary of current year costs and funding sources.
- Updates to the financial plan table presented in **Chapter 7** of this TDP. This table should be extended one more fiscal year to maintain a six-year planning period.