

KFH GROUP, INC.

Transit Service Plan for City of Radford/ Radford University

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Chapter 1

Introduction and Background

INTRODUCTION

In early 2008, discussions between key community stakeholders in Radford resulted in a request to the Virginia Department of Rail and Public Transportation (DRPT) for consultant assistance to determine the feasibility of public transportation in Radford, and if found feasible, to develop a transit service plan for the City of Radford and Radford University. Currently, community transportation services in Radford are limited to the Tartan Transit services operated by the University for students, faculty, and staff, and specialized Community Transit services operated by New River Valley Community Services in support of their community-based programs.

This *City of Radford/Radford University Transit Service Plan* documents the transportation needs identified during the study, provides a review of the Tartan Transit and Community Transit services as well as other transit providers in the region, details potential alternatives for transit services, reviews possible organizational structures, and discusses options for funding transit services. This document concludes with a conceptual plan that provides local decision-makers with the information needed for developing an application to DRPT for funds for Fiscal Year 2011, for implementing services to meet mobility needs in the area, and for responding to issues that will need to be addressed before transit services begin operating.

This study consists of six chapters, with this first chapter providing background information on the planning process. The second chapter examines transportation needs, and includes current demographics and land uses as well as the results from surveys conducted through the City and the University. The third chapter reviews existing transportation resources and details the services offered by local providers. Based on the transportation needs assessment and review of existing transportation resources, alternatives to serve the transportation needs of City residents and Radford University students, faculty, and staff are detailed in Chapter 4. This chapter also

includes possible options for funding transit services in Radford. In Chapter 5, potential short-term and long-term organizational options are discussed. The conceptual plan is detailed in Chapter 6.

BACKGROUND

The process for development of the *City of Radford/Radford University Transit Service Plan* began with a meeting with the City of Radford Public Transit Committee that was formed before the study was initiated. This committee served as the Advisory Committee throughout the planning process, and reviewed and provided comments on interim reports as well as the final plan. An Advisory Committee roster can be found in Appendix A.

From the initial meeting with the Committee, the following goals for transit services were determined to help shape the planning process:

- Connect Radford University students to internal and off-campus destinations outside walking distance; and connect City of Radford residents to area locations and services.
- Support City of Radford’s desire to “go green” and reduce the number of cars on the road and Radford University’s ambition to be a “green” campus.
- View transportation services from a regional perspective.
- Engage and involve the community in the transportation planning process.
- Identify organizational arrangement options for the City of Radford and Radford University to consider for the management of transportation services.
- Provide easy access to information on available mobility options.
- Provide transportation services in support of economic development.

Specific objectives related to these goals are located in Appendix B.

The transportation needs assessment involved both an analysis of population and land use data and input provided by area stakeholders and the public to develop a solid understanding of the travel needs of current and potential transit riders that live in and travel to the City of Radford. The demographic analysis identified underserved

and unserved populations in the region, as well as major trip generators. A key component of the needs assessment involved two surveys – one distributed to City residents and another distributed through the University to the University community. The results of these surveys are detailed in Chapter 2.

The review of current transportation resources included the current Tartan Transit and Community Transit services. In addition, services in adjacent Blacksburg and Pulaski County were reviewed to gain a better understanding of these services and gauge their possible interest in the provision of future services in Radford. This review included one-on-one interviews to acquire important insight into the current transportation providers.

From the transportation needs assessment and analysis of current services and providers, a series of service alternatives were developed that could be implemented to meet identified needs. Conceptual routes were presented to the Radford Public Transit Committee, and based on the input from the Committee, further defined for inclusion in this plan in Chapter 4. The planning process included an analysis of the possible organizational structures for operating these routes, as well as which entity could serve as the applicant for Federal and State funding programs to support public transit services. The advantages and disadvantages of these options are detailed in Chapter 5. Chapter 6 presents the conceptual plan for the Committee’s preferred network. Included is a first-year budget and timeline highlighting the application schedule to DRPT as well as an implementation schedule. Subsequent to this process, the City, University, and other community stakeholders will need to collectively make the decisions on who administers a public transit program in Radford and who operates the services.

Chapter 2

Needs Assessment

INTRODUCTION

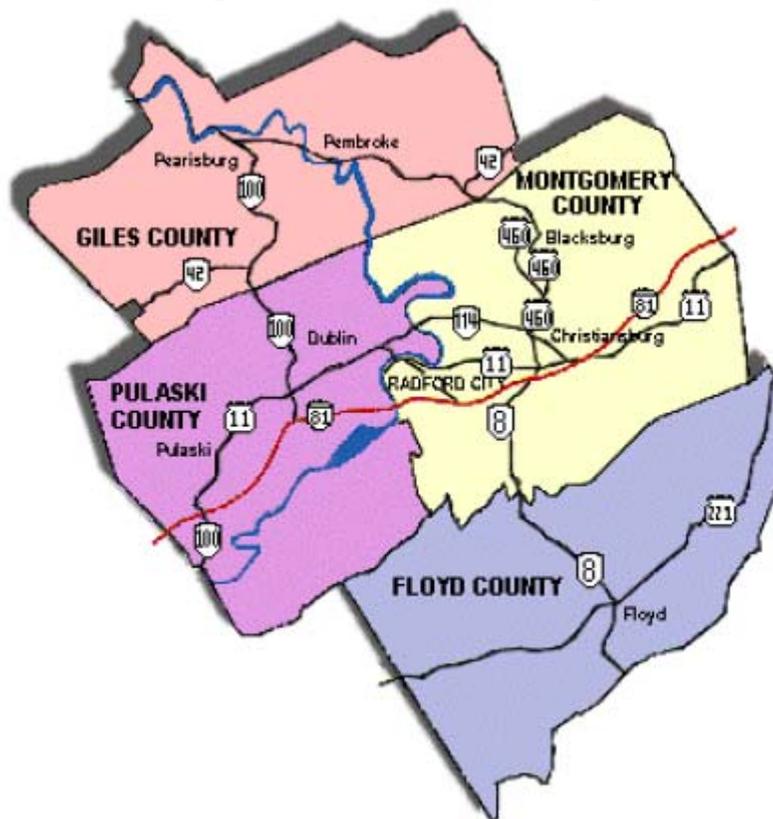
The purpose of this chapter is to provide a transit needs assessment which analyzes quantitative population and land use data, along with qualitative data provided by area stakeholders and the public, to develop a solid understanding of the travel needs of current and potential transit riders that live in and travel to the City of Radford. This needs assessment incorporates information gathered from the City and Radford University, other relevant plans conducted in the region, the U.S. Census, interviews with local stakeholders, and surveys. The needs assessment process includes a demographic analysis to identify underserved and unserved populations in the region, as well as major trip generators to help analyze and evaluate the transportation needs specific to the City and Radford University.

Figure 2-1 portrays Radford in the context of the New River Valley, which is one of 21 planning district commissions in the Commonwealth of Virginia. Radford is located in the central part of the region, surrounded by Pulaski and Montgomery Counties. Radford University is a major institution located in the eastern part of the City and provides education and employment opportunities for the City and the region.

REVIEW OF RECENT PLANS

An initial step in the needs assessment process involved reviewing previous plans and studies conducted in Radford and the surrounding areas. In particular, this assessment included a review of the results of a transportation study completed as part of Radford University's Campus Master Plan, the New River Valley Coordinated Human Service Mobility Plan, the Employment Mobility study prepared by the New River Valley Planning District Commission (PDC) for the Virginia Department of

Figure 2-1: New River Valley



Source: New River Valley Planning District Commission, Hazard Mitigation Plan, <http://www.nrvpdc.org/HazardMitigationPlan/FinalPlan/HMP%20Section%20a%20New%20River%20Valley%20Background.pdf> (accessed August 20, 2009).

Transportation (VDOT), and the Radford University-Roanoke Higher Education Center Transit Survey. Comprehensive plans for the City of Radford and surrounding jurisdictions, as well as transportation plans for the City and the Blacksburg-Christiansburg-Montgomery County Metropolitan Planning Organization (MPO), were also reviewed. This review provides important insight into the needs assessments and development of proposed services that has already been conducted to date. This transit service plan will build upon previous work and consider existing analyses and proposals in developing recommendations for comprehensive transit service to meet the City and Radford University's needs.

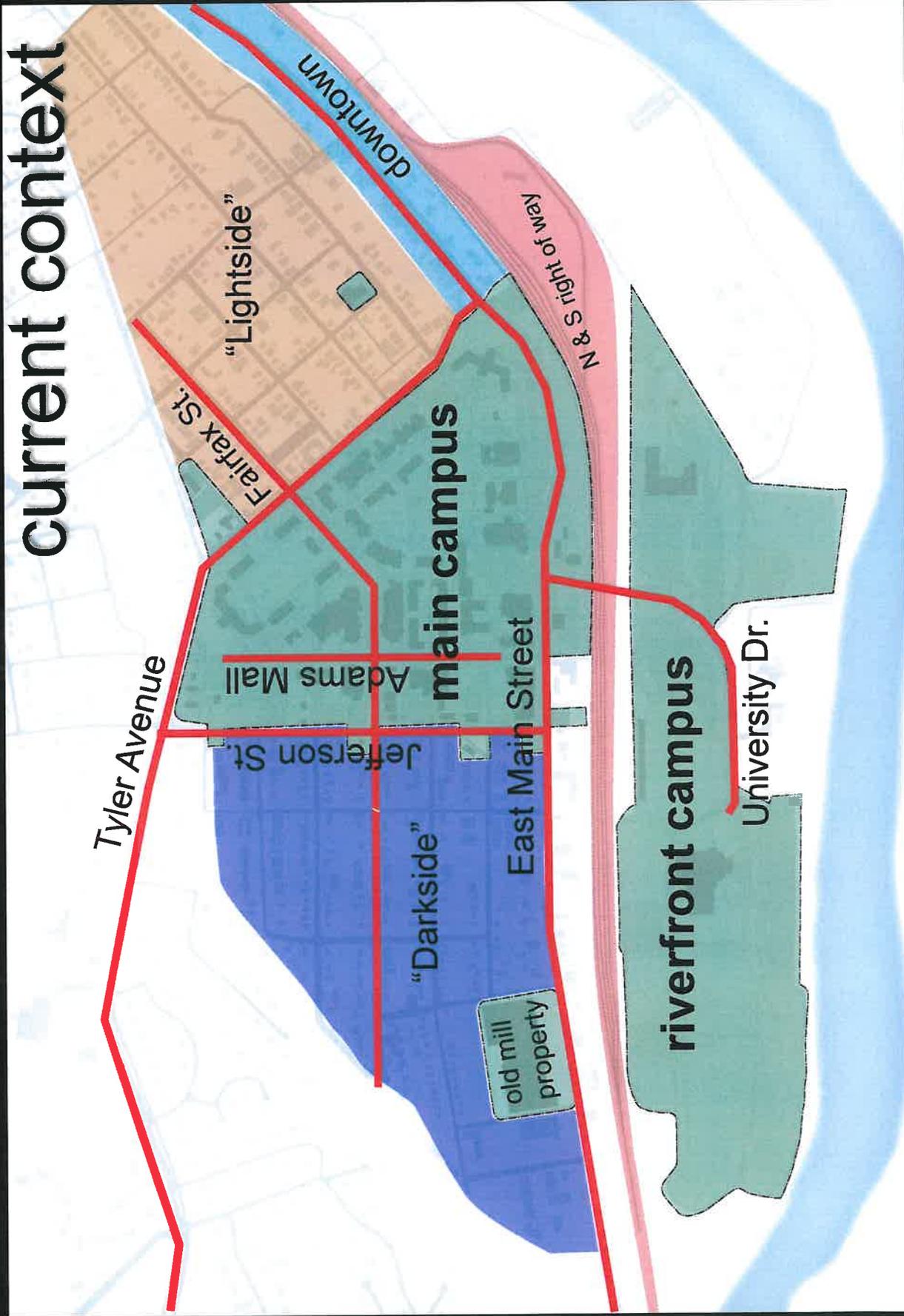
Radford University Campus Master Plan 2008-2018 – Transit and Parking Study

Completed in early 2009, the Radford University Campus Master Plan outlined a plan for long-term development at the University between 2008 and 2018.¹ Significant new construction is planned over this period, including a College of Business and Economics, a new student fitness center and athletics fields, and residence halls. The study determined a number of factors about the campus that contribute to a need for alternative transportation options:

- Parking is perceived as a major issue. Oversell rates are very high for convenient parking on the main campus. The riverfront campus has ample parking, but it is perceived as distant and inconvenient.
- The existing shuttle service needs enhancements and re-engineering.
- The campus is compact and highly walkable, but the distance to the river campus is perceived as far due to Main Street and the railroad.
- Land is at a premium, and available land on the campus will soon be built out.
- The City of Radford and Radford University should plan jointly on several issues including transportation.

Exhibit 2-1 displays a map of the Radford University campus that is segmented into different areas. The Campus Master Plan included a transit and parking study, which conducted a transportation survey for students, recommended transit routes to serve the campus, and identified parking issues. The recommendations for transit services are described below. The Plan also recommended developing a transit mall, called “La Rambla,” which would be located along Fairfax Street between Jefferson Street and Tyler Avenue. This transit mall would accommodate multiple modes including transit, pedestrians, and bikes, and would connect the East and West sides of campus. The transit mall is planned for development between 2011 and 2013.

¹ The Campus Master Plan was developed by Hanbury Evans Wright Vlattas + Company, an architecture and planning firm. Martin/Alexiou/Bryson, PLLC was part of the consultant team and conducted the transportation and parking study. A copy of the Campus Master Plan Powerpoint was received from Jo Ann Kiernan, Special Assistant to the President, at Radford University via email communication on July 8, 2009.



current context

In the Spring of 2008, Radford University conducted a transportation survey in conjunction with the University's Campus Master Plan. The survey was extensive, with 49 questions covering a variety of transportation-related issues, and was segmented between four groups – faculty, staff, undergraduate students, and graduate students.² Included in the summary report of survey results, the following issues, grouped by category, were relevant to transportation needs and transit service development:

Tartan Transit

- Tartan Transit is used by only a minority of students, and very few faculty/staff. For undergraduate students, only 7% reported using the service on most weekdays, 33% on an occasional basis, and 60% never using the service. Use of the service was even less with the other three groups surveyed. None reported occasional use of the service, and 90% of graduate students, 89% of staff, and 95% of faculty reporting never using the service.
- When asked why they didn't use the service, across all four groups of people non-riders mainly said it is faster and easier to walk. The summary noted this may reflect the type of trips they make (such as short hops between campus buildings) as much as the service itself. The report noted that also unfamiliarity with the schedule is a significant issue, with some people unaware of the service beyond simply a hazy awareness that it exists.
- Undergraduates mainly use Tartan Transit to get from main campus to the Dedmon Center, and to get from parking lots to campus. Smaller but still significant numbers use it to commute from home (in Hunters Ridge) or to go shopping (likely on the dedicated shopping route). Another small but significant number indicated that they ride the bus to save money – this is likely in lieu of using a car to make these trips.
- Although the shuttle's user community is a minority of students, those who do ride the shuttle appreciate it enough to request additional service – more often, at more times, and to more places.
- When asked for additional locations that the shuttle should serve, there was strong demand for a shuttle service around nearby neighborhoods, particularly at night and weekends. Respondents suggested this service

² Martin/Alexiou/Bryson, PLLC prepared the survey results and wrote a summary memorandum, dated May 14, 2008. These materials were also received from Ms. Kiernan, Radford University, via email communication on July 8, 2009.

- ideally run through between the East and West sides of campus rather than being a separate shuttle on each side.
- There was also strong interest in having the Campus Loop route serve the entire campus, and for service to Blacksburg and Christiansburg, particularly for shopping, but also for leisure and for onward transit links.
 - From a service standpoint, punctuality and reliability were identified as major concerns. The study noted that further investigation is needed to determine the actual causes, but speculated there may be a specific problem with buses missing stops, and that recommended service performance be measurable and accountable.
 - Overall, the survey results pointed to a transit system that is operating a fixed-route service with the informal 'look and feel' of a curb-to-curb demand-responsive service, and this was currently an unsatisfactory combination for riders. The report recommended that Radford University begin to formalize the service, improve information, and gradually increase quality, while retaining the friendly nature that riders appreciate.
 - Other recommended short-term improvements included buses operating to an advertised schedule that is widely available and posted at stops, buses with destination displays, and stops marked with signs, lighting and schedule information.

Where People Live

- Undergraduates living in Radford are by far the largest single commuter market. Eight-five percent of undergraduate respondents live on campus or in Radford.
- There are significant commuter markets in Blacksburg and Christiansburg (mainly faculty and graduates), and in Dublin and Pulaski (mainly staff).

When People Travel to/from Campus

- The survey summary report noted that potential commuter transit services should have operating hours that match the needs of the target market, and suggested that for staff, peak-only services are likely to be sufficient, and for services targeted at other categories a longer service period, and ideally all-day service, should be provided.

- Most people rarely or never have ‘linked trips’ (additional trips such as errands or shopping, made on the way to/from campus). Over two-thirds of respondents reported no additional stops on the way to campus. The summary report noted that the need to leave campus during the day is probably a greater barrier to use of alternative modes than the need to make side-trips on the way to or from the campus.

Current Method of Commuting to Campus

- Employee travel is dominated by driving alone (94%). About 2-3% share a ride, and another 3% walk. Use of other modes is negligible.
- Graduate commuter students are similar to employees, although slightly less extreme. The majority of undergraduate commuters drive alone (57%), although a large proportion (34%) walks.
- Undergraduates are the only ones who commute using Tartan Transit in any numbers.
- The summary report noted that given the current low use of alternative modes and the number of employees (in particular) who live within Radford, there is substantial opportunity to increase the use of walking, cycling, and transit.

Night-Time Travel and Safety

- The numbers feeling unsafe on campus at night are very substantial. About half of the campus community feels unsafe walking off-campus at night.
- The summary report noted specific problems with pedestrian safety along Tyler Avenue and Jefferson Street (poor lighting making it difficult to see and be seen by vehicles), and with security along the walking route across the bridge to Dedmon and the parking lots.
- There is strong support for a night transit service, with lighted, blue phone equipped bus shelters being the single most requested attribute. However, when asked how much extra they were willing to pay for a dedicated night transit service, there was very little willingness to pay additional fees in order to have such a service. Eighty-eight percent of faculty, 87% of staff, 76% of graduate students, and 67% of undergraduate students responded that they would not be willing to pay an extra fee.

Future Transportation Planning

- The survey noted that there would be increased demand for parking on the main campus as the University grew, and provided respondents with three options:
 - Replace the spaces that are lost with a new 1,000 space parking deck on the main campus. Each parking permit will cost three to four or more times the current amount per year to pay for this deck.
 - Replace the spaces that are lost with new parking lots near the Dedmon Center (with shuttle service to the main campus). Each parking permit will cost at least double the current costs per year to pay for these lots.
 - Don't replace the spaces, but institute a "sustainable transportation" student fee to provide/encourage alternative modes of transportation instead.
- Faculty and staff were split between the deck option and the transportation fee option, with shuttle lots being the least popular option for both groups. A majority of both undergraduates and graduates favored the deck.
- The summary report noted that the relatively high level of faculty/staff support for a transportation fee probably does not reflect a major sustainability consciousness, but more likely a sense that students would be paying the fee and an assumption that faculty parking would be unaffected by efforts targeted at students.
- Overall, the summary report noted there was most support for convenient deck parking, even at a high cost, but speculated that some people would likely use a cheaper shuttle parking option as an alternative to the expensive on-campus permits.
- The survey noted that in the future parking on the campus may be limited or need to be discouraged. The survey results indicated the majority of the campus community is receptive to all four of the following measures:
 - Freshmen residents should not be allowed to bring their cars to campus.
 - If parking demand exceeds supply, permit fees should be raised to the 'market rate' where demand matches supply.
 - People living off-campus within two or three blocks of the campus should not be allowed to park on-campus.
 - People should be offered the option of more expensive parking close-in or cheaper parking further out.

- The only issue with these is that staff members were mostly opposed to market-rate parking. The summary report speculated that this concern may be addressed by offering some or all staff a discounted rate or a ‘transportation allowance’ that could be used to contribute to parking fees or any other commuting costs.

General Comments

- At the end of the survey, respondents were provided an opportunity to provide any additional comments or suggestions. The survey summary noted that there were many comments on the need to travel off-campus for school-related programs (internship, student teaching, nursing clinical, etc.), concern with the aesthetic impact of a parking deck, and also with the overall effect of buildings and growth on the “small campus” environment, and concerns that too many parking permits are sold for the spaces available.

Taking into consideration the results of the survey, the consultants for the transit component of the Campus Master Plan prepared a report, *Radford University Transit Opportunities*.³ The report documented existing transit resources and identified future local and regional transit opportunities. Two routes were recommended as local circulators within the City (see Exhibit 2-2):

- The Brown Route would replicate the City Loop, currently provided by Radford University, and provide access to Main Street and Fairlawn.
- The Red Route would provide service between the residential area in the western part of the City to Radford University, with fixed stops on Main Street and at Radford University and stops by request on the residential end of the route.

Three routes were recommended to serve Radford University (see Exhibit 2-3):

- The recommended Campus Loop would essentially upgrade the existing service by adding an additional bus.
- The Dark Side Shuttle would be a new service to residential areas on the eastern side of the campus, including a connection to the Campus Loop.

³ Martin/Alexiou/Bryson, PLLC prepared this report, dated July 25, 2008. A copy of the report was received from Ms. Kiernan via email communication on July 8, 2009.

Exhibit 2-2: City of Radford Local Circulators and Campus Transit Opportunities

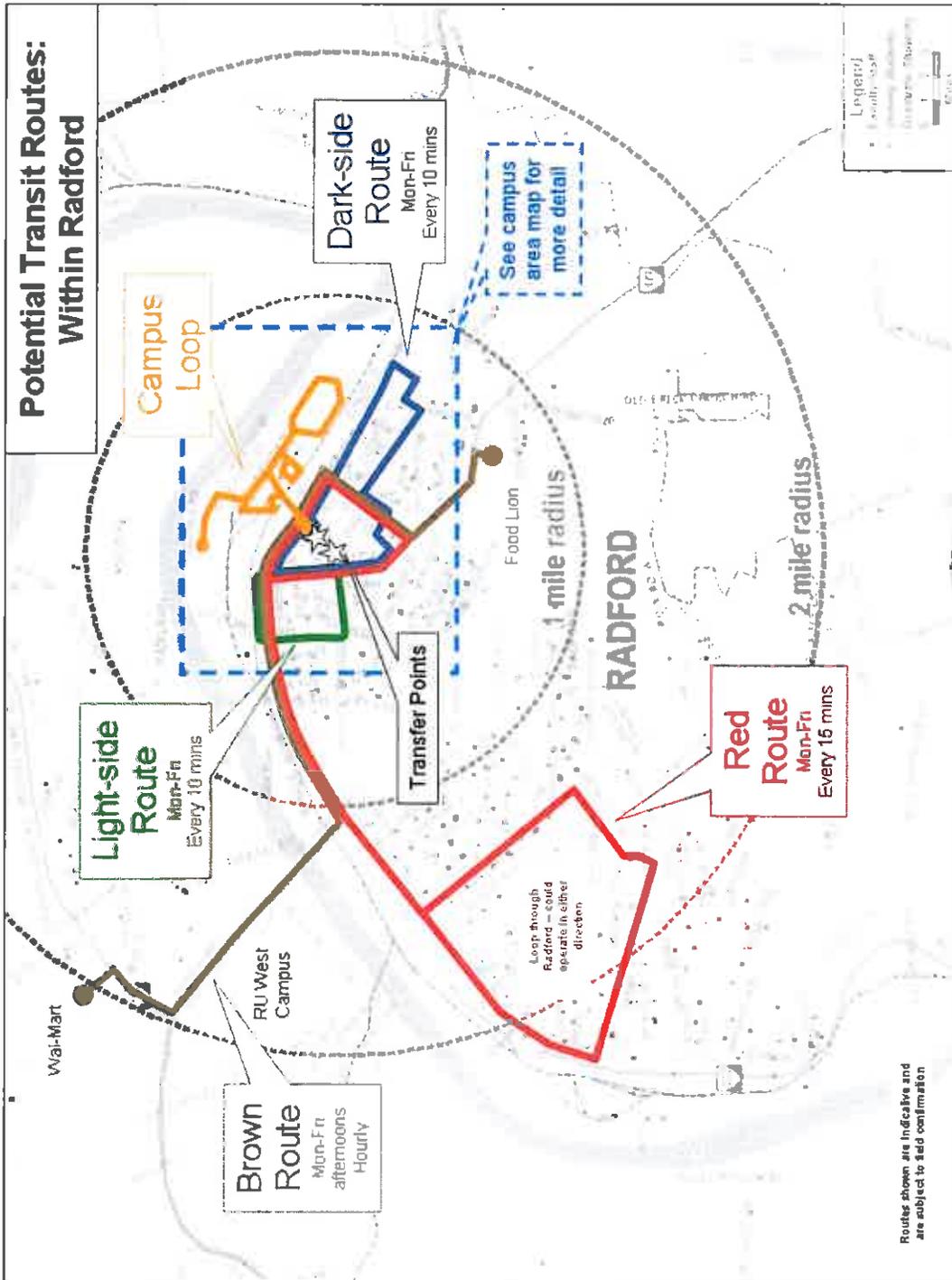
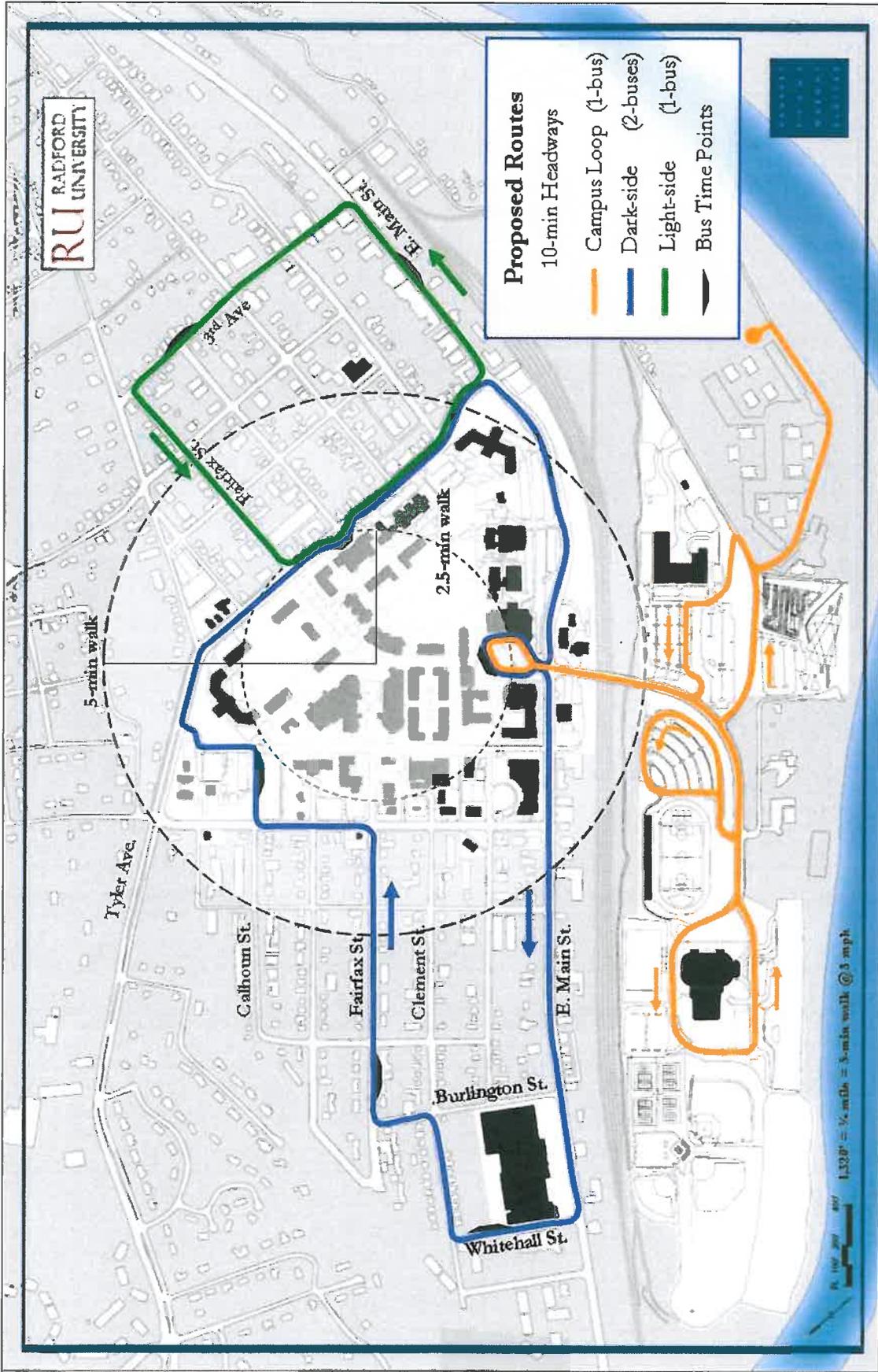


Exhibit 2-3: Radford University Transit Opportunities



- The Light Side Shuttle would be a new service to residential areas west of the campus, with a connection to the Dark Side Shuttle. This route was lower priority though because walking distances from these residential areas to campus are quite short.

In addition, two regional routes were recommended (see Exhibit 2-4):

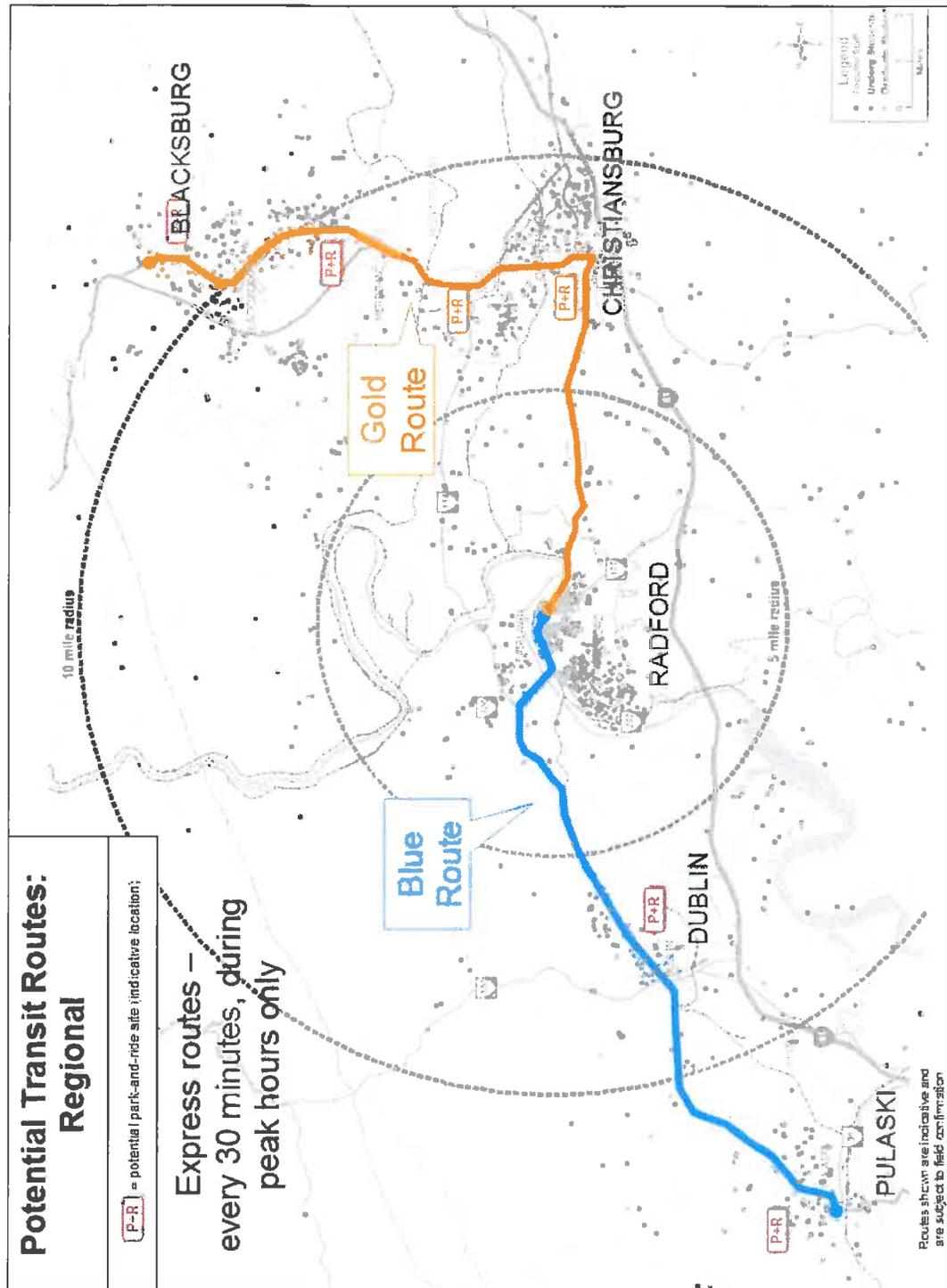
- The Gold Route would provide service between Radford, Christiansburg, and Blacksburg, traveling along US-11 and Business-460. Informal park and ride locations would serve as stops, and stops in each town would ideally be limited in order to minimize total trip times. A direct Radford to Blacksburg service may be feasible in the future if this proposed route is successful.
- The Blue Route would provide service between Radford, Dublin, and Pulaski, traveling along US-11. Again, informal park and ride locations would likely serve as stops. University commuting is the primary market, though non-University shopping trips and service to New River Community College in Dublin are additional opportunities.

The identified potential transit routes were prioritized, with the campus routes as the relative highest priorities, then the City Routes, and then the regional routes. The target market, service pattern, type of vehicle, type of service, estimated round trip distance, and route characteristics were also outlined for each potential route. These alternatives will be considered further later in the service development process for this plan.

New River Valley Coordinated Human Service Mobility (CHSM) Plan

In 2008, the Virginia Department of Rail and Public Transportation (DRPT) undertook the development of CHSM Plans for rural and small urban areas of the Commonwealth to meet new federal coordinated planning requirements for the Federal Transit Administration's (FTA) Section 5310 (Elderly Individuals and Individuals with Disabilities), Section 5316 (Job Access and Reverse Commute - JARC), and Section 5317 (New Freedom) Programs. The CHSM Plans were organized geographically around 21 PDCs throughout the Commonwealth. This CHSM Plan for the New River Valley Planning District (PDC 4) includes the City of Radford as well as Floyd, Giles, Montgomery, and Pulaski Counties. While the New River Valley CHSM Plan was regional in nature, increased mobility options including public transit services in the City of Radford was identified as a specific need in the plan.

Exhibit 2-4: Potential Regional Routes in the New River Valley



Employment Mobility Study

In January 2009, the New River Valley PDC completed an Employment Mobility Study for VDOT, which was funded under the Multimodal Planning Grant Program.⁴ This 18-month study aimed to “develop a vision for rural transportation within the New River Valley.” The study conducted two surveys, a Park and Ride survey and an Employee survey, to assess regional commuting patterns, barriers to transportation, and potential solutions. A local stakeholders group, consisting of representatives from the region’s existing transportation providers, government officials, transportation experts, and Human Resource managers from local employers, provided input and guidance throughout the study. The PDC also received grant funds from the Transportation and Housing Alliance (THA) Toolkit Program, a statewide initiative that seeks to coordinate housing and transportation planning, to develop maps of the region’s “disabled, aging, and low-income populations” and points of interest, including employment centers and medical facilities.⁵

The results of the surveys indicate that employees in the region are interested in carpools and public transportation. The Park and Ride survey showed that the majority of people used park and ride lots to commute during the work week, and most commuted to Salem and Roanoke via the Smart Way Bus. Eighty percent of the respondents also indicated that they would be interested in public transportation if additional options were available. The Employee Survey targeted a broader audience of employees across the region to identify commuting patterns, transportation barriers, potential solutions, and basic demographics. This survey received 900 responses. Though more than half of respondents lived in Montgomery County, a notable portion represented Radford residents as well. The survey results indicated that most morning commutes occurred between 7:00 a.m. and 10:00 a.m. and the evening commutes between 3:00 p.m. and 7:00 p.m., with the peak times during the 8:00 a.m. and 5:00 p.m. hours. Commuters drove 20 miles or less on average, with commute times ranging from 10 to 30 minutes.

The survey responses indicated that a barrier to carpooling was the need for a personal vehicle to run errands before or after work. Most respondents also had commute distances that were too far to travel by walking or biking. Respondents also indicated concerns about unreliable transportation causing them to get to work late or even miss an entire day. These results imply a need for greater mobility options such as public transit and the importance of reliable transit services. The survey also found that

⁴ Report received from Jennifer Wilsie, Regional Planner at the New River Valley PDC, via email communication on July 9, 2009.

⁵ Information on the THA Toolkit Program from the Thomas Jefferson PDC Website: <http://www.tjpc.org/index.asp> (accessed August 13, 2009).

several major factors influence the respondents' choices to use alternative transportation, including public transit:

- The availability of a Guaranteed Ride Home program;
- Employer subsidies for public transportation costs;
- The availability of a shuttle bus between the workplace and a major public transportation station;
- The availability of a company vehicle for business use during the day; and
- Flexible work start and finish times.

The majority of respondents noted that public transportation was their preferred alternative transportation mode. More than half the respondents indicated that \$2.00 for a one-way trip and \$3.50 for a round trip were acceptable fares. Other helpful information provided in the study included the major employment centers and the distribution of low-income families and persons with physical disabilities, who tend to be transit-dependent in Radford.

The study recommended three commuter routes in the New River Valley, including three that serve Radford or Fairlawn:

- Draper to Fairlawn
- Radford to Christiansburg/Falling Branch
- Blacksburg to Radford to Christiansburg

Maps portraying these proposed alternatives are included in Exhibits 2-5, 2-6, and 2-7, respectively. Potential stops, estimated distances, and trip times were estimated for each route. The projected total operating and capital costs for the seven routes were also provided. These operational details and costs will be considered later in this service plan during the development of service alternatives. The Employment Mobility Study also recommended a network of vanpools, running semi-fixed routes, to complement the commuter services and essentially transport riders from the transit stops to their specific work locations. In addition, the study identified a need for transit hubs to allow connectivity between the proposed commuter routes. Potential hubs that will serve as stops for multiple proposed commuter routes include the I-81/Route 8 stop and the Falling Branch Park and Ride stop.

Exhibit 2-5: Draper to Fairlawn Employment Transportation Route Map

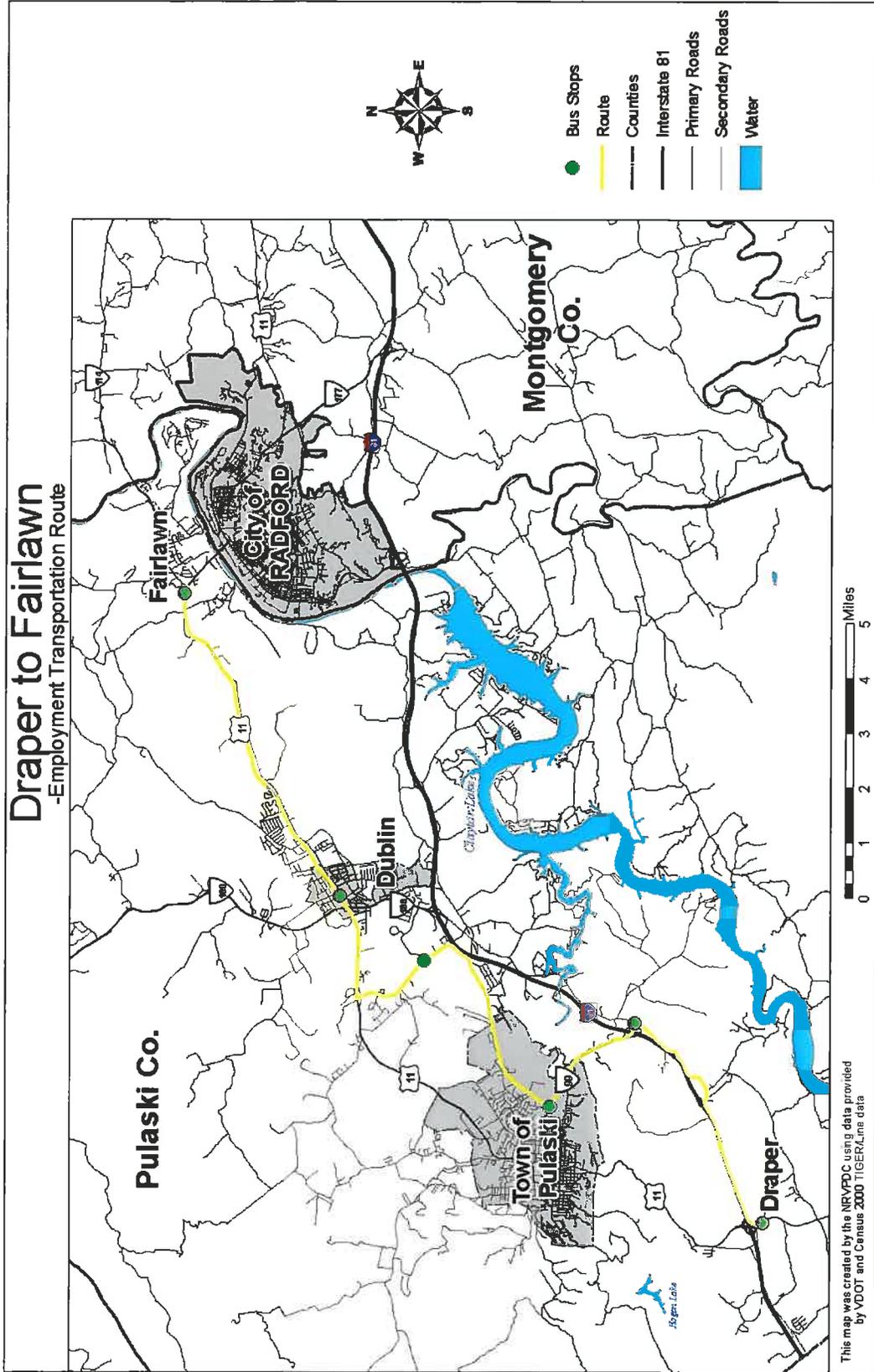


Exhibit 2-6: Radford to Christiansburg/Falling Branch Employment Transportation Route Map

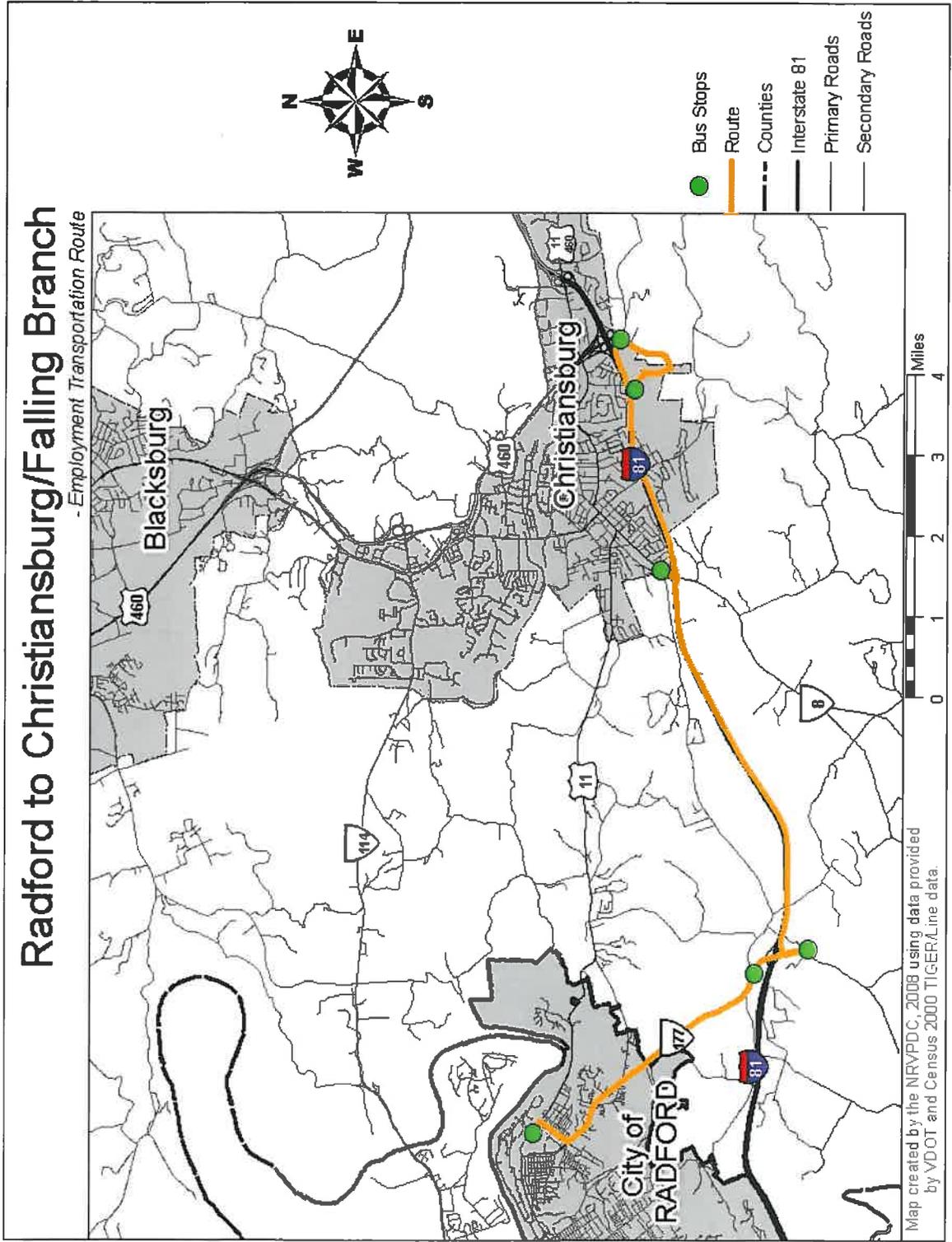
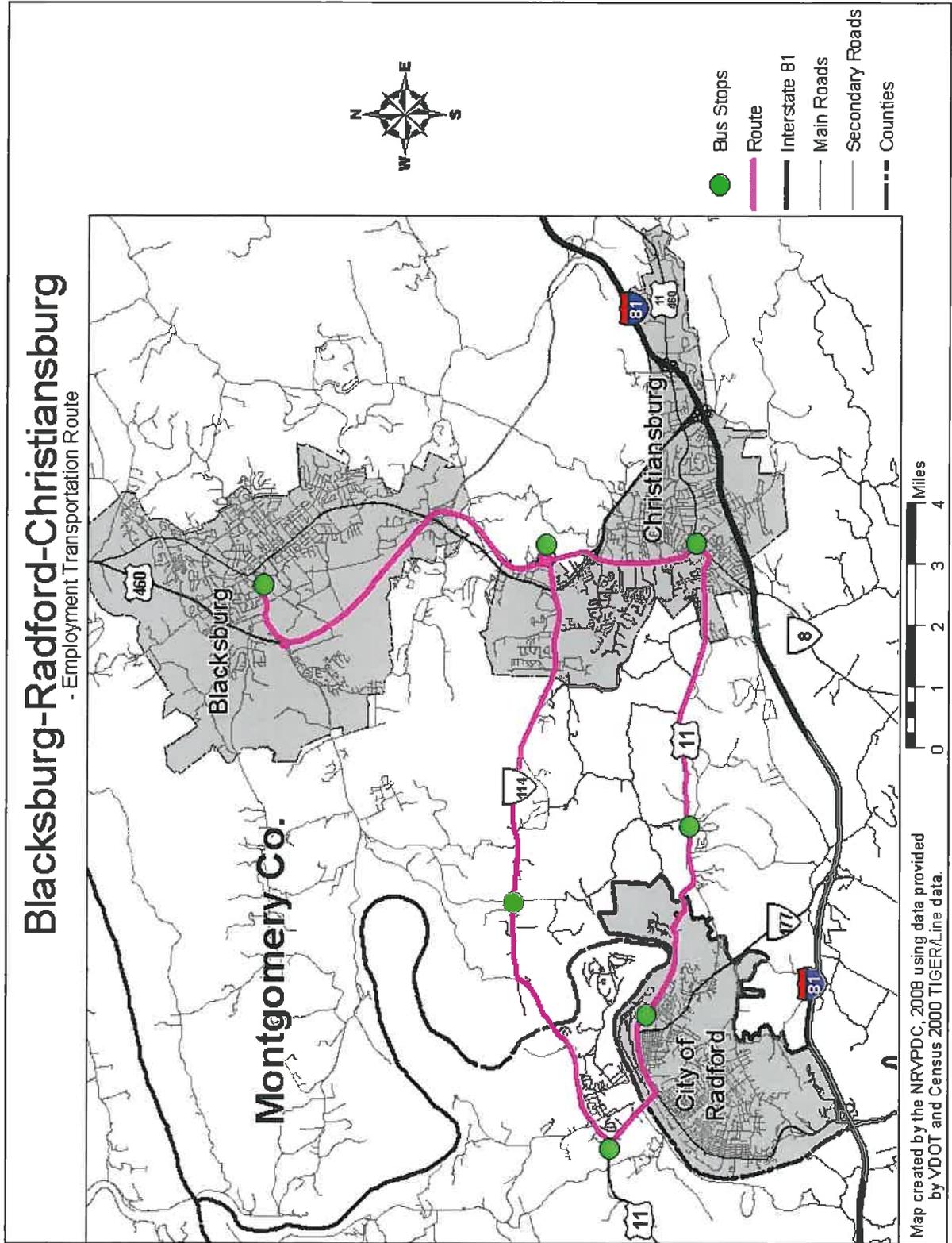


Exhibit 2-7: Blacksburg-Radford-Christiansburg Employment Transportation Route Map



Radford University-Roanoke Higher Education Center Transit Survey Results

In September 2006, Radford University and the New River Valley Planning District Commission (NRVPDC) conducted a study on opportunities for transit connections to the Roanoke Higher Education Center and Virginia Western Community College, both located in Roanoke.⁶ The study involved a survey of potential users to determine the demands for transit service between Radford University and Roanoke and between Radford, Blacksburg, and Christiansburg. The Radford University Nursing Department and the NRVPDC jointly administered the survey, mainly targeting Radford University nursing students who commute to Blacksburg, Christiansburg, and Roanoke. The majority of the 201 survey responses were collected from undergraduate students, with a few graduate student responses and one from faculty as well.

The first part of the survey explored transit needs between Radford, Roanoke, Blacksburg, and Christiansburg. The most commonly named trip origin was Radford University, specifically the Waldron College of Health and Human Services, where the School of Nursing is located. The next most common origins, listed in sequential order, were Blacksburg, specifically Main Street, Christiansburg, and Roanoke. The most common trip destinations named in survey responses were the Roanoke Higher Education Center and Roanoke Valley hospitals. The Carilion Roanoke Memorial Hospital and Carilion Roanoke Community Hospital are located in Roanoke, while the Lewis-Gale Medical Center and Veterans Affairs Medical Center are located in Salem.

The number one preferred transit route from the survey results was Radford University to the Roanoke Higher Education Center. Other preferred routes from Radford included connections to the hospitals in Roanoke and Salem. The survey results for preferred schedules showed that nearly half the respondents wanted to arrive in Roanoke between 6:00 a.m. and 6:30 a.m. The next most common schedules would arrive in Roanoke by 8:00 a.m. and 9:00 a.m. The most desired departure times from Roanoke were from 3:16 p.m. to 4:00 p.m. and from 5:16 p.m. to 6:30 p.m. These survey responses implied that the nursing students are working these approximate shifts:

- 6:30 a.m. to 3:30 p.m.
- 8:00 a.m. to 4:00 p.m.
- 9:00 a.m. to 5:30 p.m.

⁶ Report on Radford University-Roanoke Higher Education Center Transit Survey Results received from Jennifer Wilsie, Regional Planner at the New River Valley PDC, via email communication on July 9, 2009.

Preferred routes to Radford included connections from the Roanoke Higher Education Center, Blacksburg, and Christiansburg. Survey responses for the Roanoke to Radford University route showed schedule preferences to arrive in Radford at 8:00 a.m., 9:00 a.m., and 1:00 p.m.⁷ Return trips back to Roanoke included more preferences to leave Radford at 12:00 p.m. and 8:00 p.m., though responses indicated preferences for departure times throughout the afternoon. Survey responses for trips from Blacksburg and Christiansburg to Radford University indicated the top schedule preferences to arrive in Radford between 7:16 a.m. and 9:00 a.m. and leave Radford at 12:00 p.m. and 2:00 p.m.

To meet demands for these preferred routes, the study recommended operating a transit service from Waldron College at Radford University to the Carilion New River Valley Medical Center and then to the Falling Branch Park and Ride Lot near I-81 (Exit 118A) in Christiansburg. Riders continuing on to Blacksburg and Roanoke could then transfer to the Smart Way Commuter Bus, provided by Valley Metro.

Issues from the study to consider relate to commute times and fares for potential services. More than half of the responses indicated that 46 to 60 minutes was an acceptable commute time from Radford University to the Roanoke Higher Education Center.⁸ Over two-thirds of the responses for the routes from Radford University to Blacksburg and Christiansburg indicated that 16 to 30 minutes would be an acceptable commute time.

When asked to suggest a price for a one-way trip between Radford and Roanoke, 40% of respondents preferred a fare between \$1.51 and \$2.00. Twenty-four percent of respondents indicated that a fare between \$2.01 and \$2.50 was reasonable, while 11% suggested a fare between \$2.51 and \$3.00. The survey results indicated that the majority of potential users would not accept the study's estimated fare of \$4.50, including \$1.50 for the recommended route from Radford University to the Falling Branch Park and Ride Lot and \$3.00 for the Smart Way Bus.

The study received notably fewer responses in the second part of the survey, which studied commuting between Blacksburg/Christiansburg and Radford. Blacksburg (Main Street) to Radford University was the top preferred route, while Christiansburg to Radford University was another common response. About half the respondents indicated that the K-Mart or the Falling Branch Park and Ride Lot were

⁷ It should be noted that only 15 respondents provided desired roundtrip schedules for the Roanoke to Radford University route.

⁸ In comparison, the study's recommended route from Radford University to the Falling Branch Park and Ride Lot is estimated to take 25 minutes, and the Smart Way Bus requires 45 to 55 minutes to reach the Roanoke Higher Education Center during peak periods. The total trip time would be 70 to 80 minutes, notably more than the commute time considered acceptable in the survey results.

good stops in Christiansburg, though the other half indicated that another stop should be pursued or that they would not use the service.

This study provided detailed insight into the travel needs between Radford, Roanoke, Blacksburg, and Christiansburg. Though the survey targeted Radford University nursing students, the preferred routes may well serve the transit needs of other students and commuters as well (commuting patterns within the New River Valley region and to the Roanoke Valley indicate that regional transportation connections are important to each locality). Radford residents travel to other jurisdictions for work, shopping, education, and services, and the City also serves as an employment center within the region. (See the Demographics Analysis section for more on inter-jurisdictional transportation needs.) The schedule details and fare information gleaned from the survey will aid the development of service alternatives later in this plan.

City of Radford Comprehensive Plan

In 2008, the City conducted an update, titled *City of Radford Comprehensive Plan 2030*, to its 2001 Comprehensive Plan.⁹ The Plan outlined a long-term vision for the City's future including guidance for public decisions and land use over a 20-year period. With a vision of Radford becoming a "Green" city by 2030, the Plan emphasized the importance of Radford's connection to the New River and sustainable development. The most pertinent information from the Plan regarding transit service planning, including demographics, housing, transportation policies and strategies, and land use, is summarized below.

Demographics

Between 2000 and 2006, Radford's population grew 1.65%, from 15,859 to 16,120, which constituted nearly 10% of the New River Valley's total population. As of 2006, Radford had the second highest population density, about 1,600 persons per square mile, within the New River Valley. The Virginia Employment Commission's population projections for the region indicate that Radford's population is expected to increase by nearly 10% from 2006 to 2030, reaching 17,708. The City is relatively dense and walkable with the presence of Radford University and a distribution of residential and recreational areas.

It is also worth noting that Radford shares a zip code with Fairlawn, located across the New River in Pulaski County. In 2000, the population in Fairlawn was estimated at around 3,100. Discussed further in the Demographics Analysis section,

⁹ Received a copy of the *Pre-Final Draft Comprehensive Plan 2030*, dated September 2008 and prepared by Hill Studio, via data CD from Jim Hurt, City Engineer, City of Radford in July 2009.

several popular destinations including Wal-Mart are located in Fairlawn, which will be considered as a potential service area in developing transit alternatives.

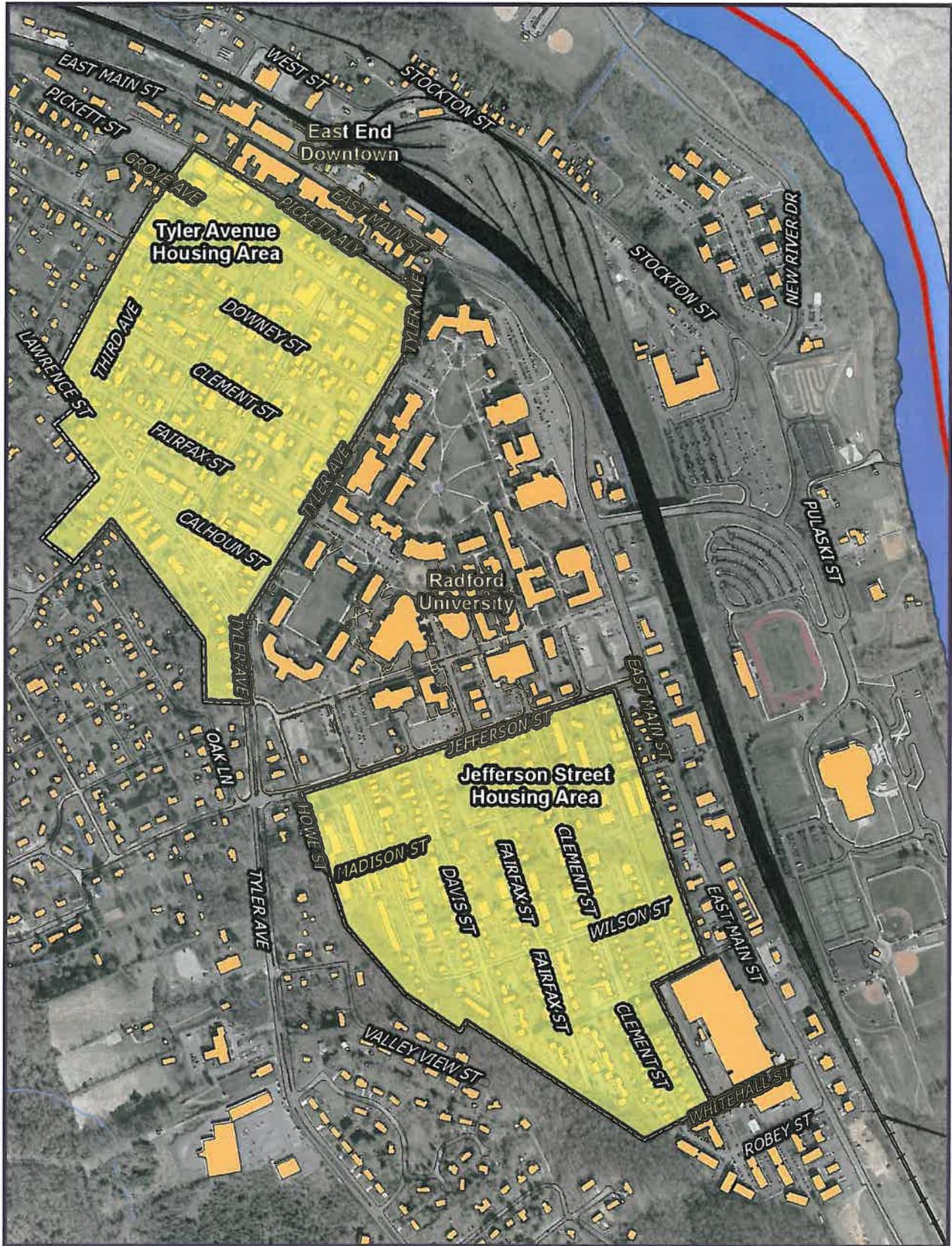
Other demographic factors, based on 2000 Census data, examined in the plan included median family income, families living below the poverty level, the estimated work force, and tourism. Radford had the second highest median family income in the New River Valley after Montgomery County. About 7% of the families in Radford were living below the poverty level in 2000; this percentage was one of the lowest in the region.¹⁰ The City's civilian workforce in 2005 was 7,543, of which 7,271 were employed. The unemployment rate was 3.61%, which was middle-range for the region. The top three industries that provided employment in Radford in 2000 were educational, health, and social services; manufacturing; and arts, entertainment, and recreation, listed in sequential order.

Tourism has become an increasingly important component of the region's economy, generating 2,239 jobs, over \$8 million in state taxes, and \$4 million in local taxes in 2004. Radford notably generated the lowest number of tourism-related jobs and received the lowest amount of tourism dollars in the region. Tourism presents an opportunity for Radford to create jobs and earn more tax revenue. A convenient public transit system may be part of the approach to garnering a larger share of the region's tourism market.

Housing

The existing and planned housing stock in Radford is worth examining because these areas will serve as major trip origins for potential transit services. In 2000, Radford's housing stock consisted of approximately 52% single-family homes, 43% multi-family units, and 5% mobile homes. Between 1990 and 2000, the number of multi-family units increased markedly (17%) compared to single-family homes (4%), and the number of mobile homes essentially doubled. The demand for multi-y units was largely driven by the increasing student population at Radford University. Two residential areas adjacent to the campus serve as the primary locations for off-campus student housing; the Tyler Avenue and Jefferson Street Housing Areas are shown in Exhibit 2-8. Improvements are planned for both Housing Areas to address parking issues and accommodate anticipated growth in housing demands. While infill development will be encouraged to maintain the historic character of the Tyler Avenue Area, which is adjacent to the East End Downtown, large-scale student housing

¹⁰ The U.S. Census does not determine poverty status for those who are younger than 15 years old, living in college dormitories, in the military, or institutionalized; so poverty status was not determined for the 2,770 students that live in Radford University's dormitories (according to the University's "Residential Life" Website, [http://www.radford.edu/res-life/Mandated percent20Template/Elements/Campus percent20Living percent20Options percent20for percent202009-10.pdf](http://www.radford.edu/res-life/Mandated%20Template/Elements/Campus%20Living%20Options%20for%202009-10.pdf)).



developments will likely be targeted in the Jefferson Street Area, which is buffered from adjacent neighborhoods.

Senior housing is another anticipated need in Radford as baby-boomers continue to age. Currently, the Ridgewood Place Senior Apartments are the only senior housing available within the City, though a number of retirement communities are located outside Radford. With an abundance of natural amenities and a convenient location near the Carilion New River Valley Medical Center, Radford offers a high quality of life that is attractive to seniors. The City must provide diverse senior housing options and assisted living facilities to attract seniors and meet anticipated housing demands. As such housing is developed, transit options should be planned accordingly to provide mobility options for seniors, who may be unable or choose not to drive. The availability of transit services can be vital in helping seniors maintain independent lifestyles.

The Plan also identified a need for newer housing for professionals, who are moving to the region for jobs. Options for middle- and high-end housing are perceived as insufficient, though the City also needs to ensure the availability of affordable housing. In accordance with plans to revitalize the downtown areas, the City aims to develop more downtown housing above commercial retail establishments and live-work units as infill development.¹¹ Such increases in mixed-use developments would likely boost population densities within Radford and make fixed-route transit services more feasible and cost-effective.

Transportation

Radford does not currently have any public transportation service. Radford University operates a City Loop, which connects the University and nearby housing to the East End Downtown, the Food Lion Shopping Center on Tyler Avenue, and the Wal-Mart in Pulaski County, but the route is not open to the general public. The Plan does recommend exploring the potential of extending the Smart Way Bus, which serves Blacksburg and Christiansburg and links to Roanoke, to Radford. Such a connection would benefit residents, who commute to other towns for work; local employers, whose employees reside in other towns; and students at Radford University and within the region, who wish to travel between schools.

Radford residents can access Amtrak passenger rail service in Clifton Forge and Lynchburg. The New River Valley is also served by three airports. The Roanoke Valley Regional Airport, about 43 miles away from Radford, provides the primary passenger service. Located in Blacksburg, the Virginia Tech Airport/Montgomery Executive

¹¹ The Comprehensive Plan described live-work units to include “urban lofts converted from older industrial buildings; storefront townhouses in downtown areas with retail on the first floor and housing above; and also home offices in a detached single-family house in subdivisions.”

Airport primarily serves corporate jets and private aircraft. The third airport is the New River Valley Airport near Dublin, which provides services such as aircraft rentals and charter services. Existing taxi services within Radford are limited, though the Roanoke Regional Airport Website lists six vendors including Liberty Cab and Yellow Cab for ground transportation.¹² The Plan recommended expanding taxi services within the City to provide an alternative transportation option for seniors in particular, where seniors pay reduced fares to use taxis for everyday transportation purposes. Providing a mobility option such as taxis or public transit would help attract retirees to Radford as well.

The Plan also identified the need to determine the traffic impacts of future redevelopment efforts to ensure that the City's transportation network is sufficient. Parking along Main Street in the East and West End Downtowns is already problematic. Downtown businesses are concerned that parking spaces are available for patrons, while employees also require parking. The City must also work with Radford University on parking availability for students and non-students in the East End Downtown near campus. Beyond a long-range parking plan, alternative transportation including bus service could help alleviate parking problems. Radford University has explored the possibility of expanding its transit services and making them available for both students and City residents (see the Brown and Red Route Alternatives described earlier as part of the University's Transit and Parking Study and Blacksburg Transit's Report on Transit Services to the University below). In particular, local bus service could help promote shopping at local businesses within the City.

The Comprehensive Plan outlined a transportation planning development policy that provides multi-modal transportation opportunities throughout the community. Certain goals and strategies were most relevant for the development of potential transit services:

Goal 1-1. Encourage a diversity of transportation opportunities and connections in Radford for both residents and visitors.

Goal 1-3. Promote economic development within the City that includes multi-modal options for employees and the public.

Strategy B. Partner with Radford University to develop and implement a bus system that would serve students and residents with connections throughout the City.

¹² Roanoke Regional Airport Website: <http://www.roanokeregionalairport.com/services/services.html> (accessed August 18, 2009).

Strategy E. Partner with the Radford Heritage Foundation and other tourism agencies to determine public transportation needs of visitors and explore opportunities to provide services.

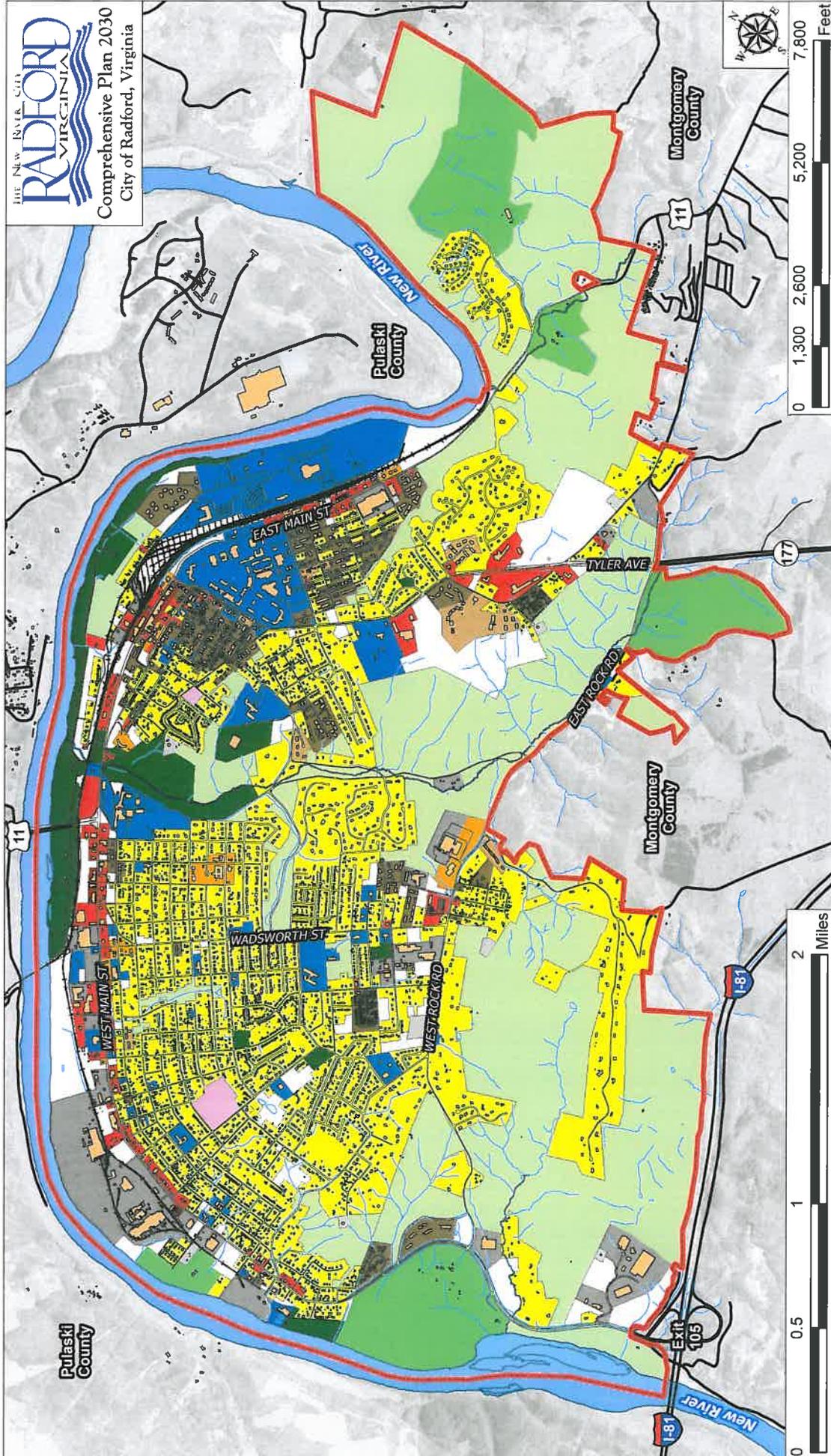
Strategy F. Work with regional transportation interests to pursue a passenger station in downtown Radford.

Land Use

Exhibit 2-9 portrays the current land use patterns within Radford. The map shows that most commercial activities are located along East Main Street, Tyler Avenue, and parts of West Main Street. Radford contains two historic districts: the East Downtown is considered the “heart of the community” and provides retail and services for local residents and students alike, while the West End Downtown is in a transition stage, with ongoing renovations to provide housing above commercial spaces. Both districts contain store vacancies and empty lots, which provide opportunities for redevelopment and revitalization. Exhibit 2-10 portrays the economic development opportunities identified in the Plan including student-oriented retail along East Main Street. Most of the City’s existing industrial facilities are located along West Main Street as well as the abandoned Foundry site, which provides an opportunity for a new business or industrial park to be developed on 100 acres with infrastructure already in place. One of the economic development goals stated in the Plan is to “evaluate transportation issues associated with the redevelopment of the West Main Street Corridor.”

The Plan identifies the need for Radford to attract new industries and businesses, which will be sustainable in the long-term and help Radford become a Green community, as a land use challenge. The availability of mobility options such as transit can especially help draw clean/high-tech employers, who seek to provide their employees with a high quality of life. The City must also work closely with Radford University to take action on mutually advantageous development opportunities. Radford University has planned a number of significant capital improvements in anticipation of future growth, and the City must plan accordingly to provide retail and entertainment options for students, thereby generating additional jobs and capturing tax revenues that are currently captured outside Radford.

Major trip generators described in the Comprehensive Plan, including senior living facilities, health care providers, and major industries, are included below in the Demographics Analysis section. Such information on the potential origins and destinations to which transit riders might require services will be used in developing service alternatives later in this study. The Plan also includes an outline for future land use, though the details are not reviewed here because the future land uses are planned



Legend

City Limits	New River	Current Land Use	Cemetery
Buildings	Hydrology	Single-Family Res	Public Infrastructure
Roads	Agricultural	Two-Family Residential	Railroad
Railroads	Prime Open Space-Conservation	Multi-Family Residential	No Land Use
	Park	Commercial	
		Downtown Commercial	
		Office/Medical	
		Public/Institutional	
		Industrial	

**Exhibit 2-9:
 Current Land Use**



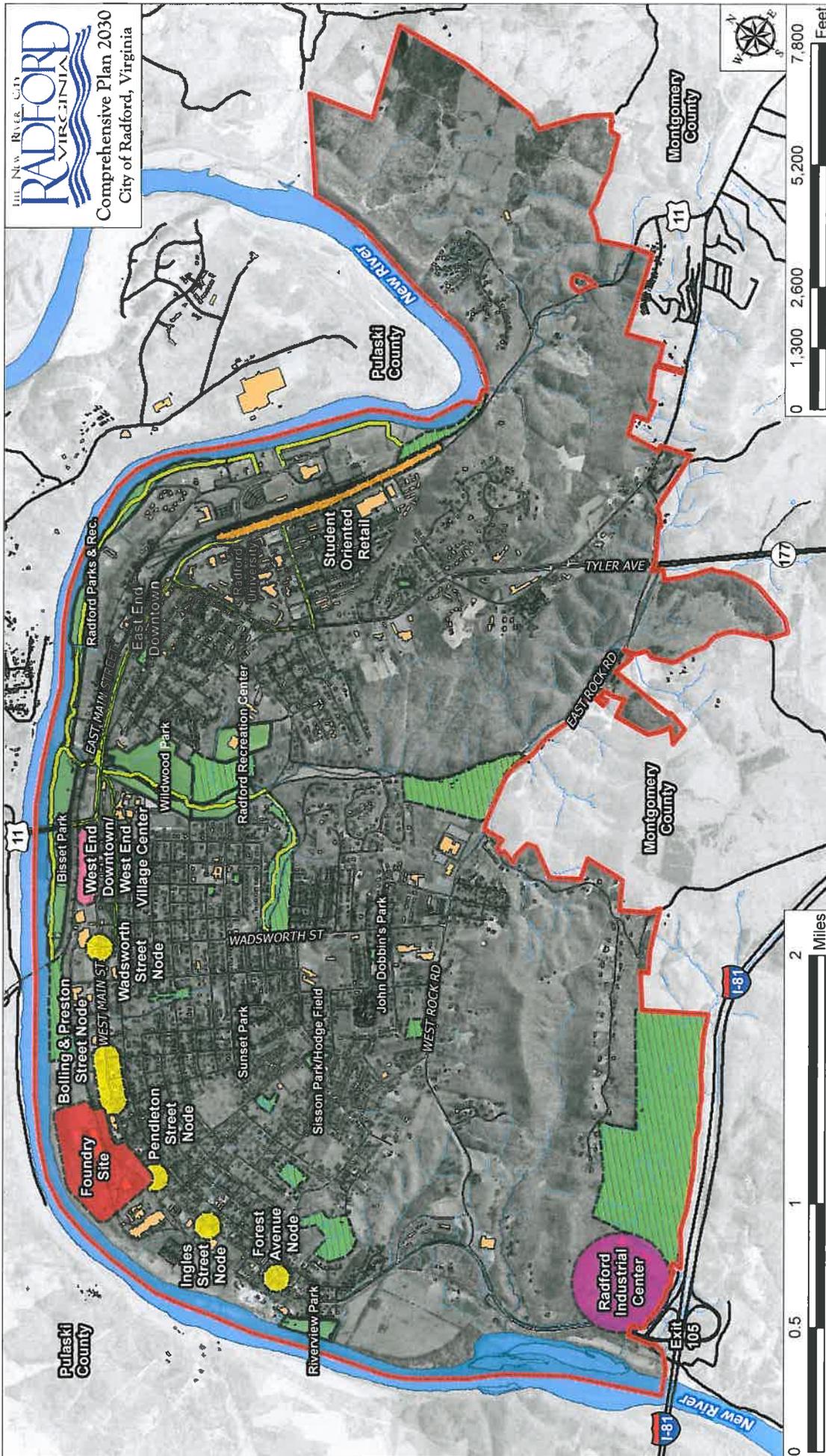


Exhibit 2-10:
Economic Development Opportunities

- Legend**
- City Limits
 - Buildings
 - Roads
 - Railroads
 - New River
 - Hydrology
 - City Parks
 - Existing Trails and Bikeways
 - Foundry Site
 - Radford Industrial Center
 - Student Oriented Retail
 - West End Village Center
 - West Main Street Redevelopment
 - Proposed Parks



through 2030 and the scope of this transit service plan focuses on the next few years. It is worth noting that the City plans to increase mixed land uses and contribute more land for residential and commercial uses, both of which boost the need for transportation alternatives and help make public transit services more viable and successful.

The *City of Radford Comprehensive Plan 2030* also describes thorough policies and plans for economic development, tourism, parks and recreation, and natural resources in the City. While transit needs are not directly outlined for these elements, new and expanded transit services can contribute to the City's progress in each of these sectors. For example, transit services could attract new businesses that look to locate in a community with transportation alternatives for their employees. Providing convenient and reliable transit services to draw "choice riders" out of their automobiles could also help decrease greenhouse gas emissions, air pollutants, and traffic congestion.

Radford Area Including Fairlawn 2020 Transportation Plan

The *Radford Area Including Fairlawn 2020 Transportation Plan* was developed jointly by VDOT, the City, and Pulaski and Montgomery Counties, and adopted by the Radford City Council in December 2001. The plan evaluated the transportation network within the study area, which included Radford, Fairlawn, and a portion of western Montgomery County, and recommended improvements to meet existing and future transportation infrastructure needs.¹³

Existing Transportation Network

This Plan examined various transportation modes and related issues within the study area. The Plan concluded that in 2001, on-street parking and off-street municipal parking were available in Radford's central business district. The major bikeway that travels through Radford is Interstate Bicycle Route 76, which travels into the City via the Memorial Bridge, connecting to West Main Street and Wadsworth Street before turning on Rock Road and then Wintergreen Drive. This bikeway travels through Virginia, Kentucky, and Illinois. The Plan names Hinton, West Virginia, 82 miles to the north, as the closest intercity rail stop and connection to an east-west rail line. Lynchburg, 102 miles southeast, provides the closest access to a north-south line.¹⁴ DRPT has conducted feasibility studies of rail passenger service between Bristol, Richmond, and Washington D.C., which would include a stop in Radford, but no formal plans have been made to date.

¹³ Summary of *Radford Area Including Fairlawn 2020 Transportation Plan* and the technical report of the Plan received via data CD from Jim Hurt, City Engineer, City of Radford in July 2009.

¹⁴ These Amtrak stops are still accurate according to Amtrak's website for the Cardinal Route (see www.Amtrak.com) and the national map, <http://www.amtrak.com/pdf/national.pdf> (accessed August 18, 2009).

According to the Plan, the nearest intercity bus service in 2001 could be accessed in Christiansburg or Pulaski, both of which had Greyhound stops. The closest Greyhound stops to Radford today appear to be farther away in Wytheville (Max Meadows) and Roanoke, about 31 and 41 miles away, respectively.¹⁵ The closest airports for passenger flights are Roanoke Regional Airport and Greenbrier Valley Airport in Lewisburg, West Virginia.

Future Conditions

The report conducted a capacity analysis of roadways within the City and predicted several capacity concerns during peak periods in 2010 and 2020:

- East Main Street/US-11, between Harrison Street and Tyler Avenue, was forecasted to operate at Level of Service (LOS) D (near- to at-capacity) by 2010 through 2020. Capacity is essential for this segment because it serves as the primary thoroughfare through the central business district.
- West Main Street, between Wadsworth Street and Randolph Street, was forecasted to operate at LOS E (at-capacity) by 2010, through 2020.
- Rock Road, between Wadsworth Street and Tyler Avenue, was forecasted to operate at LOS D in 2010 and at LOS E in 2020. Additional capacity would be required as more development occurs on Rock Road.
- Radford Road/US-11, between Rock Road and Walton Road in the eastern part of the study area, was forecasted to operate at LOS E in 2010 and at LOS F (over capacity) in 2020. This segment would need additional capacity as development occurs on US-11 between Radford and Christiansburg.
- West Main Street, between Randolph Street and Lee Highway/US-11, was forecasted to operate at LOS D by 2020.

These corridors will be considered in the development of potential transit services, which will potentially help mitigate congestion along these road segments by shifting drivers in single occupancy vehicles onto transit.

¹⁵ Nearest Greyhound stops researched on Greyhound's website of Virginia locations, <http://www.greyhound.com/home/TicketCenter/en/locations.asp?state=va> (accessed August 18, 2009), along with Google Maps.

Recommendations

Though most recommendations in this Plan focused on road improvements, a few were related to alternative transportation:

- Adequate infrastructure including park and ride lots, curb cuts, and shelters for bus stops and rail station facilities should be provided as alternative transportation modes are developed.
- Bicycle/pedestrian transportation facilities should link tourist, shopping, and employment areas, which are expected to produce bicycle/pedestrian traffic. (Bicycle and pedestrian improvements would facilitate the success and feasibility of a public transit system as well, since many riders walk or bike to transit stops.)
- Extend the Two Town Trolley, operated by Blacksburg Transit, to Radford, thereby providing a connection between Radford University and Virginia Tech as well as an additional transportation option for Radford and Fairlawn residents.

The Plan also recommended that Radford work with the New River Valley PDC to study and possibly fund a ridesharing program. The Radford City Council has since contributed funding for a mobility manager position and a regional ridesharing program called RIDE Solutions, provided by the New River Valley PDC and the Roanoke Valley-Alleghany Regional Commission.¹⁶

Town of Blacksburg's Comprehensive Plan

Adopted in May 2007, *Blacksburg 2046* is the Town's Comprehensive Plan developed for 2006 to 2046.¹⁷ In the 2009 annual review of the Plan, the Mass Transit section was updated to include the Town's discussions with Christiansburg and Radford about additional regional transit services.¹⁸ Blacksburg Transit and Virginia Polytechnic Institute and State University (Virginia Tech) are proposing a new multi-modal Transit Center that could accommodate regional transit and provide connections

¹⁶ According to a July 2009 draft report, titled *A History of Bus Service in Radford, Virginia*, by Erik C.B. Olsen, Ph.D., Transportation Planner, Blacksburg Transit, in September 2008 the Radford City Council endorsed a local match of \$1,000 to help fund the New River Valley PDC mobility manager position and RIDE Solutions.

¹⁷ *Blacksburg 2046* was downloaded from the Town of Blacksburg Website: <http://www.blacksburg.gov/Index.aspx?page=520> (accessed August 13, 2009).

¹⁸ Proposed 2009 amendments to *Blacksburg 2046*, recommended by the Long Range Planning Committee on July 9, 2009, were downloaded from the Town of Blacksburg Website: <http://www.blacksburg.gov/Index.aspx?page=837> (accessed August 13, 2009).

to local services and other modes. Another 2009 amendment described Blacksburg Transit's exploration of opportunities to make the transit system more regional, including expanding services to Radford.

Blacksburg 2046 outlined a number of mass transit objectives and action strategies that relate to transit service between Blacksburg and Radford:

- Under the objective of coordinating public transportation in the New River Valley, strategies included improving Blacksburg's regional accessibility and enhancing intercity travel, including transit options between Blacksburg and Radford.
- Under the objective of pursuing public policies that support public transportation as a mobility alternative, one strategy was to develop satellite park and ride facilities with bus service to reduce congestion. Such park and ride facilities may be appropriate for commuters between Blacksburg and Radford, given that sufficient local services or connections to local transit are available at the destination end.
- Another strategy under this objective was to encourage two-way commercial bus service between Blacksburg and other localities. Radford may present an opportunity for such service given the common exchange between students at Radford University and Virginia Tech, as well as the commuting patterns between the two jurisdictions (see Demographics Analysis section).

The plan also described community concerns about the adequacy of parking in downtown Blacksburg. Transit services from Radford to Blacksburg could help relieve parking pressures from commuters coming from Radford. Under the objective of utilizing public transportation to stimulate economic development in the community, the strategy of using transit availability to help existing local businesses in employee retention could apply to workers commuting from Radford. As traffic congestion is expected to worsen with continued population growth in Blacksburg, providing a transit option for employees commuting from Radford may also help local companies maintain their workforce.

Town of Christiansburg's Comprehensive Plan

Last updated in 2003 and reviewed by the Town of Christiansburg Planning Commission in 2007, the Comprehensive Plan for the Town of Christiansburg cites that discussions of extending Blacksburg Transit service to Radford have occurred, but no

concrete plans are mentioned.¹⁹ Under the transportation goal of providing a system that can safely, conveniently, and reliably move people and goods, the Plan outlined a strategy to “explore the potential creation and maintenance of a bus service between Christiansburg, Blacksburg and Radford (including the long-term potentials for a regional transit authority).” Such a service to Radford would also contribute toward the Town’s goal of providing safe and accessible alternative modes of transportation to residents.

Montgomery County Comprehensive Plan

Montgomery County’s Comprehensive Plan, *Montgomery County, 2025*, was adopted in October 2004. The Transportation Resources Chapter of the Plan outlined 2001 regional commuting patterns between Montgomery County and Radford: 1,785 commuters from Radford (54% of Radford’s outcommuters) travel to Montgomery County, and 1,840 commuters from Montgomery County (36% of Radford’s incommuters) travel to Radford. These statistics demonstrated strong commuting ties between Radford and Montgomery County.

Montgomery County, 2025 addressed Radford in a few of its goals, objectives, and strategies for the County’s Transportation Resources. The goal of creating a better mass transit system, which provides mobility options for all citizens, contained three objectives:

- Under the objective of maintaining and enhancing existing Blacksburg Transit services, one strategy was to request that the MPO evaluate mass transit extensions, including extending the Two Town Trolley service to Radford, in its 2030 long-range transportation plan.
- Part of the second objective was to encourage future transit service between jurisdictions, specifically Blacksburg, Christiansburg, and Radford, to help decrease congestion and the number of personal car trips.
- The third objective sought to evaluate public transportation opportunities between six villages (Belview, Elliston-Lafayette, Plum Creek, Prices Fork, Riner, and Shawsville) in Montgomery County and the urban centers, including Radford.²⁰

¹⁹ Town of Christiansburg’s Comprehensive Plan accessed on Town’s Website in August 2009:

<http://www.christiansburg.org/index.aspx?NID=155>.

²⁰ *Montgomery County, 2025 Handbook*. Adopted October 12, 2004. Accessed on Montgomery County Website on August 12, 2009: <http://www.montva.com/departments/plan/downloads/handbook.PDF>

Pulaski County Comprehensive Plan

The Pulaski County Comprehensive Plan included action plans for smaller areas within the County. Radford is adjacent to the Northeast and North Central Pulaski County Planning Areas. Part of the Northeast Planning Area located north of Radford across the New River, Fairlawn is a major commercial and retail destination for Radford residents. The action plan for the Northeast Planning Area describes goals of increased in-fill development in Fairlawn, establishing a bike-walkway between Radford and Fairlawn over the Memorial Bridge, and integrating modes of transportation.²¹ Transit service in Radford could provide transportation options to Fairlawn as it is further developed and improve connectivity for bicyclists and pedestrians.

While the overall Comprehensive Plan does not explicitly reference transportation needs to Radford, it does include a goal to improve existing transportation facilities in the County. The following objectives and strategies are pertinent to developing potential transit connections between Radford and Pulaski County:

- Objective: Develop the County’s transportation system to adequately service anticipated future travel demands.
 - Strategy: Study public transit options, particularly with regard to the needs of transit dependent populations such as the elderly, handicapped, and unemployed. This study should include regional service options.
- Objective: Support transportation improvements to provide national connectivity.
 - Strategy: Continue to work with other localities in the region to utilize transportation assets, particularly those that connect in Dublin, and continue to support development of an intermodal transportation center.²²

Blacksburg Transit Report on Transit Services to Radford University

In a memorandum to Radford University President, Penelope Kyle, dated February 2009, Blacksburg Transit outlined and prioritized potential transit routes to serve Radford University:

²¹ Pulaski County Comprehensive Plan, Volume 2, Action Plans for Planning Areas: http://www.pulaskicounty.org/pc_comp_plan/Vol%202/action%20plans%20for%20planning%20areas.htm (accessed August 21, 2009).

²² Pulaski County Comprehensive Plan, Volume 2, Citizen Input and Goals and Objectives: http://www.pulaskicounty.org/pc_comp_plan/Vol%202/pc%20plan%20citizens%20input.htm (accessed August 21, 2009).

- **Priority #1** - New Commuter Express to connect Radford to the Christiansburg/Blacksburg community. This route would include extended late night hours to accommodate work schedules and other economic development activities.
- **Priority #2** - Revised Campus Loop to connect off-campus parking with the Dedmon Center and other trip generators such as apartments Monday through Friday. During weekends, this service would also operate express to economic centers including downtown Radford and Wal-Mart.
- **Priority #3** - New Campus Circulator targeted toward the general public to provide services around the Radford University campus and between the campus, commuter parking lots, handicapped parking lots, and the hospital.
- **Priority #4** - New Summer Commuter Express to continue operating the Academic Commuter Express (priority #1) in the summer.
- **Priority #5** - New Special Route Hours to provide special, express service for basketball games, serving the Dedmon Center, the campus, and nearby apartment complexes.

The total operating and capital costs, including the University's local match and potential federal and state funding amounts, were outlined for each potential service. Blacksburg Transit suggested applying for federal funding from the JARC Program since Radford University is a "commuter-based employer." These proposed routes, associated figures, and funding sources will be taken into account in developing alternatives later in this transit service planning process.

Blacksburg Transit Report on the History of Bus Service in Radford

Blacksburg Transit also prepared a report called, "A History of Bus Service in Radford, Virginia," which described relevant studies and activities related to transit services in Radford from 1970 to 2010.²³ Pertinent information on transit needs, particularly those of Radford University, are included in the Demographics Analysis section below. (See Radford University under the Major Trip Generators sub-heading.) In conjunction with this report, Blacksburg Transit provided a list of key documents including study and survey reports and comprehensive plans, many of which have been described above.

²³ Olsen, E.C. B. (2009). A History of Bus Service in Radford, Virginia. Blacksburg Transit (a Department of the Town of Blacksburg). Blacksburg, VA. Copy of the draft report, Version 1.3, dated July 28, 2009, received during a meeting between KFH Group and Blacksburg Transit on the same date. Electronic copy of report received via email on August 6, 2009.

DEMOGRAPHIC ANALYSIS

The demographic analysis of transit needs conducted by the study team focused on quantitative data associated with potentially transit dependent populations, such as older adults, individuals with disabilities, and persons living below the poverty level. U.S. Census data on these populations were collected, processed, and mapped using Geographic Information Systems (GIS) technology, to help identify areas with relatively high potential transit needs. Major origins of and destinations for potential transit riders were also researched and mapped, in order to augment the study team's understanding of areas with higher transit needs. Together with input from stakeholders and the public, the analysis of gaps in existing services and the identification of relatively high need areas—including key origins and destinations—will guide the design of new transit services and changes to existing ones.

Transit Dependent Populations

The first part of the demographic analysis examined those population segments that are most likely to require alternatives to personal automobile transportation, due to age, disability, economic disadvantage, or lack of access to a private automobile. The data utilized in this analysis were gathered from Census 2000 tables (Summary Files 1 and 3), and included several segments of the population:

- Elderly - Persons age 60 and above. This group may include those who choose not to drive any longer, have previously relied on a spouse for mobility, or—because of factors associated with age—can no longer drive.
- Persons with Disabilities - Civilian, non-institutionalized persons age 16 and above who have a “go-outside-the-home” disability, which makes leaving the home alone for simple trips such as shopping and medical visits difficult.
- Persons in Poverty - This segment includes those individuals whose income is below the poverty level. Persons living in this situation may not have the economic means to purchase or maintain a personal vehicle.
- Autoless Households - The number of households, both owner- and renter-occupied, without an automobile. One, if not the most, significant factor in determining transit needs is the lack of an available automobile for members of a household to use.

In order to identify the geographic areas demonstrating high relative transit needs, the Census 2000 data on these four population segments were gathered and summarized at the Block Group level. In order to provide the most up-to-date

perspective possible, summarized data were adjusted based on the rate of population change in the City of Radford between 2000 and 2008. Radford's ten Block Groups were then classified and mapped in terms of relative need—low, moderate, and high—based on numerical thresholds for each segment of the potentially transit dependent population. For example, if a Block Group's elderly population was below 100 persons, it was classified as having relatively low need; if a Block Group's elderly population was between 101 and 200 persons, it was classified as having relatively moderate need; and if a Block Group's elderly population was greater than 200, it was classified as having relatively high need.

This process was replicated for the other three potentially transit dependent populations listed above. The same numerical thresholds were applied to the population of persons living below the poverty level. The population of persons with disabilities was classified by the thresholds of zero to 75, 75 to 150, and 150 and above. When classifying Block Groups based on their number of autoless households, thresholds of zero to 50, 50 to 100, and 100 and above were used. Similar thresholds have been used in the demographics analysis for other transit service planning studies in the Commonwealth.

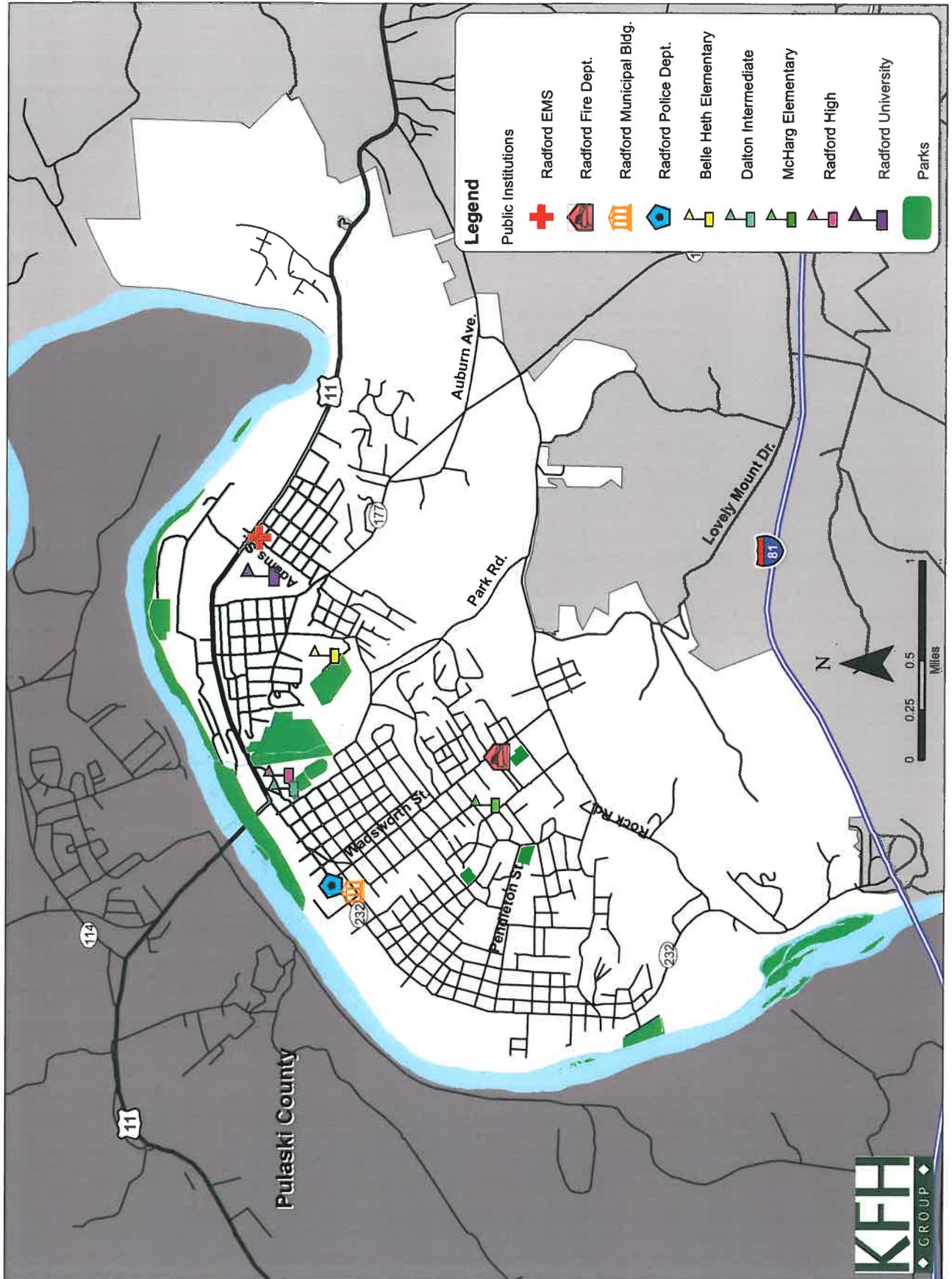
Block Groups were also classified and mapped based on population density, which helps determine the type of transit service that is most feasible for a given area, as that assessment is not always clear based on transit dependency alone. Figure 2-2 portrays a basic view of the Radford area, to orient the reader and to complement the analyses of population density and relative transit needs found below.

It should be noted that these maps serve as a guide for transit service planning, delineating general areas within the City that potentially have higher transportation needs. Data at the Block Group level is used because this is the smallest geographic scale for which detailed information is provided for transit dependent populations. However, one limit to using Census Block Group data to examine a small city such as Radford is that the Block Groups are large relative to the City size. Therefore areas within one Block Group tend to be generalized in the maps, though the transportation needs may be concentrated in a certain part of the Block Group. Input from stakeholders and the public augments our analysis using Census data and clarifies transportation needs on the ground, which will be considered in developing service alternatives.

Population Density

Population density was mapped by Block Group to help determine appropriate levels of transit service in different areas of Radford, such as fixed-route, deviated fixed-route, scheduled, or demand-response. The most accepted guideline holds that a

Figure 2-2: Base Map of Radford Area



population density of at least 2,000 persons per square mile is required to support regular, fixed-route transit service. However, if an area has a large transit dependent population, a lower density can sometimes support this type of service as well.

Figure 2-3 portrays Radford's Block Groups by their population density. Overall, the City is quite dense with several areas capable of supporting fixed-route transit services. The Block Groups with highest densities predominate in the central and northern sectors of the City. The Block Groups surrounding Radford University exhibit very high densities of more than 5,000 persons per square mile. Block Groups in the center of the City show high densities of over 2,000 persons per square mile. The area in the center of the City, across from Bissett Park and the Memorial Bridge, has a moderate population density, between 1,000 and 2,000 persons per square mile. Block Groups in the western, southern, and eastern (adjacent to Montgomery County) areas of Radford have low relative population densities compared to the rest of the City.

Elderly

Figure 2-4 portrays Radford's Block Groups by the number of persons age 60 and above. Radford has a notable population of older adults, particularly in the western half of the City, which contains more than 200 older adults per Block Group. The eastern half of the City, roughly divided from the western half by the Wildwood Park/Park Road corridor, has Block Groups with moderate elderly populations (i.e., between 100 and 200 persons). The Block Groups with the lowest elderly populations (i.e., fewer than 100 older adults) are located at the northern tip of the City, surrounding Radford University.

Persons with Disabilities

Figure 2-5 portrays Radford's Block Groups by the number of persons age 16 and above with a go-outside-the-home disability, meaning a person has difficulties leaving the home alone for simple activities such as shopping and medical appointments. The Block Group with the highest population of persons with disabilities, more than 150 persons, is at the northern tip of the City along East Main Street. Block Groups with a moderate number (between 75 and 150 persons) of persons with disabilities are clustered in the central and southern areas of Radford. The Block Groups with the lowest numbers (fewer than 75 persons) of persons with disabilities are spread between the western and eastern fringes and the north-central area of the City.

Figure 2-3: Population Density

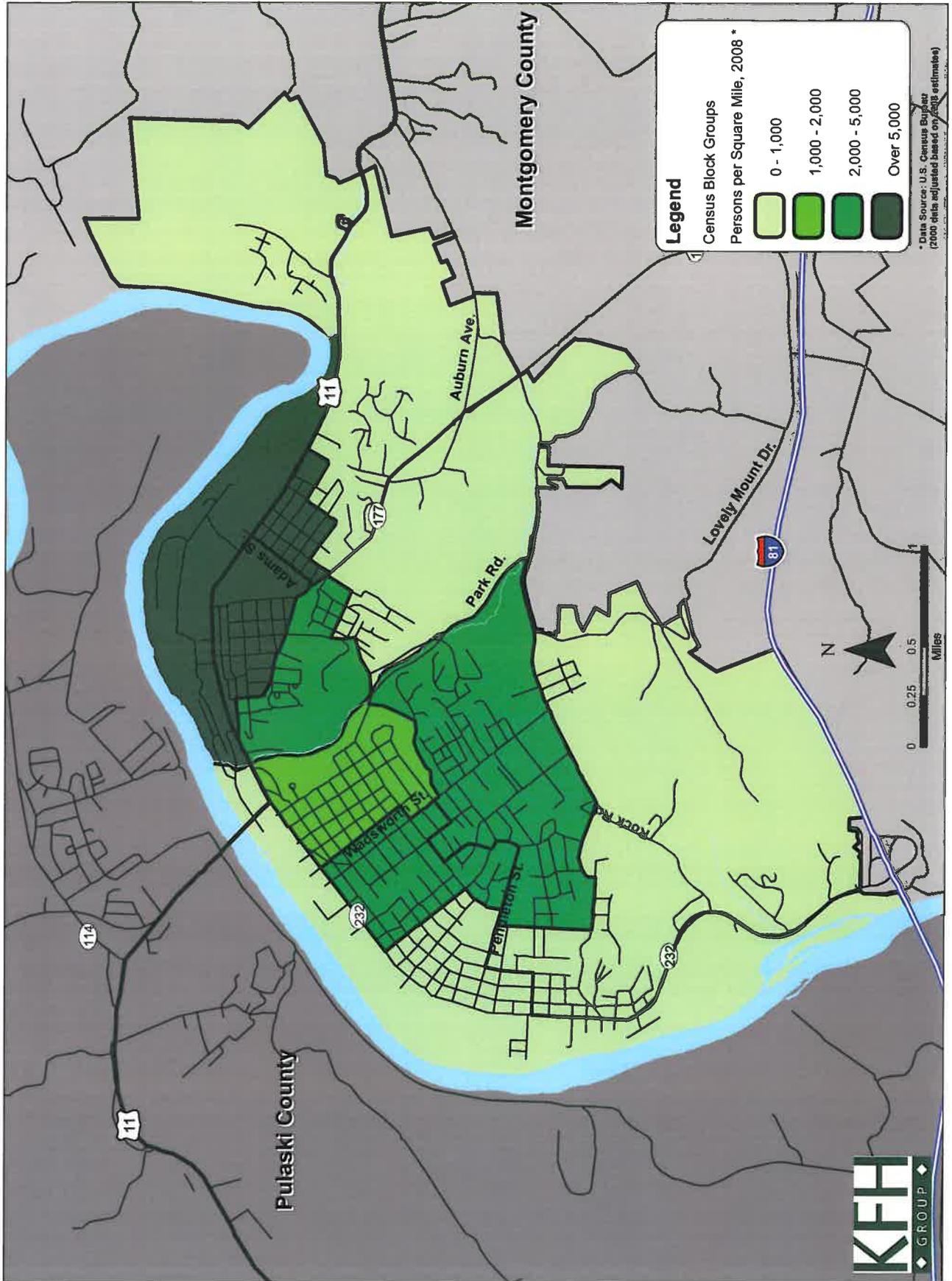


Figure 2-4: Transit-Dependent Population: Elderly Persons

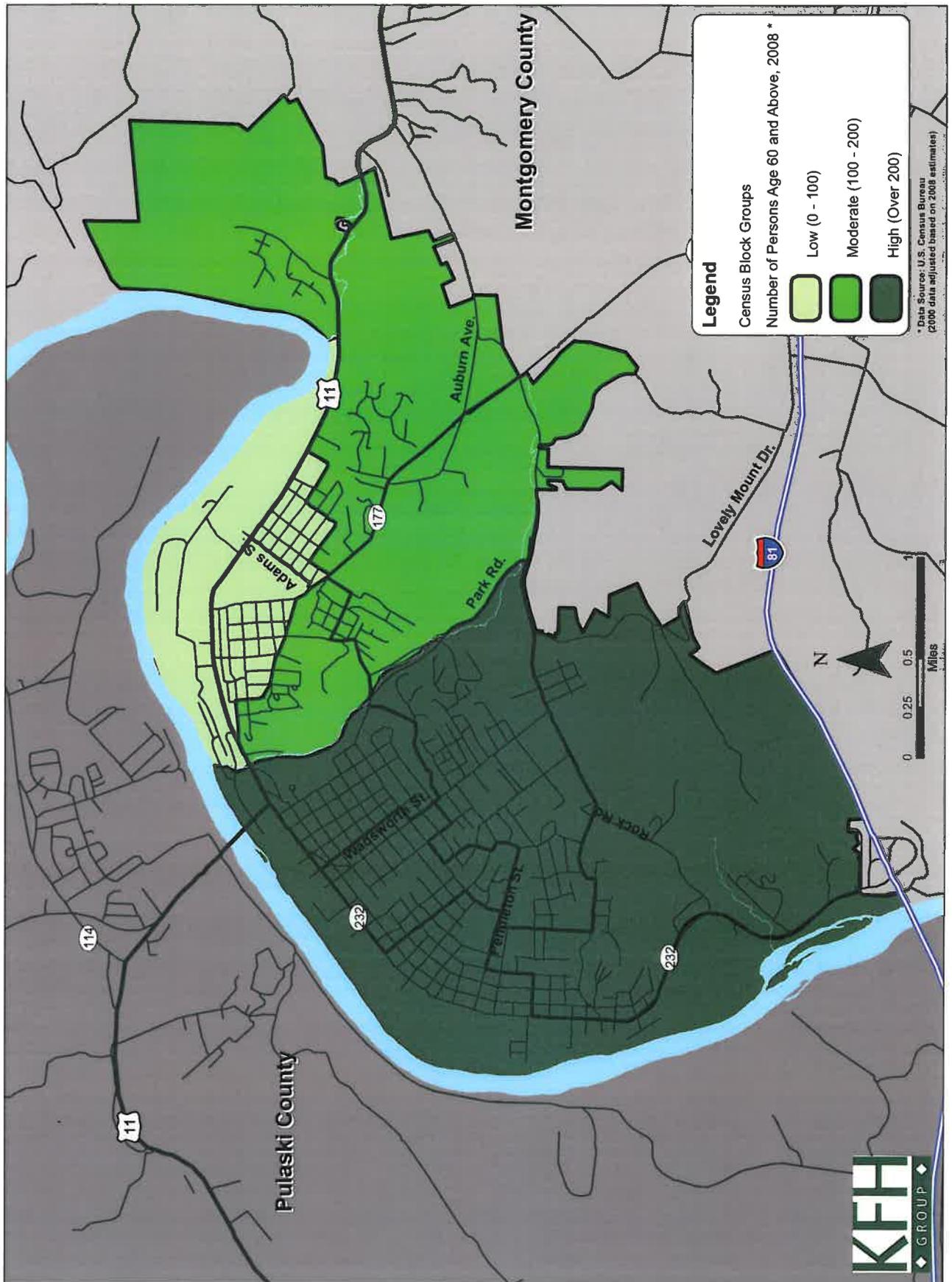
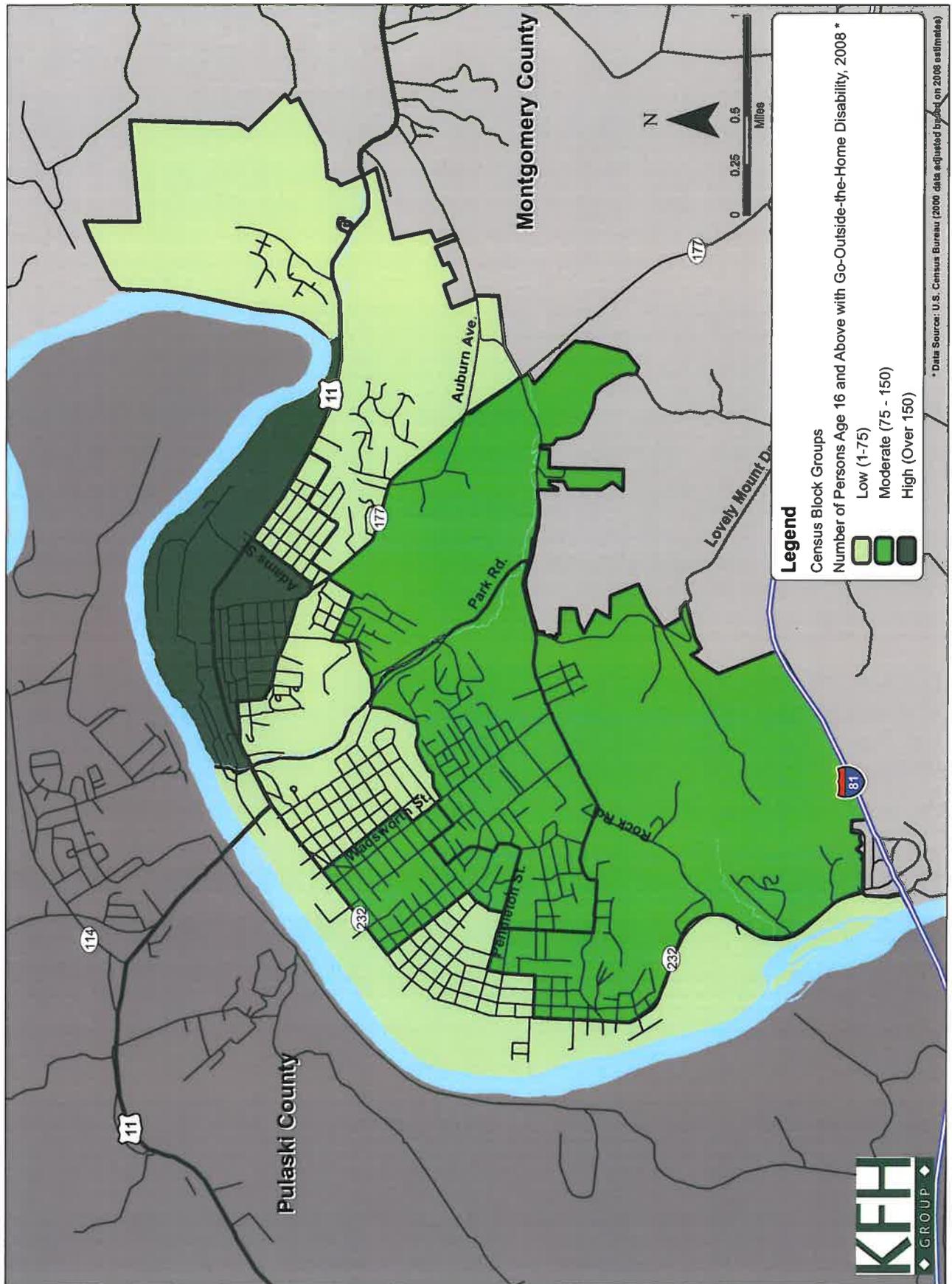


Figure 2-5: Transit-Dependent Population: Persons with Disabilities



Persons Living Below the Poverty Level

Figure 2-6 depicts the Block Groups by the number of persons living below the poverty level. Central Radford and the northeastern part of the City have the highest numbers of persons, over 200 per Block Group, living below the poverty level. The Radford University student population living on campus and in the surrounding areas likely contributes heavily to the high numbers in the northeastern area. It should be noted that the High Meadows community, within the northeastern area, is not low income. Block groups in the western part of the City contain a moderate number (between 100 and 200) of persons living below the poverty level. The Block Groups with the lowest numbers (fewer than 100 persons) are spread between the western fringe and the eastern part (between Park Road and Tyler Avenue) of the City.

Autoless Households

Figure 2-7 displays the Block Groups by the number of households without a car. Radford contains a significant number of autoless households spread throughout the City. Central Radford, west of Park Road, contains the highest number of autoless households, more than 100 per Block Group. Block Groups in western Radford and in the fringe areas of the City all the way to the east contain a moderate number of autoless households, between 50 and 100. The central part of the City, adjacent to West Main Street in the north and Tyler Avenue in the east, contains Block Groups with relatively low numbers of autoless households, between zero and 50.

Major Trip Generators

Major trip generators are those facilities in the community that a large number of people typically need to access for daily life activities. Major trip generators include job training centers, major employers, governmental offices, medical facilities, educational facilities, human service agencies, and shopping destinations. Areas of trip origins such as apartment complexes, assisted living facilities, and senior housing complexes are also considered major trip generators.

Data concerning the locations of major trip generators were collected and mapped in Figure 2-8. The trip generators are listed in Table 2-1. The purpose of this analysis was to develop a visual tool to examine the locations of important transit origins and destinations and to look at the extent to which they are currently served by public transportation. While Radford University's Tartan Transit City Loop currently provides some service in Radford and to Fairlawn, these services are not open to the public. In accordance with the previous figures illustrating transit dependent populations throughout the City, residents need transportation options to travel between their everyday origins and destinations.

Figure 2-6: Transit-Dependent Population: Persons Living Below the Poverty Level

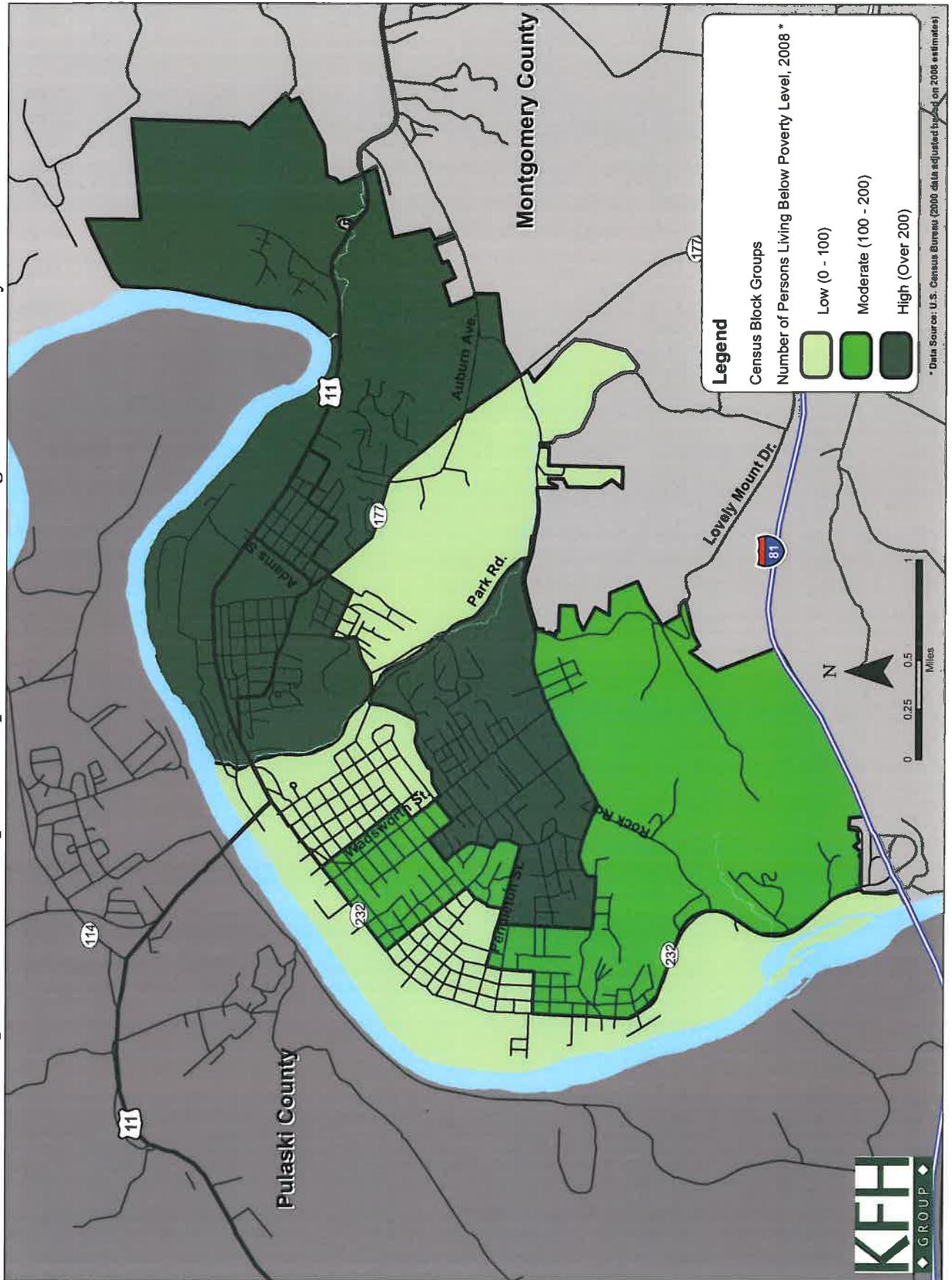


Figure 2-7: Transit-Dependent Population: Autoless Households

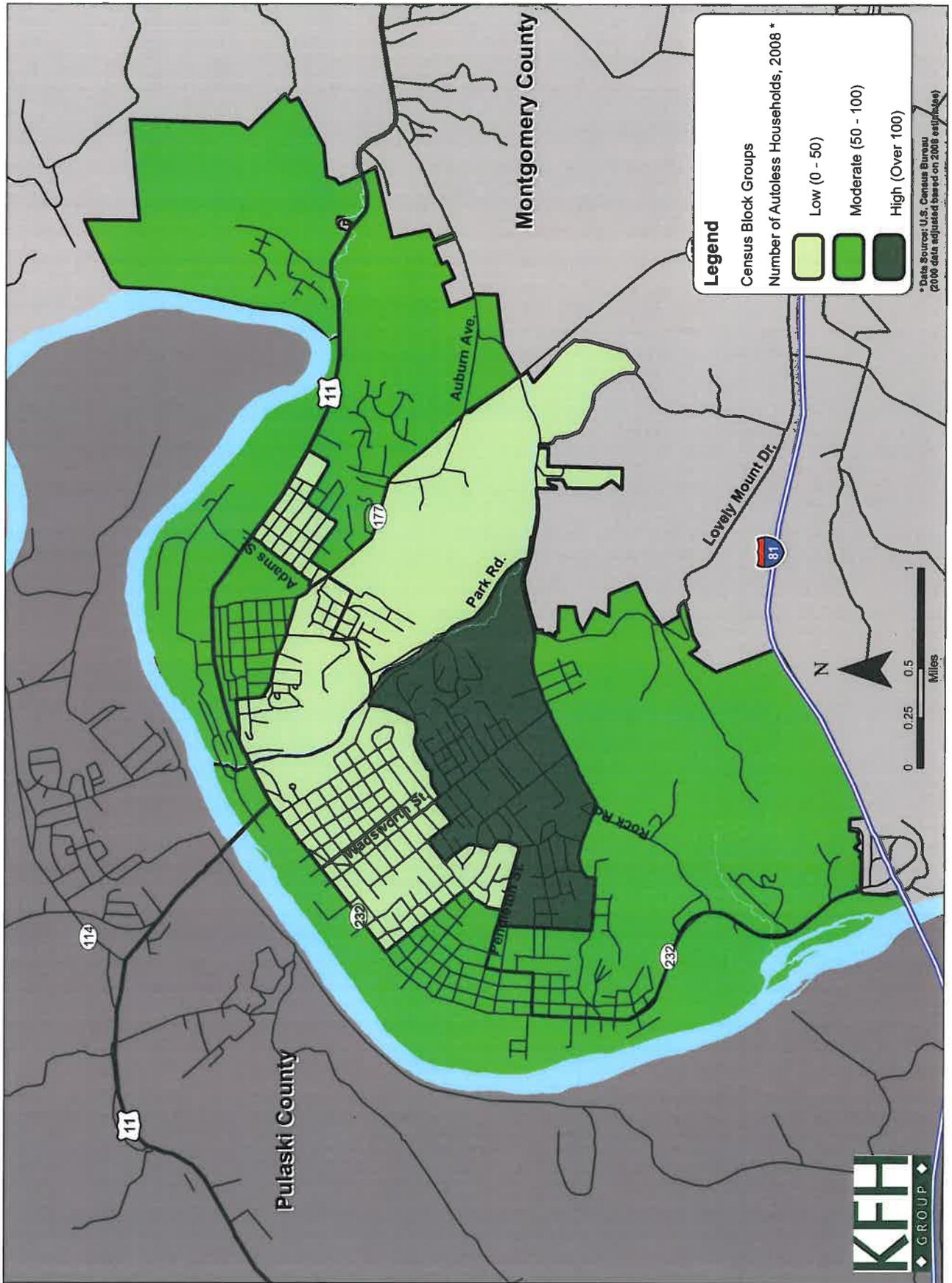


Figure 2-8: Radford Area Trip Generators

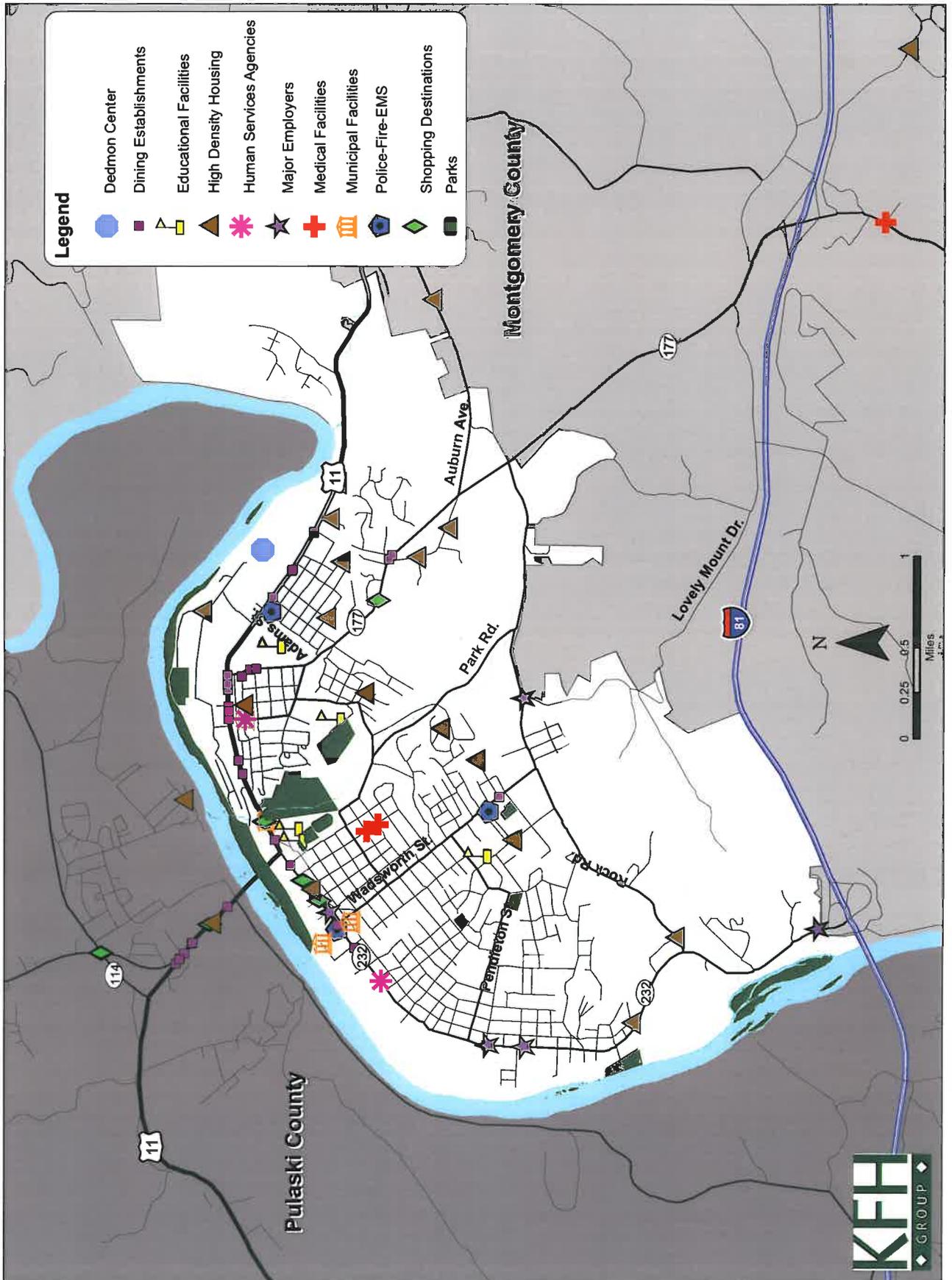


Table 2-1: Trip Generators

Type	Name	Address	City	State	ZIP
Human Services Agency	City of Radford Department of Social Services (DSS)	928 W Main St	Radford	VA	24141
Human Services Agency	Virginia Employment Commission Radford Field Office	206 3rd Ave	Radford	VA	24141
Major Employer	Danaher/Kollmorgen	201 W Rock Rd	Radford	VA	24141
Major Employer	Radford Industrial Center	Corporate Dr	Radford	VA	24141
Major Employer	Internet Corporation	1701 W Main St	Radford	VA	24141
Major Employer	Danaher/Kollmorgen	501 W Main St	Radford	VA	24141
Major Employer	Goodyear Tire & Rubber Company	1905 W Main St	Radford	VA	24141
Medical Facility	Carilion Radford Center	700 Randolph St	Radford	VA	24141
Medical Facility	Carilion Clinic Saint Albans Hospital	2900 Lamb Cir	Christiansburg	VA	24073
Medical Facility	Carilion New River Valley Medical Center	2900 Lamb Cir	Christiansburg	VA	24073
Medical Facility	New River Valley Pediatrics	202 8th St	Radford	VA	24141
Medical Facility	Radford Nursing and Rehabilitation Center	700 Randolph St	Radford	VA	24141
Mobile Home Park	Rustic Village Mobile Home Park	1500 Staples St	Radford	VA	24141
Mobile Home Park	Eagleview Mobile Home Park	6441 Belspring Rd	Fairlawn	VA	24141
Mobile Home Park	Sowers Mobile Home Park	3346 Meadow Creek Rd	Christiansburg	VA	24073
Mobile Home Park	Long's Trailer Court	1224 Rock Rd	Christiansburg	VA	24073
Mobile Home Park	Massie's Mobile Home Park	2834 Peppers Ferry Rd NW	Christiansburg	VA	24073
Municipal	Chamber of Commerce	200 3rd Ave	Radford	VA	24141
Municipal	Public Library	30 W Main St	Radford	VA	24141
Municipal	Radford Armory	6th St at Scott St	Radford	VA	24141
Municipal	Visitor's Center/Glencoe Museum/Arnheim	600 Unruh Dr	Radford	VA	24141
Municipal	City of Radford Municipal Building	619 2nd St	Radford	VA	24141
Parks and Recreation	Dedmon Center	101 University Dr	Radford	VA	24141
School	Belle Heth Elementary School	810 2nd Ave	Radford	VA	24141
School	Dalton Intermediate School	60 Dalton Dr	Radford	VA	24141
School	McHarg Elementary School	700 12th St	Radford	VA	24141
School	Radford High School	50 Dalton Dr	Radford	VA	24141
School	Radford University	801 E Main St	Radford	VA	24141
Senior/ Assisted Living Facility	Ridgewood Place Senior Apartments	109 Ridgewood Ln	Radford	VA	24141
Senior/ Assisted Living Facility	Fairlawn Manor	6599 Annie Akers Rd	Fairlawn	VA	24141
Senior/ Assisted Living Facility	Riverbend Apartments	108 Midkiff Ln	Radford	VA	24141
Senior/ Assisted Living Facility	Wheatland Hills Retirement Center	7486 Lee Hwy	Fairlawn	VA	24141
Shopping Center	Wal-Mart Supercenter	7373 Peppers Ferry Blvd	Fairlawn	VA	24141

Figure 2-8 shows that most local trip generators within Radford are located along East and West Main Streets. In addition, Fairlawn has a number of shopping destinations and senior residential facilities, and the Carilion New River Valley Medical Center is about five miles south of the City. New transit alternatives will be developed to serve these major trip generators, as well as shopping, dining, and recreation destinations, later in this planning process. It is also important to note that this study focuses on developing transit alternatives to serve Radford residents, but the City is also a regional destination. Visitors and those commuting or traveling to Radford from other parts of the New River Valley will benefit from local transit services provided in the City, as well as longer distance services that may be recommended to serve the needs of residents in Radford and the region alike.

Figure 2-9 shows the trip generators and the population density within Radford. The map shows that most trip generators are located in the central and northern parts of the City and coincide with the densest Block Groups. Therefore, new transit services targeted toward these areas can serve the highest concentrations of people within Radford as well as most origins and destinations. A few major employers are located along West Main Street in areas with relatively low population density. Proposed services in this area will likely focus on transporting residents from origins in central and eastern Radford to these employers in the western part of the City.

Radford University

Radford University serves nearly 9,200 students through seven colleges including “strong programs in business, geography, nursing, communications, and education.”²⁴ Located in the northeastern part of the City, the campus consists of 177 acres of land including 15 residence halls, which house approximately 2,800 students. Other private housing options are located in surrounding neighborhoods within walking distance of the campus. Radford University is the largest employer and a “major economic generator” in the City, though limited options within Radford mean that students often travel outside the City for retail and entertainment opportunities.²⁵ The transportation needs of Radford University students were reviewed earlier under the 2008 transportation survey results associated with the Campus Master Plan. An additional student survey, tailored more toward potential transit service opportunities, will be administered as part of this service planning study. The students’ transportation needs garnered from these surveys will be considered in the development of transit alternatives that serve both Radford University and the City.

²⁴ Hill Studio. *City of Radford Pre-Final Draft Comprehensive Plan 2030*. September 2008. Received via data CD from Jim Hurt, City Engineer, City of Radford in July 2009.

²⁵ Quoted from the *City of Radford Pre-Final Draft Comprehensive Plan 2030*.

STAKEHOLDER AND COMMUNITY INPUT ON TRANSPORTATION NEEDS

In addition to collecting and analyzing demographic data, to further understand the need for transit services specific input was received from the community. This qualitative data concerning transit needs included a discussion of transportation needs at the project kick-off meeting, two surveys regarding the transportation needs of City residents and Radford University students, and input through the Facebook social networking Website.

Project Kick-Off Meeting

At the June 23, 2009 kick-off meeting with the Radford Public Transit Committee, input on the specific transportation needs of the University and City were received.

These needs included:

- Transportation services from the University and the City to area grocery stores (i.e. Food Lion and Wade's), restaurants (i.e. Applebee's and Sal's), and locations in Pulaski County (i.e., Wal-Mart, Kroger, banks).
- Transportation services to connect City of Radford residents to employment, including jobs at Radford University and a connection to the Smart Way Commuter Bus to Roanoke. Blacksburg including Virginia Tech and Christiansburg are additional employment destinations.
- Transportation services to connect City of Radford residents to community services (i.e., medical facilities, Department of Social Services offices).
- Access to regional destinations (i.e. Carilion New River Valley Medical Center, Virginia Tech, Roanoke).
- Connections between the campuses of Radford University, Virginia Tech, and New River Community College.
- Sufficient transit services for Radford University such that the University could reconsider the policy regarding car use on campus.
- Transportation services to support local economic development, particularly to promote downtown Radford.

City of Radford Resident Survey

To gain specific input on transportation needs from City of Radford residents, a survey was administered in September/October, 2009. A copy of the survey is included in Appendix C.

The survey was distributed to City residents with their September utility bills. The survey was also posted on the City website, and blank surveys along with individual display boxes with return slots were located at a variety of local businesses, government offices, and community locations (City Treasurer's Office, City Recreation Center, City Library, U.S. Post Office, Wade's grocery, Sal's Italian restaurant, Carillion New River Valley Medical Center). Outreach activities to raise awareness of the survey included an article on the front page of the local newspaper (*The Radford News Journal*) and a notice in the *City Newsletter* that is mailed to each utility account holder.

A total of 780 completed surveys were received. While the entire results tally can be found in Table 2-2, several highlights from the findings are presented below.

The first portion of the transit service plan survey helped determine the demographic makeup and general travel patterns of Radford residents:

- Respondents indicated that the most prevalent age groups within surveyed households were:
 - 45-59 (46%)
 - 25-44 (46%)
 - 19-24 (32%)
- Out of all of those households only 5% of eligible individuals did not have a driver's license.
- Over half (67%) of these households have two or more working vehicles.
- The majority of respondents (90%) were residents of Radford, and 23% were affiliated with the Radford University (student, faculty, or staff).
- The most common duration for their current trips was "30 minutes or less" (69%), trailed by durations of "30-45 minutes" (21%), and "45-60 minutes" (7%).
- The most popular mode of transportation for access to work, school, shopping, and other life activities was driving one's self (86%), followed by carpooling (13%) and walking (12%).

Table 2-2: City of Radford/Radford University Transit Service Plan Survey Summary

Distributed with September utility bills; also placed in key locations throughout Radford
in September and October 2009

Q1: Please indicate the number of people in your household by age group:

Under 12:	<u>24%</u>	45-59:	<u>46%</u>
12-15:	<u>8%</u>	60-69:	<u>28%</u>
16-18:	<u>7%</u>	70-79:	<u>14%</u>
19-24:	<u>32%</u>	80-89:	<u>12%</u>
25-44:	<u>46%</u>	90+:	<u>2%</u>

Q2: Please indicate how many of these individuals (who are eligible) have a driver's license:

0:	<u>5%</u>	3:	<u>9%</u>
1:	<u>33%</u>	4 or more:	<u>5%</u>
2:	<u>47%</u>		

Q3: How many working vehicles (cars/trucks/motorcycles) are available in your household?

1:	<u>33%</u>	3:	<u>17%</u>
2:	<u>41%</u>	4 or more:	<u>9%</u>

Q4: Please check all that apply:

I am a Radford City resident:	<u>90%</u>	I am on the staff at Radford University	<u>4%</u>
I am a student at Radford Univ.:	<u>11%</u>	I am on the faculty of Radford Univer:	<u>8%</u>

Q5: What is your current primary mode of transportation to access work, school, shopping, medical appointments, and other life activities?

Drive myself:	<u>86.3%</u>	Transportation services provided by City of Radford (School Bus):	<u>1.9%</u>
Ride with family or friend:	<u>13.6%</u>	Tartan Transit services provided by Radford University (T2) :	<u>0.6%</u>
Bicycle:	<u>3.1%</u>	Transportation services provided by NRVCS (Community Transit	<u>0.9%</u>
Walk:	<u>11.9%</u>	Other:	<u>1.3%</u>
Taxi:	<u>0.8%</u>		

Q6: We anticipate that any new transit services in Radford would use small buses to operate several routes in the City and adjacent areas, with marked bus stops and service open to anybody who wishes to ride and pay the fare. Do you think there is a need for this type of public transit service in the City of Radford?

Yes:	<u>88%</u>	No:	<u>12%</u>
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Q7: If you think public transit services are needed, please indicate what types of services would be most useful (please check only three and where appropriate note locations):

Downtown Circulator:	<u>39%</u>	Service to Fairlawn:	<u>46%</u>
Service to Pulaski County:	<u>8%</u>	Services geared to medical and social services:	<u>39%</u>
Service to Blacksburg:	<u>26%</u>	Services geared to shopping centers and major stores:	<u>43%</u>
Service to Christiansburg:	<u>34%</u>	Services geared to employment locations:	<u>12%</u>
Service to Roanoke:	<u>18%</u>	Services geared to Radford Government Offices:	<u>12%</u>
Services to RU campus:	<u>24%</u>	Other:	<u>5%</u>

Q8: Would you or members of your household use public transit services in or around Radford?

Yes:	<u>65%</u>	No:	<u>35%</u>
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Q9: What is the reasonable fare you would be willing to pay for a one-way public transit trip?

\$0.25:	<u>7%</u>	\$1.25:	<u>17%</u>
\$0.50:	<u>24%</u>	\$1.50:	<u>8%</u>
\$0.75:	<u>13%</u>	More than \$1.50:	<u>4%</u>
\$1.00:	<u>41%</u>		

Q10: What days of the week should services operate? (Check all that apply)

All weekdays:	<u>76%</u>	Saturdays:	<u>58%</u>
Only some weekdays:	<u>11%</u>	Sundays:	<u>32%</u>

Q11: How early and late should public transit services operate to be convenient for you and members of your household? (Please complete for only those days you and other household members would use public transit services)

Weekdays

<i>How early?</i>		<i>How late?</i>	
5:00 AM or earlier	2.0%	Noon-3:00 PM	0.9%
5:30 AM	0.5%	4:00 PM	2.0%
6:00 AM	17.1%	5:00 PM	7.9%
6:30 AM	2.7%	6:00 PM	14.6%
7:00 AM	32.4%	7:00 PM	17.8%
7:30 AM	6.2%	8:00 PM	12.9%
8:00 AM	19.6%	9:00 PM	13.1%
8:30 AM	1.6%	10:00 PM	14.4%
9:00 AM	10.6%	11:00 PM	7.2%
9:30 AM	0.2%	12:00 AM	4.3%
10:00 AM	5.9%	1:00 AM	0.7%
Noon or later	0.5%	2:00 AM or later	2.9%

Saturdays

<i>How early?</i>		<i>How late?</i>	
5:00 AM or earlier	0.7%	Noon-3:00 PM	2.2%
5:30 AM	-	4:00 PM	2.2%
6:00 AM	6.8%	5:00 PM	5.9%
6:30 AM	1.2%	6:00 PM	13.5%
7:00 AM	14.9%	7:00 PM	4.9%
7:30 AM	0.7%	8:00 PM	10.3%
8:00 AM	27.1%	9:00 PM	11.3%
8:30 AM	0.5%	10:00 PM	15.8%
9:00 AM	25.4%	11:00 PM	8.4%
9:30 AM	0.7%	12:00 AM	9.4%
10:00 AM	14.4%	1:00 AM	3.0%
11:00 AM	1.5%	2:00 AM	8.9%
Noon or later	2.7%	3:00 AM or later	2.0%

Sundays

<i>How early?</i>		<i>How late?</i>	
5:00 AM or earlier	1.6%	Noon-1:00 PM	2.0%
6:00 AM	6.7%	2:00 PM	3.6%
7:00 AM	10.6%	4:00 PM	3.6%
7:30 AM	1.2%	5:00 PM	8.8%
8:00 AM	20.9%	6:00 PM	17.6%
8:30 AM	0.4%	7:00 PM	6.8%
9:00 AM	20.1%	8:00 PM	10.8%
9:30 AM	1.2%	9:00 PM	15.6%
10:00 AM	20.1%	10:00 PM	10.4%
10:30 AM	0.8%	11:00 PM	8.0%
11:00 AM	3.1%	12:00 AM	6.0%
11:30 AM	0.8%	1:00 AM	-
Noon or later	9.8%	2:00 AM or later	3.2%

***Total surveys analyzed:** 780

Notes:

1. Percentages were taken out of total number of responses for that question, not total surveys (where not all questions were answered).
2. Survey questions 6, 7, 8, 9, and 14 included additional comments, which are not included in this summary, but will be described in the report.
3. For question 11, where responses for "How early" were not on the half hour, they were counted as the previous half hour; and where responses for "How late" were not on the hour, they were counted as the next hour.
4. Questions 12 and 13 are summarized on separate pages.

While the first part of the survey established a sense of general travel patterns for the riders, the second part included several questions regarding the type of transit service that residents would like to see in Radford:

- A significant majority (88%) of respondents indicated that there is a need for transit services in Radford.
- When asked what type of services are needed, the most popular responses were:
 - Service to Fairlawn (46%),
 - Services geared to major shopping centers and major stores (43%),
 - Services geared to medical and social services (39%), and
 - A downtown circulator (39%).
- Over half (65%) of respondents indicated that members of their household would use public transit in and around Radford.
- When asked what fare they would be willing to pay for a one-way public transit trip, \$1.00 was the most popular response (41%).
- 76% of respondents indicated that transit service should operate on all weekdays, 58% stated a desire for Saturday service, and 32% of respondents would like to see service on Sundays.
- When asked how early and late service should operate, the most popular responses were:
 - 7:00 a.m. (32%) or 8:00 a.m. (20%), and 7:00 p.m. (18%), 6:00 p.m. (15%), or 10:00 p.m. (14%) for weekdays,
 - 8:00 a.m. (27%) or 9:00 a.m. (25%), and 10:00 p.m. (16%) or 6:00 p.m. (14%) on Saturdays, and
 - 8:00 a.m. (21%), 9:00 a.m. (20%), or 10:00 a.m. (20%), and 6:00 p.m. (18%) or 9:00 p.m. (16%) on Sundays.

The final section of the survey asked about specific origins and destinations, including the respondents' homes, businesses, and other frequented destinations, to help develop effective transit alternatives:

- The most common locations for homes and businesses were along Tyler Avenue and Wadsworth Street.
- The most common destinations were Fairlawn including Wal-Mart and Kroger, Radford University, Christiansburg including the New River Valley

Mall, Carilion New River Valley Medical Center, and various locations within Radford including Wade's, downtown, and Food Lion. Blacksburg and Virginia Tech were additional popular destinations.

At the end of the survey respondents were encouraged to leave any additional comments regarding public transportation in Radford. There were several themes that arose for these comments. The most prevalent was that there is a need for transit for people who do not have the ability to drive themselves. The need for accessible transit service for people with disabilities, the elderly, and residents who do not own a personal automobile were highlighted by numerous respondents. Several comments included concerns about how transit service would be funded and whether or not taxes would have to be raised in order to provide the service. Many comments also highlighted the environmental benefits of transit and the potential to reduce congestion.

It is worth noting that the survey respondents provided nine pages' worth of comments supporting transit service in Radford, and only three pages of comments were not in favor of transit service. Some highlights of both positive and negative comments from survey respondents include:

- "I think if we had public transportation again in primary Radford, our downtown areas and business would increase their income, therefore keeping our tax dollars on this side of the bridge. This would benefit everyone in the city."
- "I think families in the West End of Radford deserve to be able to get to a grocery store, or doctor, or to work, or child care, for a reasonable price if they are lacking independent transportation. Sometimes children are hindered from participating in extracurricular activities because their families don't have transportation."
- "Many older people live at home and no longer drive. Many cannot avail themselves of services; daily bread luncheons, food distribution at Fire Station, Radford Clothing Bank, doctors' offices, etc."
- "I think it is imperative that the transportation be made available. In my neighborhood I see evidence that many families struggle to maintain and own motor vehicles -- many people struggle walking to and from work."
- "I rode as a teenager all over Radford and felt independent and spent money downtown at the stores. I can't help but think that it would help our downtown now if people who couldn't drive had access to these stores."

- “It would be a great way to link the city. On-campus students would likely use it the most. If the University paid student fare, that would be even more convenient.”
- “Don't really need it for this household, but surely it would help a lot of people. Am willing to support it if tax increase is needed. Buses should be "green" as possible.”
- “I don't think it will be used. Parking is free and plentiful, and one can drive anywhere in Radford in five minutes. RU students would be the primary users, and they are only here 2/3 of the year.”
- “We need no new tax increase in Radford for this service.”
- “You cannot continue to tax the citizens of Radford out of every cent they have. There are many avenues that already exist to get people where they need to go. Churches are more than willing to help out.”
- “I think the current system with Tartan transit taking care of the student population and the NRV community services taking care of those with special needs works well, I don't think the greater population will ride the bus. The city has more important things to spend money on than a mass transit system.”
- “I don't believe Radford needs public transit. There isn't anywhere to go. Radford needs to use money to attract companies to Radford.”

Radford University Survey

In addition to the paper survey of city residents, an on-line survey was conducted for Radford University students, staff, and faculty. The survey was distributed to University e-mail accounts, and available through the University's Website. A copy is located in Appendix D.

The on-line survey received 825 responses. A detailed report is included in Appendix E. Some highlights include:

- Most popular off-campus destinations were Wal-Mart, Blacksburg/Virginia Tech campus, Christiansburg (mall and Target), Downtown Radford/Main Street, Carilion New River Valley Medical Center, CVS, Food Lion, and Krogers.

- Highest priorities for new or improved transit service:
 - New service to Christiansburg (45%)
 - New service to Blacksburg/VT (37%)
 - New late night scheduled bus service between campus and locations in Radford (34%)
 - Expanded service to locations in Radford (29%)
 - Expanded service to Fairlawn (29%)
- Preferred frequencies of service was 10-15 minutes for on-campus locations, and 15-30 minutes for off-campus sites.
- 64% of respondents indicated they would support an increase in student activity fees to fund public transit services. The majority (58%) were willing to pay \$25 more per semester, and 26% said they would pay \$50 or more.

Overall Survey Results

Together, the two surveys provided important data and information for the planning process. These include:

- Both City residents and students prioritize service to Fairlawn and Christiansburg, as well as services geared toward shopping.
- Residents prioritize service downtown more, while students/faculty/staff prioritize Blacksburg/Virginia Tech as a higher need.
 - While most popular weekday schedules were generally similar, from 7:00/8:00 a.m. to 6:00/7:00 p.m., City residents would also like 6:00 a.m. service while many students/faculty/staff were comfortable with a start between 9:00 a.m. and noon.
- For Saturday service, both City residents and University students /faculty/staff supported similar start times between 8:00 a.m. and 10:00 a.m., students preferred a later end time (midnight-2:00 a.m. compared to residents (10:00 p.m.).
- For Sunday service, the different groups supported similar start times between 8:00 a.m. and 10:00 a.m., but again students preferred a later end time (midnight) compared to residents (9:00 p.m.)

The Survey results also confirmed major origins and destinations identified through the demographic analysis and the input from the committee, and were then used to develop the proposed routes detailed in Chapter 4.

Facebook Page

In February, 2009, a “Support New Transit in Radford” page was established on the Facebook social networking site. As of December 16, 2009, there were 410 members in the group. The group was updated on the progress of the transit study, and received links to both the City and University surveys. Members also posted comments on the Facebook “wall”, and a sample of these comments reflect the need and support for a public transit option in Radford:

- “I have lived in Radford almost 12 years we have needed something like this for years.”
- “It's a little irritating that the only buses in Radford take you to Walmart, and that's basically it.”
- “I think part of what made Blacksburg Transit such a success is having most if not all part-time drivers -- most of those being students. I think the same setup would GREATLY make RT (or Radford Transit, if you will) just as much as a success as BT has been for Blacksburg and Virginia Tech! Since both jurisdictions are largely based around the University, a system based on BT (or at least BT's origins), would work quite nicely I think.”
- “This would be great to have in Radford. I would love to save gas and be able to get a ride to Blacksburg and Christiansburg.”
- “I am very excited about this project, and I agree that public transit is definitely needed in Radford. As a commuter student at RU, I can see how it would be such a great relief to parking headaches. I also look forward to seeing more of a connection between Fairlawn and Radford City. Bring on the buses!”

SUMMARY

Numerous plans and studies conducted in Radford and the New River Valley have cited the need for increased local and regional transportation options. Though Radford is a relatively compact city with a number of trails and pathways (and plans for further expansion), it currently lacks a transportation alternative that is comparable to driving a personal vehicle. Traffic, congestion, and parking are escalating concerns with the City’s and Radford University’s projected growth and development. Providing transit services, and implementing Travel Demand Management services such as carpooling, vanpooling, and telecommuting, can help mitigate and potentially

avoid these problems in the future, thereby preserving a high quality of life in the New River City. The demographics analysis also demonstrated significant numbers of population segments that tend to be transit dependent. Not only can the provision of transit services help transit dependent persons live independently and affordably, but it also provides a transportation alternative for residents who previously solely depended on their automobile.

Chapter 3

Existing Transportation Services

INTRODUCTION

This chapter provides an overview of the transportation resources that are currently available in the City of Radford and surrounding region. Specifically, the focus of this review is on the current services operated by Radford University, transportation services operated by a human service agency based in Radford, and two public transportation operators based in adjacent jurisdictions. These providers are very different in the types of service each provides, as well as the areas and populations they serve. Therefore, the information in this chapter is presented for background purposes, and not to make detailed evaluations of transportation providers or to make comparisons between different providers.

Interviews were conducted with Community Transit, Blacksburg Transit, and Pulaski Area Transit (PAT) to gain a better understanding of their capacity and interest in possibly providing transportation services in Radford. These one-on-one discussions concerning their programs conveyed important insight into the current transportation providers, and how their organizations may fit into future transit plans for the City of Radford and Radford University. This process provided information that was used in the development of service and organizational alternatives.

In addition, information was obtained from Radford University regarding their current Tartan Transit services. Also, an interview with the City of Radford included discussion of the transportation services the City provides for Radford City Schools.

Information is also included on the Smart Way commuter bus service that operates between Roanoke and Christiansburg/Blacksburg. Connections to this service were noted as one of the project's objectives by the Radford Public Transit Committee that is serving in an advisory capacity for the *City of Radford/Radford University Transit Services Plan*. Finally, information on intercity bus and rail, airports, and taxi services is also included in this chapter.

REVIEW OF EXISTING TRANSPORTATION SERVICES

Tartan Transit

Radford University currently operates the Tartan Transit, or “T2”, service that is open to Radford University students, faculty, and staff. Information on this service was provided via correspondence with the University, along with additional information on Tartan Transit riders and areas for improvement in the Radford University Campus Master Plan which is discussed in Chapter 2. This information includes the results of a transportation survey conducted in conjunction with the University’s Campus Master Plan, as well as proposed improvements to the University’s transit system.

The current T2 service features two routes: the Campus Loop and the City Loop.

Campus Loop

The Campus Loop operates Monday through Friday from 7:45 a.m. to 10:00 p.m., operating every 15 minutes from 7:45 a.m. to 2:15 p.m. and every 30 minutes from 2:30 p.m. to 9:45 p.m. Two vehicles operate on the Campus Loop until 2:30 p.m., and then one vehicle for the remainder of the day. The Campus Loop serves the following stops:

1. Hunters Ridge, on the curb, in front of the 400 building
2. Lot E, University Drive
3. Lot A, in front of Young Hall
4. Lot DC, University Drive on the upper side of the Dedmon Center
5. Lot Z, University Drive on the riverside of the Dedmon Center
6. Lot CC, University Drive adjacent to the Stadium
7. Lot FF, Stockton Street



On Sunday, the Campus Loop operates from 6:00 p.m. – 1:00 a.m. There are no set stop times on Sunday. The route begins at the Dedmon Center, and serves the following locations:

1. Lot DC, University Drive on the upper side of the Dedmon Center
2. Lot Z, University Drive on the riverside of the Dedmon Center
3. Lot CC, University Drive adjacent to the Stadium
4. Lot E, University Drive

5. Lot A, in front of Young Hall
6. Waldron Hall, off of Jefferson Street
7. Walker Hall, off of Tyler Avenue

City Loop

The City Loop operates Monday through Friday from 2:30 p.m. to 8:30 p.m., on an hourly basis. The City Loop does not operate on weekends. It follows this route:

1. Route starts in Lot A, in front of Young Hall, departs at :30 past the hour
2. East Main Street, in front of University BP Gas Station
3. Wal-Mart, between Wal-Mart and shopping plaza, departs at approximately 2:50 p.m.
4. RU Business Technology Park, stops on University Park Drive
5. Corner of Grove Avenue and Tyler Avenue
6. Food Lion shopping plaza on Tyler Avenue
7. Lot A, in front of Young Hall

Vehicles

Four accessible vehicles are currently used to provide the T2 service. Two 35-passenger Bluebird buses, 2004 and 2007 models with 86,700 and 62,700 miles, respectively, provide the regular service. Two 25-passenger vehicles, a 1995 Ford with 129,600 miles and a 2000 Thomas with 86,300 miles, serve as back-up.

Ridership

Radford University does not maintain annual ridership data, but provided daily ridership for a 16-day period in October 2007. During this time period, there were an average of 631 daily riders on the Campus Loop and 45 daily riders on the City Loop. Ridership is free for those with a valid University identification card.

Funding

The T2 services are funded through a combination of sources, which include student fees, revenues from parking, and an annual contribution from the Hunter's Ridge Apartments, which are served by the Campus Loop. These funding sources support both the transit and parking programs at the University. For FY09, the Radford University budget for the T2 services was \$231,797.



City of Radford

The City has a contract with the Radford City Schools system to provide school transportation. The City Engineer's Office performs routing and other administrative roles, and buses are marked as "City of Radford".

A fee-based system is in place for the purchase of transportation services. Tickets are available for \$1.70 per pack of ten tickets, and in addition a prepay program was established for the 2009-2010 school year with the following payment schedule:

- Full year paid by 8/31/09: \$55.00
- Half year paid in two installments: \$28.25 per installment
- Quarterly paid in four installments: \$20.40

Blacksburg Transit

The Blacksburg Transit system began operating service for Virginia Tech and Blacksburg residents in 1983, and except for a short startup period during which a transit management company oversaw the operation, has been administered and operated by the Town of Blacksburg. Blacksburg Transit provides fixed-route bus service and demand response van service throughout Blacksburg, as well as regional routes to neighboring communities.

Routes

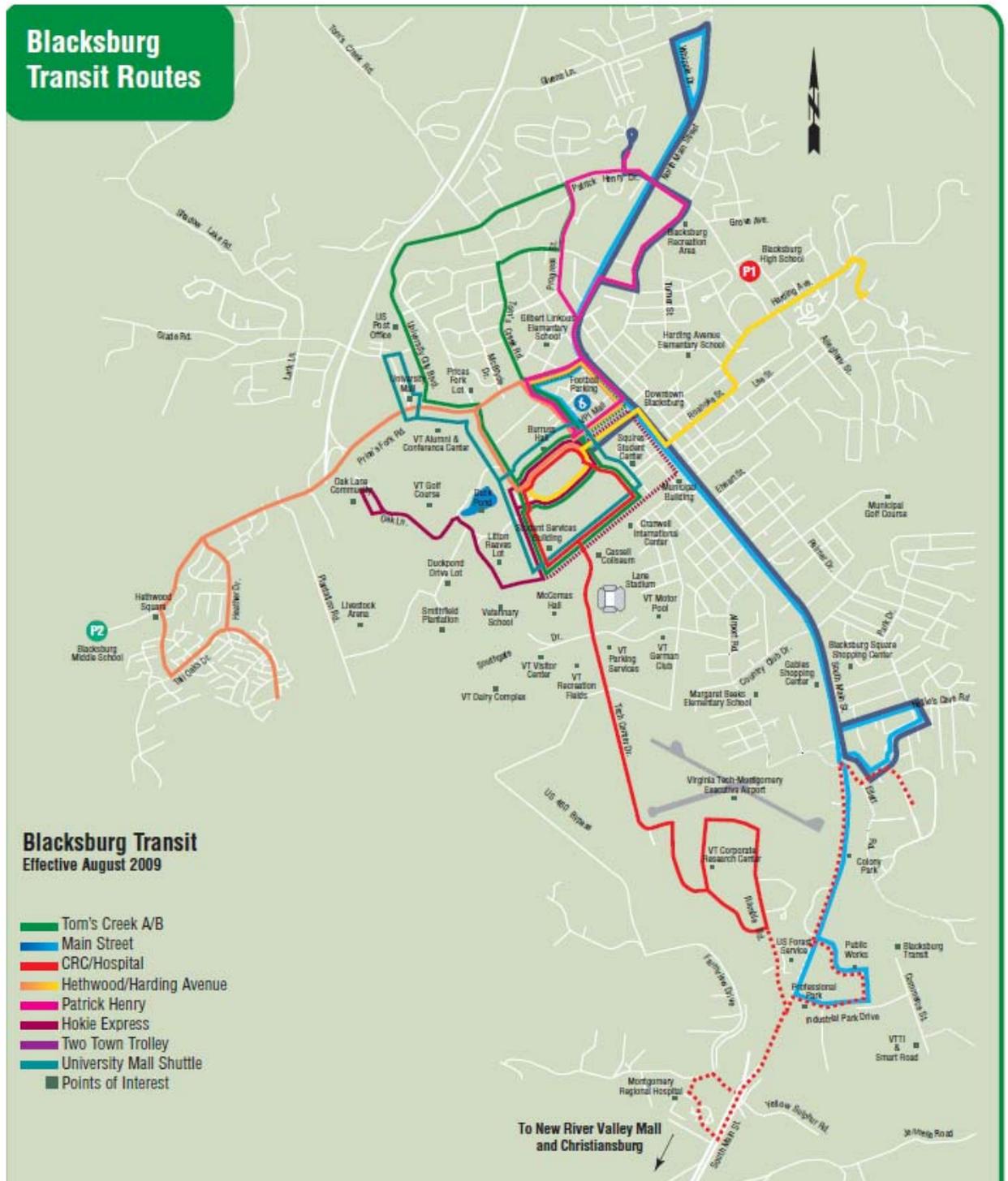
The Blacksburg Transit system currently includes the following fixed-route services:

- Corporate Research Center (CRC) Shuttle
- Hethwood / Harding Avenue
- Hokie Express
- Hospital Connector
- Main Street
- Patrick Henry
- Tom's Creek A
- Tom's Creek B
- Two Town Trolley - Blacksburg Loop
- University Mall Shuttle

A system map is shown in Exhibit 3-1, and individual route maps are included in Appendix F.



Exhibit 3-1: Blacksburg Transit System



Source: Blacksburg Transit Website, <http://www.btransit.org/cms.php/routes/BTMAP-0809.pdf>, (accessed January 10, 2010).

Schedules

Blacksburg Transit's schedule for operation coincides with Virginia Tech's school year, since the majority of riders are students. Regular service hours during the school year are 7:00 a.m. to 12:45 a.m. Monday through Thursday, 7:00 a.m. to 2:45 a.m. on Fridays, 9:30 a.m. to 2:45 a.m. on Saturdays, and 11:30 a.m. to 11:30 p.m. on Sundays. The hours of operation are shortened during break periods to end at 10:15 p.m. during the week and at 7:15 p.m. during weekends. Blacksburg Transit does not provide service on Sundays during the summer or on several holidays during the year.

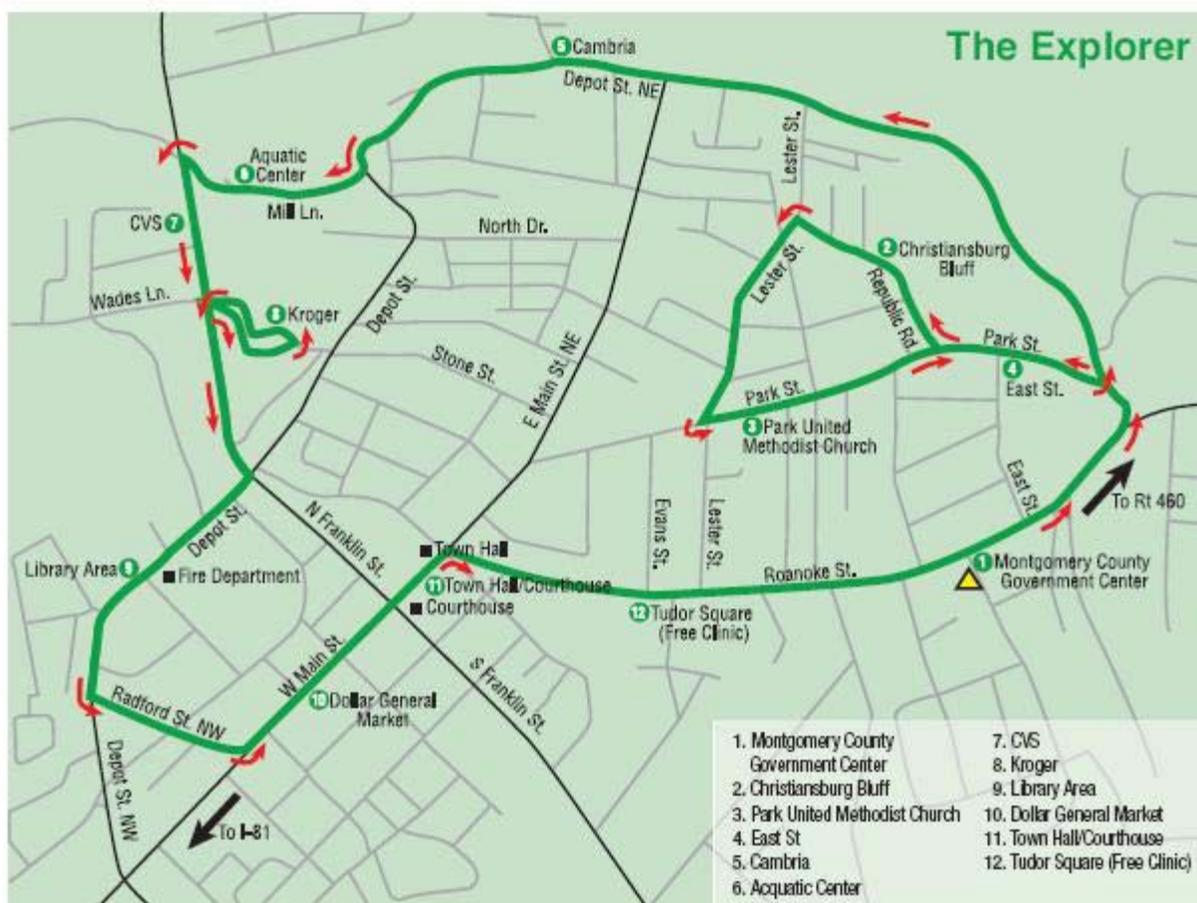
During weekdays, headways range from 10 to 20 minutes throughout the day, decreasing to 30 minutes after 7:00 p.m. and sometimes hourly for late night service up until 2:30 a.m. Frequencies are somewhat lower, 30 to 60 minutes, for weekend services, and some routes such as the Hokie Express do not provide afternoon service during the weekends. The Corporate Research Center Shuttle, the Patrick Henry route, and the University Mall Shuttle operate on weekdays only. The Morning Hospital Connector provides two trips from Virginia Tech to the Montgomery Regional Hospital during weekday mornings; the Blacksburg Loop of the Two Town Trolley now provides afternoon service to the Hospital during the week until 6:00 p.m. Blacksburg Transit's fixed-route services are operated at lower frequencies and for fewer hours per day during school breaks.

Regional Services

In November, 2009, Blacksburg Transit expanded services in Christiansburg. The Two Town Trolley Christiansburg route was eliminated and replaced with three services:

- The Explorer serves Christiansburg's Downtown Central Business District and surrounding neighborhoods. The route operates every 30 minutes between 9:00 a.m. and 7:00 p.m. A map of the route can be found in Exhibit 3-2.
- The Shopper Express serves the commercial areas near the intersection of Route 460 Business and Peppers Ferry Road. The route operates every 30 minutes between 9:00 a.m. and 7:00 p.m. A map of the route can be found in Exhibit 3-2.
- The Go Anywhere! Christiansburg route requires advance reservations and provides service from any place in Christiansburg to any destination within Christiansburg. Service is available Monday through Friday, between the hours of 9:00 a.m. and 4:00 p.m.

Exhibit 3-2: Map of “The Explorer” Route



The Explorer route operates on a continuous loop, stopping at the Government Center at the top of the hour and 30 minutes after the hour.

Figuring out what time to be at a stop is easy!

The Explorer route stops at the Government Center at the top of the hour and at 30 minutes after the hour. So if your stop is 1 – 6, then you should be at these stops at the top of the hour or at 30 minutes after the hour. If your stop is 7 – 12, then you should be at the stop by 15 minutes after or at 45 minutes after the hour.

If you are unsure, please call our helpful staff at 540-961-1185.

Source: Blacksburg Transit Website, http://www.btransit.org/cms.php/christiansburg/explorer_map.jpg, (accessed January 10, 2010).

Fares

The fares for Blacksburg Transit's fixed-route services are \$0.50 per adult and \$0.25 for children ages 3 to 17, persons age 65 and older, persons with disabilities, and Medicare card holders. One-month and six-month passes are available at \$8.00 and \$37.50, respectively, for adults and at half price for children, seniors, persons with disabilities, and Medicare card holders. Children under 3 years old ride for free, and the fares for Virginia Tech students, faculty, and staff, and Virginia College of Osteopathic Medicine students are prepaid. For passengers paying cash fares, transfers between buses are free and valid for one hour. Passengers must ask drivers for a transfer slip, and drivers may even call ahead for passengers to ask that their next bus holds for them.

Paratransit Services

In addition to the fixed-route public transit services, Blacksburg Transit also operates their BT Access, accessible demand-response services for persons who cannot use the fixed-route services due to a temporary or permanent disability. Passengers must complete a two-part application to establish eligibility including verification by a personal care physician. Once an application is accepted, eligible passengers will receive a Passenger Identification Card. BT Access service is only provided within the Town Limits of Blacksburg, and passengers can request transfers to any fixed-route bus including the Two Town Trolley. BT Access operates during the same service hours as the fixed-route services, and the same fares apply.

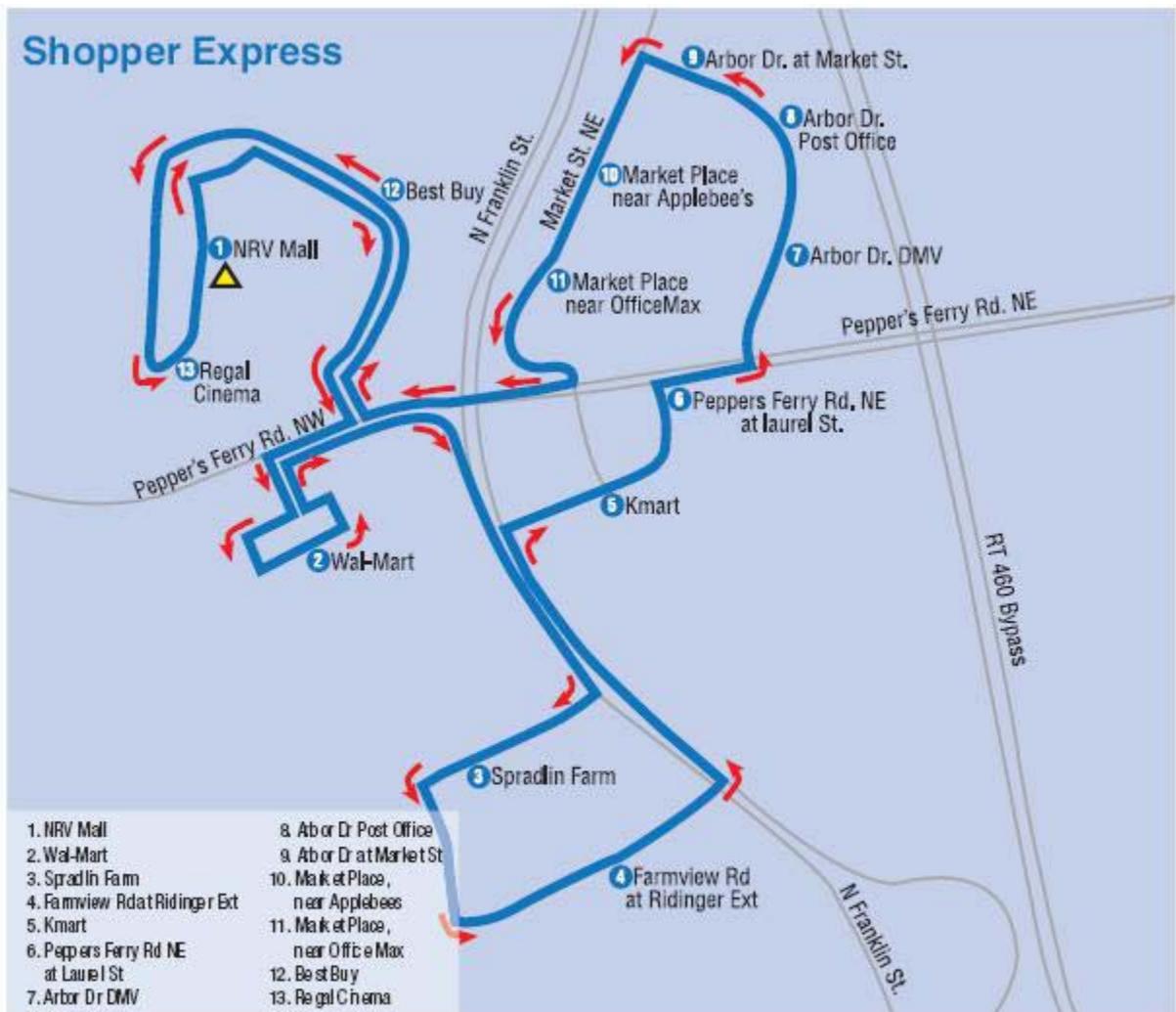
Ridership

In their submittal for the 2007 National Transit Database (NTD), Blacksburg Transit reported 2,445,799 passenger trips, similar to 2006 when just over 2.4 million trips were provided, and slightly more than 2005 when 2.3 million trips were provided. The agency estimates that about 90% of ridership typically comes from Virginia Tech students, 5% from Tech faculty and staff, and the remaining 5% from other Blacksburg citizens.

Operating Data

The overall operating expenses for Blacksburg Transit in FY 2007 were \$3,845,069 (\$3,358,400 for the fixed-route bus services and \$486,669 for demand-response services). In FY 2007, for the fixed-route bus services the combined cost per passenger trip was \$1.38, and for demand-response services the combined cost was \$33.45.

Exhibit 3-3: Map of “The Shopper Express” Route



The *Shopper Express* route stops at the rear entrance of the NRV Mall every 15 minutes. For more information call our helpful staff at 540-961-1185.

Source: Blacksburg Transit Website, http://www.btransit.org/cms.php/christiansburg/shopper_express.jpg (accessed January 10, 2010).

The operating cost per vehicle revenue mile was \$5.48 for the fixed-route bus services, and \$7.93 for demand-response services. The operating expense per vehicle revenue hour was \$49.52 for fixed-route bus services. The operating cost for demand-response services was \$73.04 per revenue vehicle hour.

In terms of system effectiveness, as noted in the NTD data, 35.85 passenger trips were provided per vehicle revenue hour on fixed-route bus services. For demand-response services, 2.18 passenger trips per revenue vehicle hour were provided.

Additional operational data from Blacksburg Transit's 2007 NTD report can be found in Appendix G.

Vehicles

According to the 2007 NTD report, Blacksburg Transit operates 24 buses on their fixed-route services and four vehicles for BT Access during peak service. The active fleet includes 33 fixed-route (30', 35', and 40') buses and 11 vans.

Funding

As noted in the 2007 NTD report, the sources of operating funds for Blacksburg Transit are fare revenues (47%), federal assistance (34%), and State assistance (19%). Sources for capital funding are federal funds (85%), State funds (15%), and other funds (5%).

Community Transit

Community Transit is operated by the New River Valley Community Services (NRVCS), an agency of Virginia's statewide Community Services Board system. Community Transit is a department of the Administration Services section of NRVCS. An organizational chart is included in Exhibit 3-4.

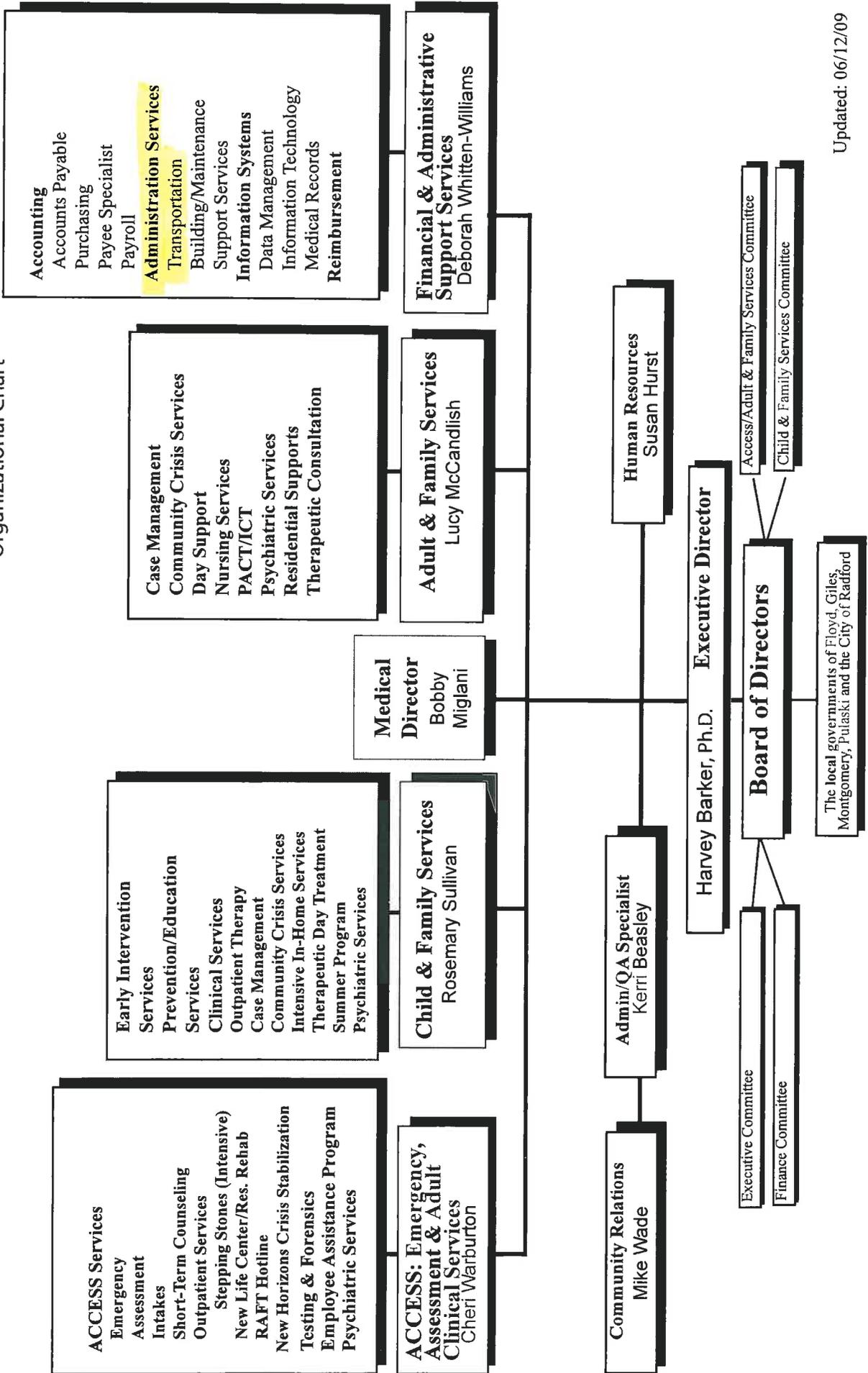
Client transportation is provided in support of the community-based programs for mental health, mental retardation, substance abuse, and prevention services offered by NRVCS. NRVCS serves the City of Radford, as well as the Counties of Floyd, Giles, Montgomery, and Pulaski.





New River Valley Community Services

Organizational Chart



Contractual Arrangements

In addition to services to support the NRVCS programs, Community Transit also provides transportation through contractual arrangements with the following agencies or organizations:

- Logisticare (for Medicaid-funded transportation)
- Virginia Premiere (Medicaid transportation)
- Beans and Rice, Inc.
- City of Radford
- Mental Health Association of the New River Valley
- New River Valley Community Action, Inc.
- Optimal Translation and Transportation
- Radford Nursing and Rehabilitation
- Radford City Social Services

Operating Data

In FY09, Community Transit provided 91,452 passenger trips agency-wide. Of these trips, 23,228 passenger trips were through the contractual agreements listed above and the remainder was in support of NRVCS services. For their past fiscal year, Community Transit reported total operating costs of \$688,943.83.

Vehicle Maintenance Services

In addition to maintaining their vehicles through an in-house garage, Community Transit also provides vehicle maintenance services for New River Community Action (NRCA), a private non-profit that supports low-income individuals and families, Pulaski Area Transit, and the TCOM system that the Commonwealth uses for State-owned vehicles. Vehicle maintenance services for Radford City Social Services are pending.

Training

The Community Transit director and another staff member are certified instructors for the National Safety Council Defensive Driving Courses, and provide this training for NRCA. The director is also a Certified Community Transit Manager (CCTM) through the Community Transportation Association of America (CTAA), and two employees are in the process of obtaining their Certified Community Transit Supervisor (CCTS) certifications through CTAA. The Community Transit staff also includes three Passenger Service & Safety (PASS) certified instructors through CTAA.

Staffing

Community Transit staff currently consists of a Transportation Director, a Dispatcher, two Mechanics, two full-time Drivers, and 18 part-time Drivers. The current fleet includes 24 vehicles -- 21 for passenger transportation along with three support vehicles. In addition, Community Transit currently provides vehicle maintenance for 74 other NRVCS vehicles.

Pulaski Area Transit

PAT began with a demonstration grant from the Virginia Department of Rail and Public Transportation (DRPT) in 2004, and received Federal Transit Administration (FTA) funding to provide general public service beginning October 1, 2005. New River Valley Senior Services, a private non-profit organization, operates PAT.

Services

PAT provides regularly scheduled transportation around Dublin and the Town of Pulaski, including stops at New River Community College in Dublin. Three trips are made daily between Pulaski and Dublin. New River Valley Senior Services also has a contractual agreement with the New River Valley Agency on Aging to provide transportation services to their clients to and from seven nutrition sites throughout the 4th Planning District. They also provide shopping assistance to the Agency on Aging clients and the general public, 60 years of age or older who have no transportation available. People with disabilities under 60 are transported on a space available basis.

Operating Data

In FY 2007, PAT provided 53,072 passenger trips. PAT's operating expenses for FY 2008 were \$265,357. The combined cost per passenger trip was \$5.00. Operating cost per vehicle mile was \$2.96, and operating expense per vehicle hour was \$35.23. In terms of system effectiveness, 7.05 passenger trips were provided per vehicle hour and 0.59 passenger trips per vehicle mile.

Funding

Funding for PAT services comes from a variety of sources, including the FTA Section 5311 Program, the Town of Pulaski, Pulaski County, as well as contracts with the New River Valley Agency on Aging and New River Community College. Some local businesses provide funding support, and an annual golf tournament is held to solicit financial support from the community.

Vehicles

PAT operates six vehicles in peak service. Overall, New River Valley Senior Services operates 35 vehicles, which include 13-passenger vans, minivans, and lift-supported vehicles.

OTHER TRANSPORTATION SERVICES

Smart Way

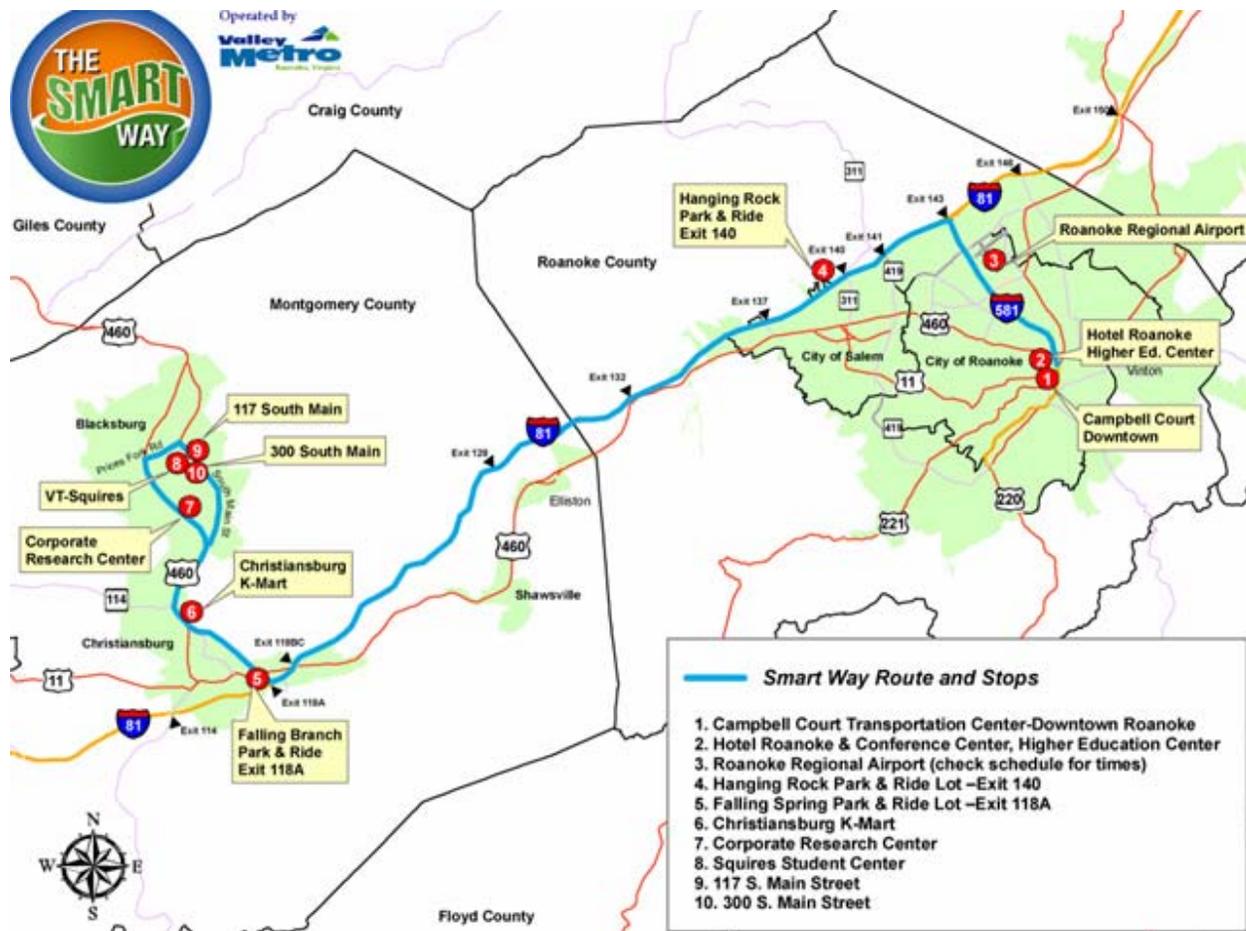
The Smart Way commuter bus service links the Roanoke Valley to the New River Valley. The service originates in downtown Roanoke at Valley Metro's Campbell Court Transportation Center and travels to Christiansburg and Blacksburg, serving the following locations:

- Hotel Roanoke & Conference Center/Higher Education Center
- Roanoke Regional Airport
- I-81: Park & Ride Lot - Exit 140 - Hanging Rock
- I-81: Park & Ride Lot - Exit 118 - Falling Branch
- Christiansburg K-Mart
- The VT Corporate Research Center
- Downtown Blacksburg (Main St)
- Squire Student Center - Virginia Tech Campus (Squires East)

The service provides 13 round-trip daily runs (four trips operate Monday through Friday and nine trips operate Monday through Saturday) from Roanoke (beginning at 5:15 a.m. for the Monday through Friday service and 6:20 a.m. for the Monday through Saturday service) to Blacksburg and ending at 9:40 p.m. There is one trip that operates Friday and Saturday evenings from Roanoke (8:20 p.m.) to Blacksburg (9:40 p.m.) Customers can connect to Valley Metro bus services in Roanoke through a free transfer. See Exhibit 3-5 for a route map and Exhibit 3-6 for the service schedule.

Basic fare for the Smart Way service is \$3.00 for a one-way trip. A discounted half fare of \$1.50 is available for Medicare card holders, persons age 65 or older, and people with disabilities. A monthly pass is also available for \$100 that includes unlimited rides on the Smart Way service as well as Valley Metro fixed-route service in Roanoke, Salem, and Vinton.

Exhibit 3-5: Smart Way Bus Route Map



Source: Smart Way Bus Website, <http://www.smartwaybus.com/busmap.htm> (accessed September 9, 2009).

The Smart Way service began in July 2004, and ridership has increased from 23,281 in FY05 to 63,894 in FY09. Average monthly ridership has increased from 1,985 to 5,325 in this period. Though the Smart Way Bus currently does not serve Radford, the Radford Comprehensive Plan names this as a transportation opportunity to explore in the near future.

Intercity Bus and Rail

Radford is not directly served by intercity bus or rail, though residents can travel to nearby towns to access these services. Residents can access Greyhound intercity bus services in Roanoke, approximately 45 miles northeast, or in Wytheville (Max Meadows), about 31 miles southwest. Three round-trips per day serve both these cities on a route that travels between Richmond, Virginia and Nashville, Tennessee. Wytheville is served by another two round-trips daily, which travel between Charleston, West Virginia and Jacksonville, Florida.

Residents can access Amtrak passenger rail service in Clifton Forge, 82 miles north, or in Lynchburg, about 100 miles northeast. Passengers that go to Clifton Forge can access the Amtrak Cardinal/Hoosier State Route, which travels between New York, New York and Chicago, Illinois. The Amtrak stop in Lynchburg lies on the Crescent Route, which travels between New York, New York and New Orleans, Louisiana. Three roundtrips per week, on Wednesday, Friday, and Sunday, serve the Clifton Forge Amtrak station, while the Lynchburg station is served by two round-trips daily.

Airports

As described in Chapter 2, the New River Valley is also served by three airports. The Roanoke Valley Regional Airport, about 43 miles away from Radford, provides the primary passenger service. Located in Blacksburg, the Virginia Tech Airport/Montgomery Executive Airport primarily serves corporate jets and private aircrafts. The third airport is the New River Valley Airport near Dublin, which provides services such as aircraft rentals and charter services.¹

Other Private Providers

Existing taxi services within Radford are limited, though the following companies provide some local and regional service, including airport services:

¹ Hill Studio. *The City of Radford Pre-Final Draft Comprehensive Plan 2030*. September 2008.

- Affordable Cab Company, Radford, Christiansburg
- Hootie Ride, Radford, Blacksburg, and Grundy
- Christiansburg Cab Service, Christiansburg
- Fresh Air Transportation (FAT Taxi), Christiansburg
- Fascab, Christiansburg
- Blacksburg Taxi, Blacksburg
- Kiger Transportation, Inc., Blacksburg
- T & T Taxi Service, Pulaski²

The Roanoke Regional Airport Website also lists five vendors (aside from the Smart Way Bus) for ground transportation:

- C'artier Limousine
- Liberty Cab
- Roanoke Airport Transportation Service
- Quality Transportation, and
- Yellow Cab.³

SUMMARY

Currently, the City of Radford is not directly served by public transportation, though Radford University provides shuttle service on campus and limited service through the City for its students, faculty, and staff. Community Transit provides human service transportation that serves City residents. In addition, there is the City's school bus service, and beyond the City boundaries there are transit providers in adjacent communities and regional transportation services.

This variety of transportation services were further assessed during the alternatives phase of the planning process in conjunction with the needs assessment documented in Chapter 2. These alternatives are presented in the next chapter.

² Sources include Internet research using Yahoo! Local, Google, and Switchboard.com (accessed September 9, 2009).

³ Roanoke Regional Airport Website: <http://www.roanokeregionalairport.com/services/services.html> (accessed August 18, 2009).

Chapter 4

Service Alternatives

INTRODUCTION

Chapters 2 and 3 documented transit needs in the Radford area and provided a review of existing transportation providers. In addition, surveys conducted in the City and through the University provided critical information targeting specific transit needs and on possible new services and improvements to existing transportation services.

This chapter provides a series of service alternatives were developed to meet identified needs. Conceptual routes were developed based on the initial needs assessment, gaps determined in current services, recommendations from previous studies and proposals, and a physical review of potential routes. These initial route concepts were presented to the Radford Public Transit Committee at their October 2009 meeting. Based on the discussion at this meeting, along with input collected from the results of the City and University surveys' results, these alternatives were further defined are detailed in this chapter.

After a review of the various alternatives, this chapter provides potential groupings of the alternatives that the Radford Public Transit Committee reviewed and considered. The advantages and disadvantages of each option group, along with potential operating and capital costs, are provided. Finally, this chapter reviews the various federal and state funding sources that are available to meet operating and capital costs.

SERVICE ALTERNATIVES

Several service alternatives were developed to primarily serve the transportation needs of City residents and University students, faculty, and staff. Non-residents who work in or visit the City would also benefit from these new transit services. The alternatives that are geared toward City residents included:

- Route 1: Radford – Carilion New River Valley Medical Center (Carilion), and
- Route 2: Radford – Fairlawn.

Four alternatives were developed to primarily serve Radford University:

- Route 3: West Campus,
- Route 4: East Campus,
- Route 5: Dedmon Center – Hunter’s Ridge, and
- Route 6: University Campus – Fairlawn.

A regional route was also proposed to serve the entire community, City residents and University patrons alike, both of which voiced needs to travel to Blacksburg and Christiansburg for various purposes including employment, medical appointments, education, shopping, social/recreation, and human services:

- Route 7: Radford – Christiansburg – Blacksburg

Each service alternative is described, along with the advantages and disadvantages. Some alternatives were proposed with more than one routing option, and these options are discussed in each description. The alternatives are not presented in any particular order of priority. The potential operating and capital cost estimates are described later in the report when the routes were packaged together as potential systems to implement. It is important to note that the routes were not designed in a manner requiring every route to be implemented for service to be successful.

Another issue to consider in terms of implementation was the need to meet the requirements of the Americans with Disabilities Act (ADA). One possibility was to operate the proposed alternatives as flex-routes, or deviation services, where the buses may deviate up to three-quarters of a mile from the planned route to pick up eligible passengers, who call in advance for such deviations. While some of the alternatives were proposed with estimated speeds and cycle times (discussed later in the route packages) that provide flexibility to operate them as deviation services, other alternatives required greater adjustments to run as flex-routes. Another approach to fulfill ADA requirements is to directly provide demand-response services, where patrons call ahead to schedule trips, and an accessible van or small bus transports them between a specific origin and destination. Such door-to-door service often provides higher quality transportation, but at higher costs because more vehicles and operators are needed, among other resources, to operate this type of service.

Route 1: Radford - Carilion

This route would provide connections for both City residents and University students to the Carilion New River Valley Medical Center located at I-81 and Route 177, approximately six miles from the downtown area. In addition, Carilion expressed the need for additional transportation options to their location, particularly for employees such as food service workers and housekeeping staff. This proposed alternative has two routing options; both travel from Carilion toward Radford via Route 177, which becomes Tyler Ave.

Route 1A, shown in Figure 4-1, then serves the neighborhood adjacent to Radford University to the west (Fairfax Street) before heading toward the Radford Recreation Center. From there, Route 1A serves the medical offices near 7th Street and Randolph Street and takes 8th Street across Wadsworth Street to Pendleton Street. Route 1A continues south on West Main Street, takes Rock Road back to Wadsworth Street, and returns to Carilion via the same routing that it came from.

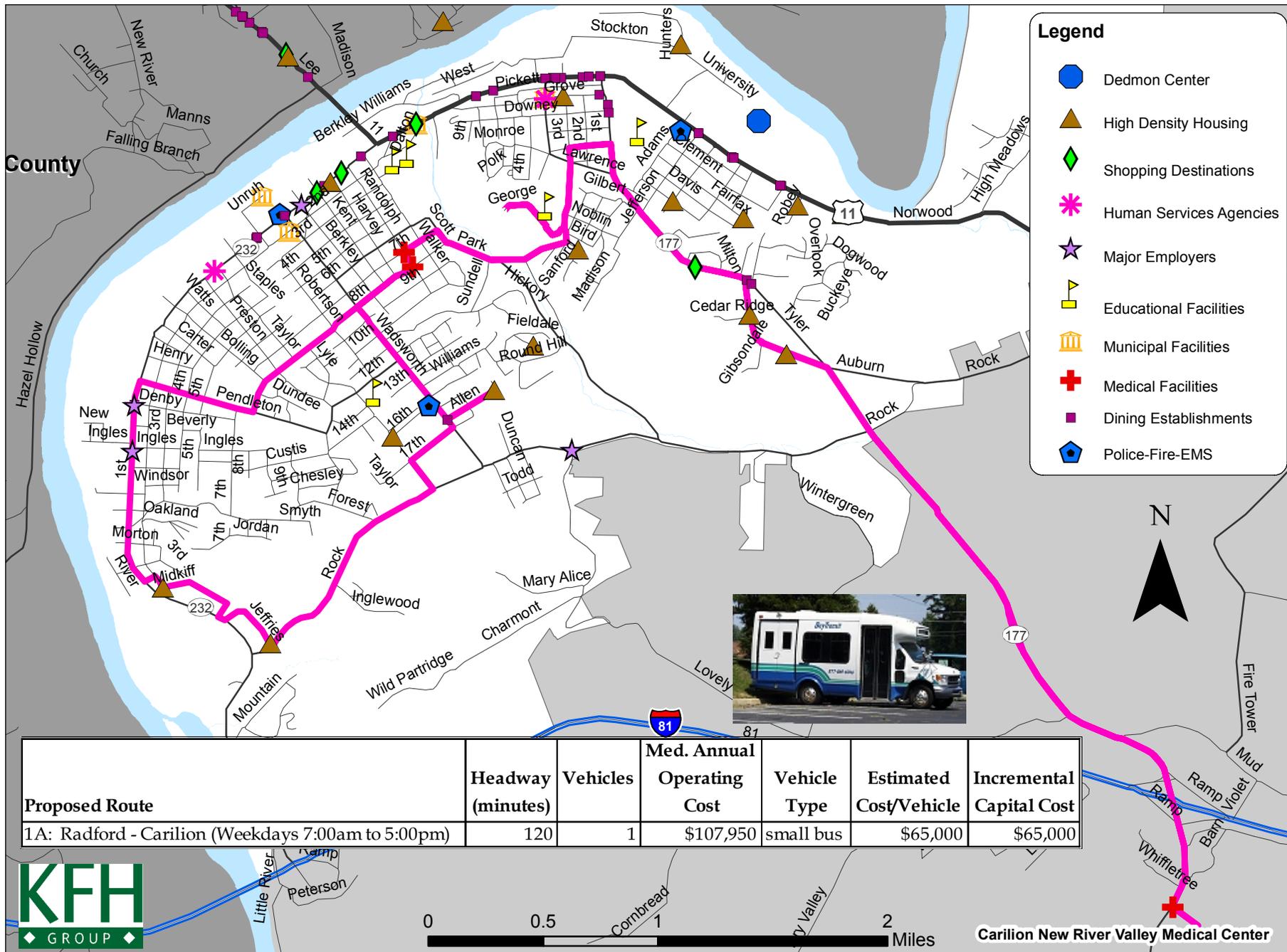
Advantages

- Connects both City and University to the major medical facility in the area, as well as local doctor's offices. (Carilion was one of top five specific destinations in the City survey.)
- Connects both City and University to the Radford Recreation Center.
- Provides City residents with transportation to major employers, including companies on West Main Street, Radford University, and Carilion - more options for commuters.
- Faster, more direct connection for residents at the southern end of West Main Street to reach the fire station (via Rock Road) for the Department of Social Services (DSS) monthly food distribution.
- Provides a direct transit connection for students or staff living in apartments near the Recreation Center to Radford University.

Disadvantages

- Significant part of the route between downtown and Carilion provides little opportunity for ridership.
- While Radford Public Transit Committee members expressed the need for this service, it was not noted as a high priority in the University survey.
- Riders returning from Carilion to housing along the southern part of Wadsworth Street must walk several blocks, or ride a circuitous route along West Main Street and Rock Road.
- Route segment on Rock Road provides little opportunity for ridership.

Fig. 4-1: Route 1A: Radford - Carilion



4-4

Route 1B, shown in Figure 4-2, provides more service directly to Radford University than Route 1A. This route serves both areas to the east and west neighboring campus before following the same routing to serve the Recreation Center and medical offices. Route 1B then travels south on Wadsworth Street, serves high density housing on Allen Avenue, then returns up Wadsworth Street and completes a similar path along Pendleton Street and West Main Street. The bus would turn around at Rock Road and return to Allen Avenue, the Recreation Center, and Carilion along the same routing as it came.

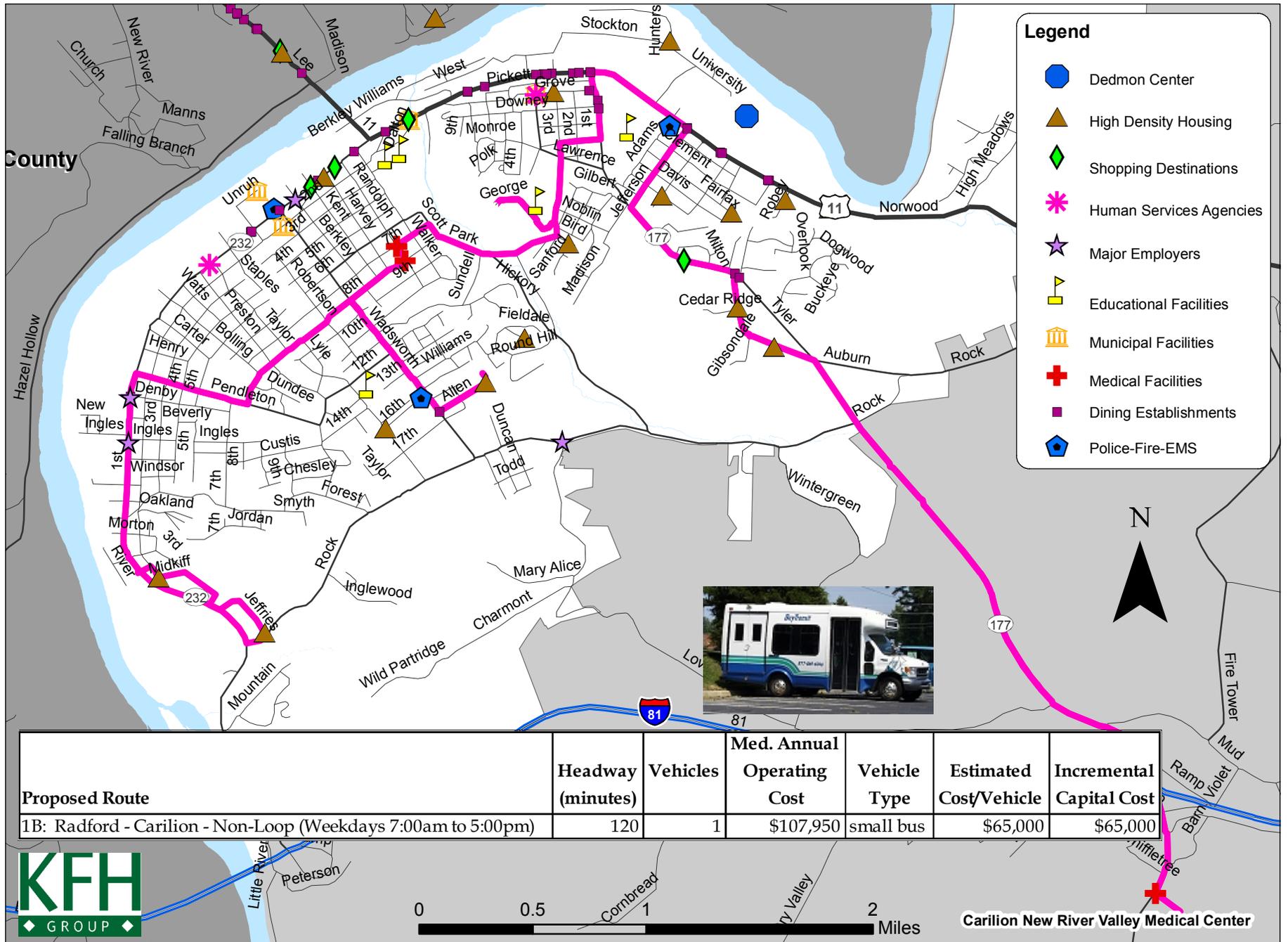
Advantages

- Connects both City and University to the major medical facility in the area, as well as local doctor's offices. (Carilion was one of the top five specific destinations in the City survey.)
- Connects both City and University to the Radford Recreation Center.
- Provides City residents with transportation to major employers, including companies on West Main Street, Radford University, and Carilion - more options for commuters.
- Provides more direct service for Radford University students, in both the east and west sides of campus to reach Carilion and local doctor's offices.
- Provides more direct service for riders returning from Carilion to housing along the southern part of Wadsworth Street.
- Provides a direct transit connection for students or staff living in apartments near the Recreation Center to Radford University.
- Provides a one-seat ride for City residents to access Radford human service agency programs like the DSS and Radford-Fairlawn Daily Bread.

Disadvantages

- Significant part of the route between downtown and Carilion provides little opportunity for ridership.
- While Radford Public Transit Committee members expressed the need for this service, it was not noted as a high priority in the University survey.
- Schedule may be confusing for riders along Wadsworth Street who are trying to go toward Carilion, because some buses will be coming from Carilion to drop people off along Wadsworth and continue onto West Main Street. Other buses, returning from the southern part of West Main Street, will be more convenient for riders looking to be picked up along Wadsworth Street to go toward Carilion.
- Traveling in both directions, riders who live near Pendleton Street or along West Main Street must ride longer, as the route first travels down and back up Wadsworth Street.

Fig. 4-2: Route 1B: Radford - Carilion - Non-Loop



4-6



Carilion New River Valley Medical Center

- Route 1B is more circuitous around Radford University for City residents looking to travel directly to Carilion.
- Notably longer ride for residents at southern end of West Main Street to reach the fire station for food distribution. (More direct service would travel along Rock Road.)

Route 2: Radford - Fairlawn

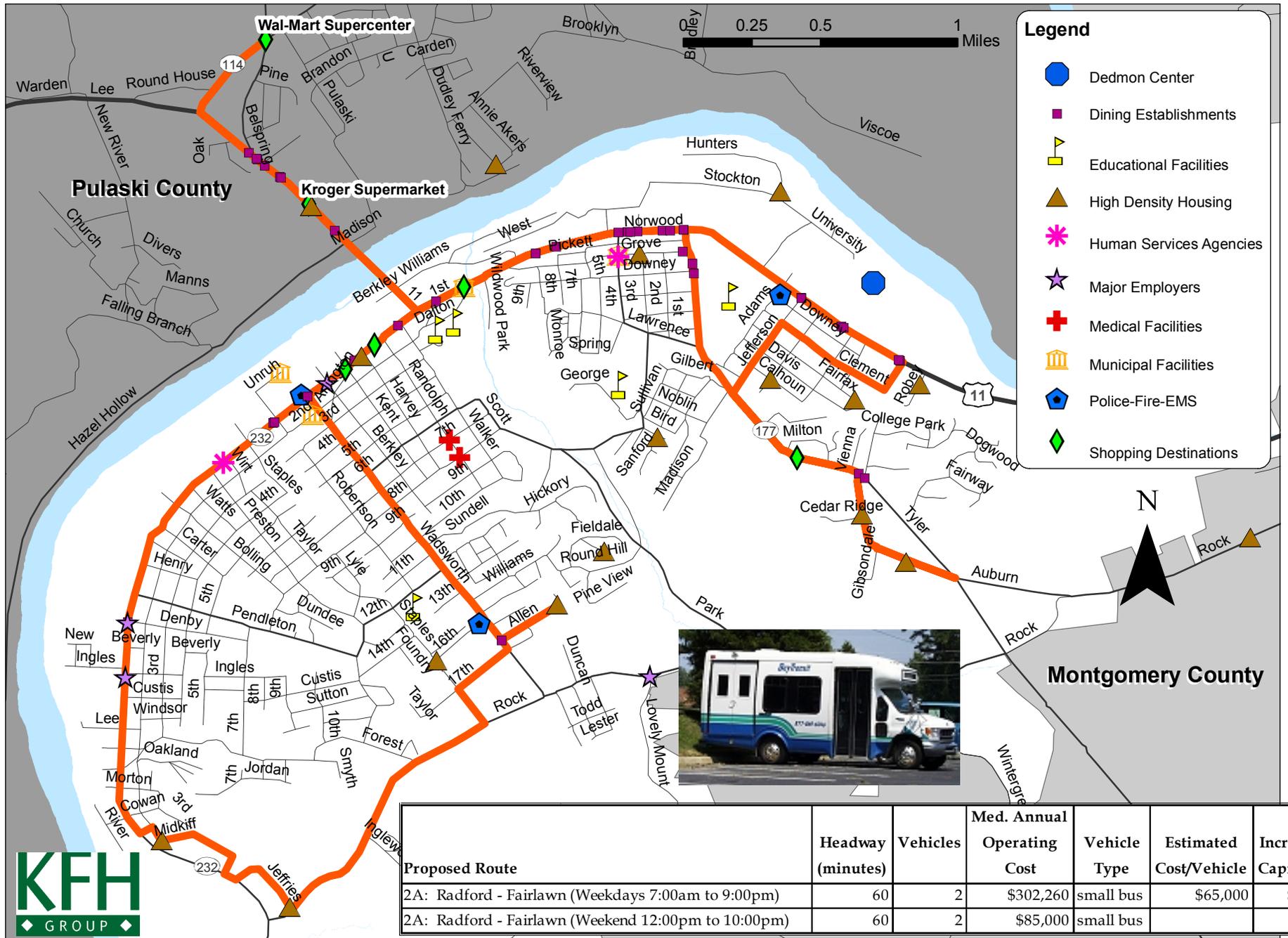
This route provides both City residents and the University with connections to a variety of services and locations in the City, and to destinations located across the river from Radford in the Fairlawn area. The route includes a segment of the current Tartan Transit City Loop while also serving residential areas of the City. This proposed alternative has several routing options, described below.

Route 2A, shown in Figure 4-3, starts by serving the high density housing near Tyler Avenue and Auburn Avenue, and then serving the east side of campus of Radford University. The route then travels along East Main Street to shopping destinations in Fairlawn, and comes back across the river to serve West Main Street, including employers and high density housing. The route takes Rock Road to connect to residential areas along Wadsworth Street, and then heads east on Main Street, turning south on Tyler Avenue to head back to the starting point.

Advantages

- Provides a transit option for City residents and the University to access Main Street.
- Serves several shopping locations along Main Street and Tyler Avenue.
- Provides new service for City residents to Wal-Mart, Kroger, and other destinations in Fairlawn. (Fairlawn was the top destination specified as a need in the City survey.)
- Meets some of the top needs for expanded service to locations in Radford and Fairlawn, as indicated in the Radford University survey.
- Provides more direct connection for residents at southern end of West Main Street to reach the fire station (via Rock Road) for the DSS monthly food distribution.
- Provides one-seat ride (albeit a long one, depending on the destination) for City residents to reach social services including the City DSS and Radford-Fairlawn Daily Bread.

Fig. 4-3: Route 2A: Radford - Fairlawn



Disadvantages

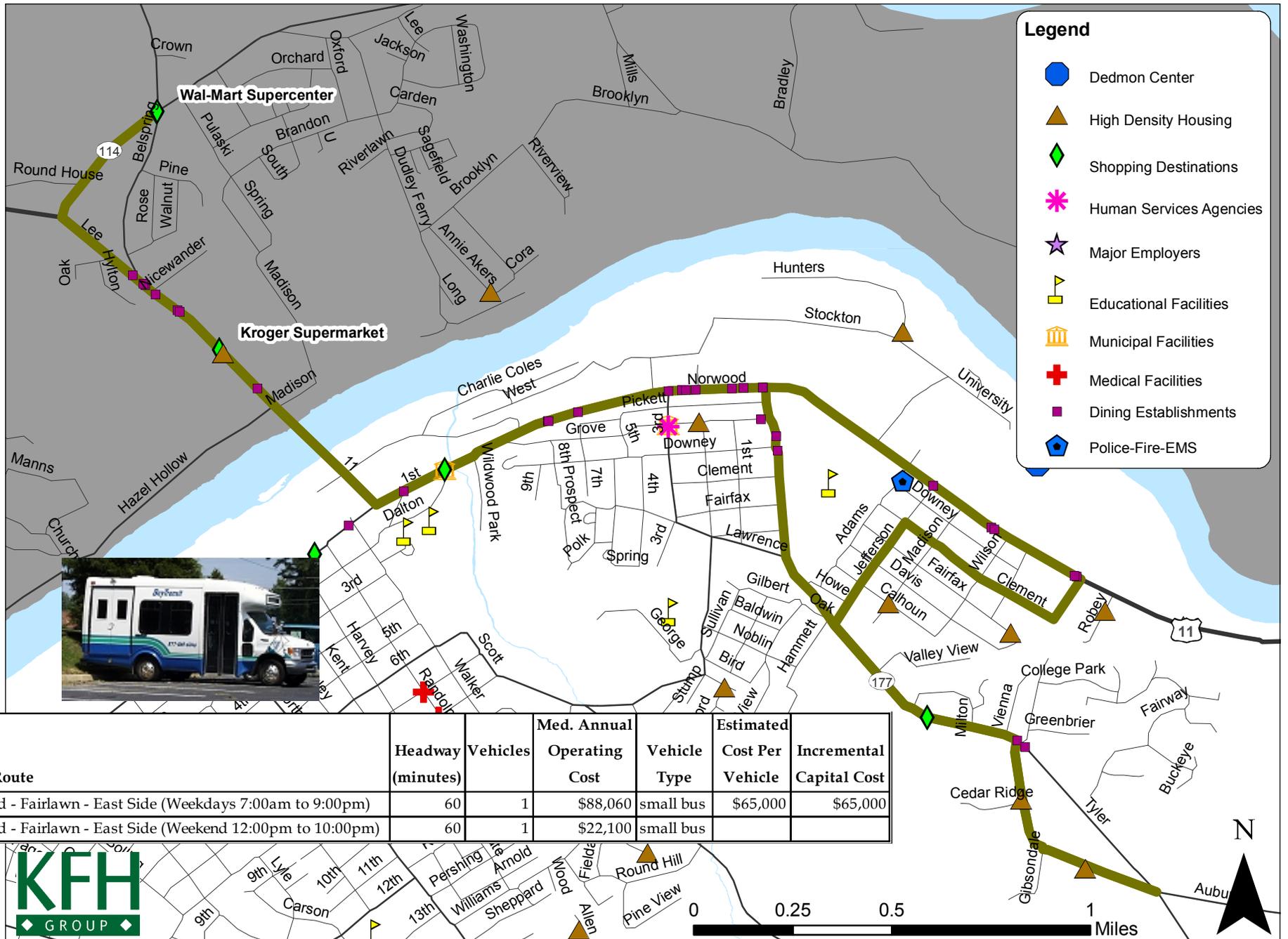
- Stops are mostly located along major streets, requiring some riders to travel several blocks to a bus stop.
- Riders traveling between the east and west sides of the City must sit through an intermediate stop in Fairlawn (i.e., Radford University students going to Sal's, or City residents going to the Food Lion on Tyler Avenue).
- Riders who board the bus on West Main Street west of Wadsworth Street, must ride a circuitous route (via Wadsworth Street) to reach Fairlawn or destinations in the eastern part of the City.
 - To reach a destination along West Main Street between Rock Road and Wadsworth Street, these riders must ride the route all the way back to the starting point (Tyler Avenue) since the bus travels only in one direction on that portion of West Main Street.
- Riders who board the bus in the neighborhood to the east of Radford University have a direct trip to Fairlawn, but must get off along Tyler Avenue on the return trip, or ride the bus down Tyler Avenue until it turns around, because the bus does not travel through the neighborhood on the way back from Fairlawn.
- Route segment on Rock Road provides little opportunity for ridership.

Route 2B, shown in Figure 4-4, provides a separate, direct connection between east Radford and Fairlawn. This route also starts by serving the high density housing near Tyler Avenue and Auburn Avenue, and then travels through the neighborhood adjacent to Radford University to the east (via Jefferson and Clement Streets). Route 2B travels along East Main Street to reach shopping destinations in Fairlawn. On the return trip, the route takes East Main Street and heads south on Tyler Avenue back to the starting point (instead of traveling through the neighborhood east of Radford University again).

Advantages

- Provides direct service to East Main Street and Fairlawn from residential areas, including high density housing, near the University and along Tyler Avenue.
 - Meets some of the top needs for expanded service to locations in Radford and Fairlawn, as indicated in the University survey.
 - Serves Wal-Mart, Kroger, and CVS (on Main Street), which were common destinations named in the University survey.
 - Fairlawn was the top destination specified as a need in the City survey.

Fig. 4-4: Route 2B: Radford - Fairlawn - East Side



4-10



- Provides both students and City residents with service to the Food Lion on Tyler Avenue, which was a popular destination in both the University and City surveys.
- Residents living nearby could travel out to East Main Street for direct transit service to Fairlawn.

Disadvantages

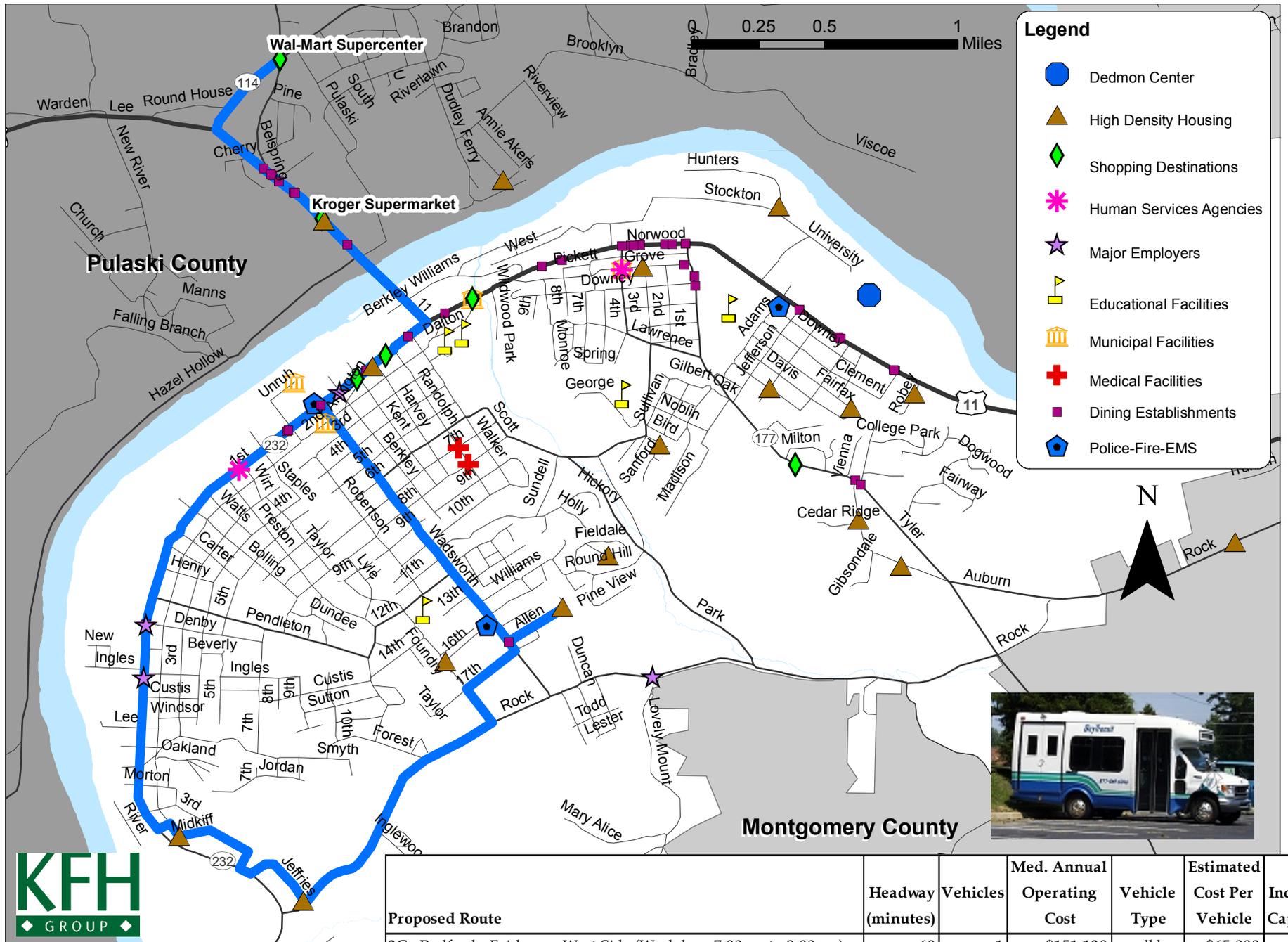
- Routing is very similar to Route 2E; only one of these options should be implemented.
- Routing significantly overlaps with the proposed Campus - Fairlawn alternative (Route 6), if both are implemented.
- No direct service between east and west Radford.
 - Riders would need to walk several blocks to West Main Street, or transfer to an alternative that serves destinations in the West End.
- Riders who board the bus in the neighborhood to the east of Radford University have a direct trip to Fairlawn, but must get off along Tyler Avenue on the return trip, or ride the bus down Tyler Avenue until it turns around, because the bus does not travel through this neighborhood on the return trip.

Shown in Figure 4-5, **Route 2C**, provides a direct connection from the West End to Fairlawn. The route travels all along West Main Street, serving various destinations including employers and the Radford Municipal Building, as well as some high density housing. The route takes Rock Road to connect to residential areas along Wadsworth Street, and then heads east on Main Street to connect to US Route 11/Lee Highway to reach Fairlawn.

Advantages

- Provides a transit option for City residents in the West End to access Main Street.
 - Wade's, the post office, and West Main Street/West End were common destinations named in the City survey.
- Provides new service for City residents to Wal-Mart, Kroger, and other destinations in Fairlawn. (Fairlawn was the top destination specified as a need in the City survey.)
- Provides more direct connection for residents at the southern end of West Main Street to reach the fire station (via Rock Road) for the DSS monthly food distribution.

Fig. 4-5: Route 2C: Radford - Fairlawn - West Side



4-12



Proposed Route	Headway (minutes)	Vehicles	Med. Annual Operating Cost	Vehicle Type	Estimated Cost Per Vehicle	Incremental Capital Cost
2C: Radford - Fairlawn - West Side (Weekdays 7:00am to 9:00pm)	60	1	\$151,130	small bus	\$65,000	\$65,000
2C: Radford - Fairlawn - West Side (Weekend 12:00pm to 10:00pm)	60	1	\$42,500	small bus		

Disadvantages

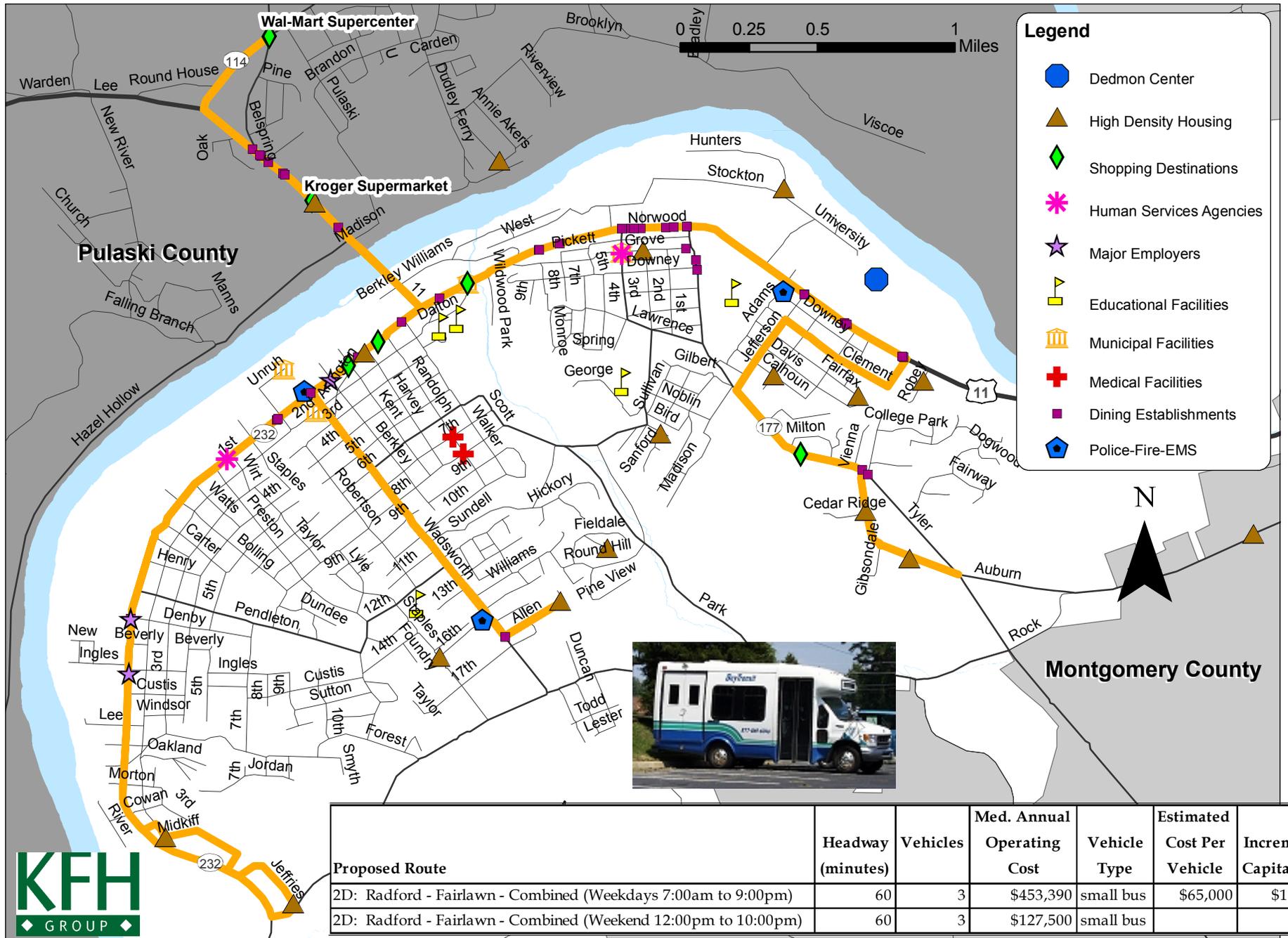
- Stops are mostly located along major streets, requiring some riders to travel several blocks to a bus stop.
- No direct service between east and west Radford.
 - Riders would need to walk several blocks or transfer to an alternative that serves destinations on East Main Street.
- Riders who board the bus on West Main Street west of Wadsworth Street, must ride a circuitous route (via Rock Road and Wadsworth Street) to reach Fairlawn, since the bus only travels in one direction along this routing. On the return trip from Fairlawn, patrons returning to Wadsworth Street must ride a circuitous route all the way down West Main Street and Rock Road.
- Route segment on Rock Road provides little opportunity for ridership.

Shown in Figure 4-6, **Route 2D** also starts by serving the high density housing near Tyler Avenue and Auburn Avenue, and then traveling through the neighborhood to the east of Radford University (via Jefferson and Clement Streets). Next, the route travels along East Main Street to destinations in Fairlawn, before coming back to West Main Street. Route 2D then continues south on Wadsworth Street to serve high density housing near Allen Avenue. The route travels back up Wadsworth Street and turns west to serve the rest of West Main Street, and turns around after serving the high density housing near Rock Road. Heading back in the eastern direction, the route travels down Wadsworth Street again to Allen Avenue, and then returns to Fairlawn. Route 2D travels back to East Main Street and serves Radford University and Tyler Avenue in the same routing as the start of the route.

Advantages

- Provides a direct connection between East and West Radford (although ride may be long depending on origin and destination).
- Provides a transit option for City residents and the University to access Main Street.
- Serves several shopping locations along Main Street and Tyler Avenue.
- Provides new service for City residents to Wal-Mart, Kroger, and other destinations in Fairlawn. (Fairlawn was the top destination specified as a need in the City survey.)
- Meets some of the top needs for expanded service to locations in Radford and Fairlawn, as indicated in the Radford University survey.
- Provides one-seat ride (albeit a long one, depending on the destination) for City residents to reach social services including the City DSS and Radford-Fairlawn Daily Bread.

Fig. 4-6: Route 2D: Radford - Fairlawn - Combined



4-14



Disadvantages

- Stops are mostly located along major streets, requiring some riders to travel several blocks to a bus stop.
- Riders traveling between the east and west sides of the City must sit through an intermediate stop in Fairlawn (i.e., Radford University students going to Sal's, or City residents going to the Food Lion on Tyler Avenue).
- Schedule may be confusing for riders along Wadsworth Street who are trying to go to Fairlawn or eastern Radford, because some buses will be heading west to drop people off along Wadsworth and continue onto West Main Street. Other buses, returning from the southern end of West Main Street, will be more convenient for riders looking to be picked up along Wadsworth Street to go toward Fairlawn and eastern Radford.
- Traveling in both directions, riders who live along the southern part of West Main Street must ride longer, as the route first travels down and back up Wadsworth Street.
- Route is more circuitous around Radford University for riders going to destinations along Tyler Avenue.

Route 2E, shown in Figure 4-7, is an option that provides a separate, direct connection between east Radford and Fairlawn. This route also starts by serving the high density housing near Tyler Avenue and Auburn Avenue, and then travels through the neighborhood adjacent to the east of Radford University (via Jefferson and Clement Streets). Route 2E travels along East Main Street to reach shopping destinations in Fairlawn, and makes the return trip by the same routing.

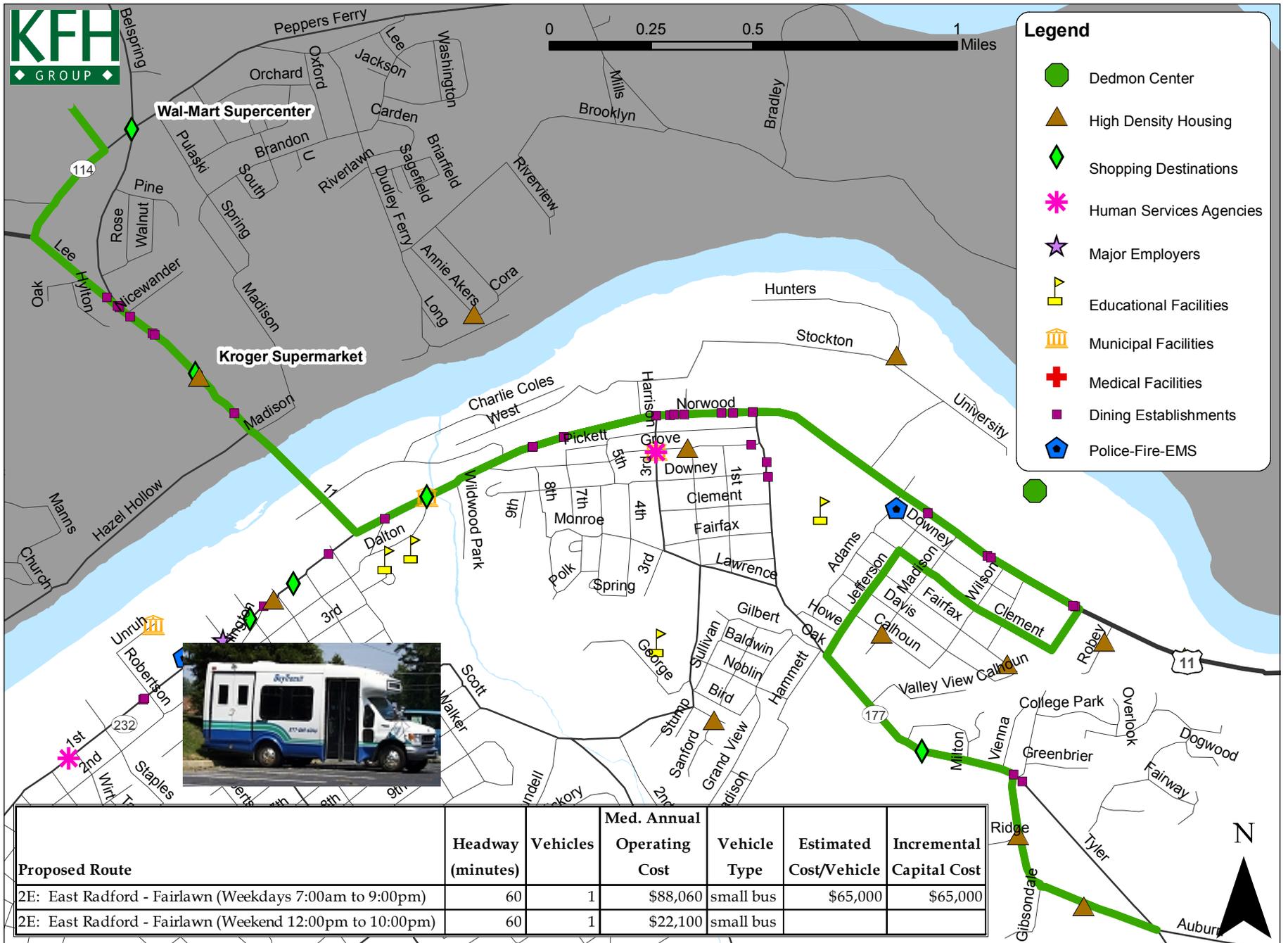
Advantages

- Provides direct service to East Main Street and Fairlawn from residential areas, including high density housing, near Radford University and along Tyler Avenue.
- Meets some of the top needs for expanded service to locations in Radford and Fairlawn, as indicated in the Radford University survey.
- Residents living nearby could travel out to East Main Street for direct transit service to Fairlawn.

Disadvantages

- Routing is very similar to Route 2B; only one of these options should be implemented.
- Routing significantly overlaps with the proposed Campus - Fairlawn alternative (Route 6), if both are implemented.

Fig. 4-7: Route 2E: East Radford - Fairlawn



4-16

- No direct service from east Radford to Wade's or other locations on West Main Street, which were popular destinations in the City Survey.
 - Riders would need to walk several blocks or transfer to another route that serves West Main Street.

Route 2F, shown in Figure 4-8, connects housing along Wadsworth Street directly to Fairlawn. The route starts at Rock Road West and Smith Avenue, traveling to Todd Street and Martin Avenue to serve a residential area. The route then proceeds north on Wadsworth Street, and serves the local medical offices located near 7th Street and Randolph Street. Then the route heads toward Fairlawn via West Main Street. On the return trip, the bus follows the same routing back to Wadsworth, but travels down Allen Avenue to serve the large apartment complex, before returning to the starting point.

Advantages

- Provides direct service to West Main Street and Fairlawn from a large residential area in the West End, including high density housing near Allen Avenue and a small mobile home park on Martin Ave. (Rustic Village Mobile Home Park is also just two blocks from the route on Wadsworth Street.)
- Serves the medical offices near 7th Street and Randolph Street.
- This alternative could potentially be expanded to serve large employers located along Rock Road West, as well as a townhouse complex off Lovely Mount Drive.

Disadvantages

- With stops located along Wadsworth and West Main Streets, some riders that live in nearby areas will need to travel several blocks to a bus stop.
- Serves a limited number of destinations within the City; riders would need to transfer to other routes to access additional destinations in both east Radford and farther south along West Main Street.

Route 2G, shown in Figure 4-9, provides a direct connection between high density housing at the south end of West Main Street, destinations along West Main Street, and Fairlawn.

Advantages

- Provides direct service to West Main Street and Fairlawn from residential areas adjacent to West Main Street, including high density housing near West Main Street and Rock Road.

Fig. 4-8: Route 2F: Central Radford - Fairlawn

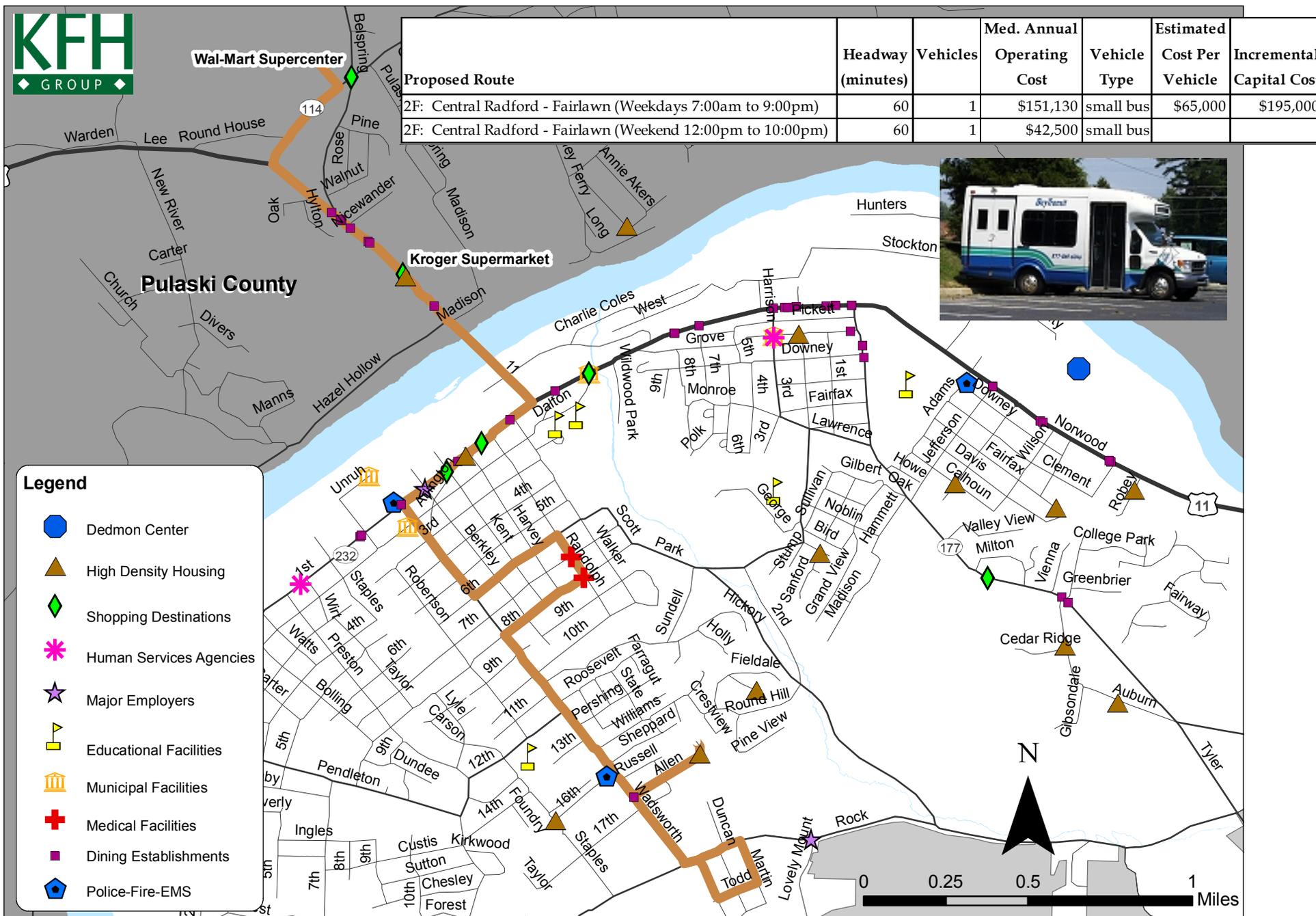
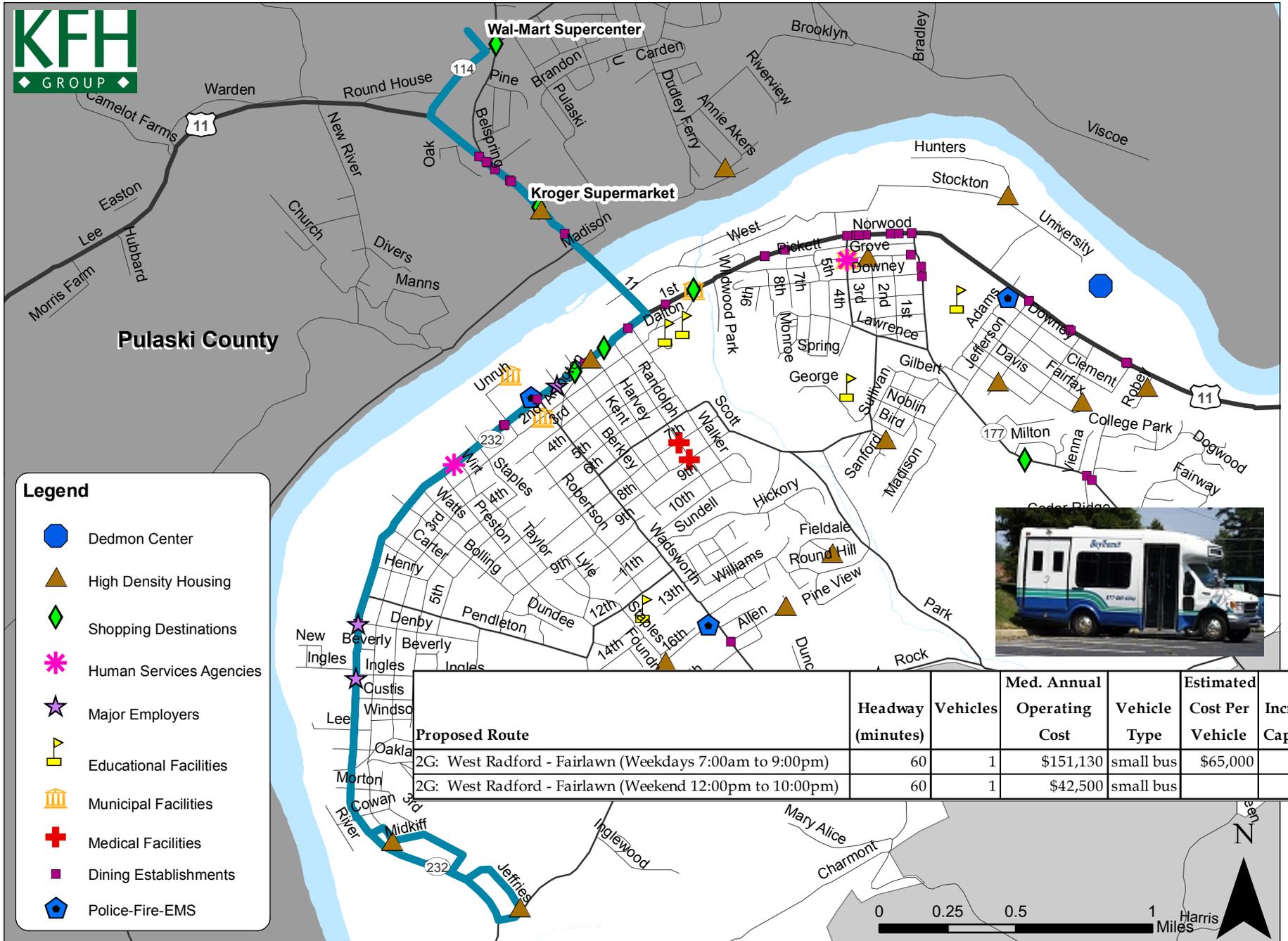


Fig. 4-9: Route 2G: West Radford - Fairlawn



- Connects residents in the West End to Wade's, the post office, and other destinations along West Main Street, which were common requests in the City survey.
- Provides new service for City residents in the West End to Wal-Mart, Kroger, and other destinations in Fairlawn. (Fairlawn was the top destination specified as a need in the City survey.)

Disadvantages

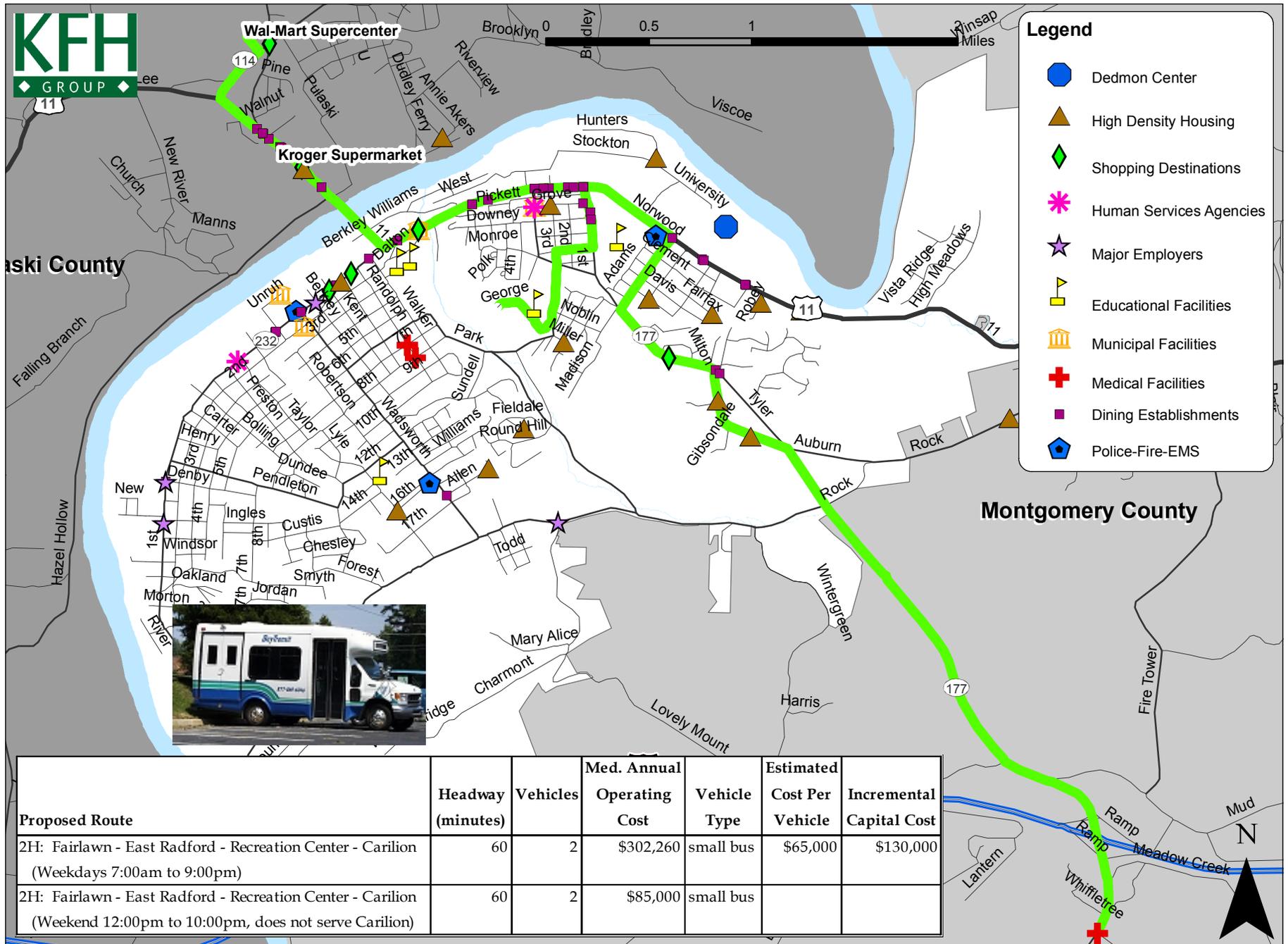
- With stops located along West Main Street, some riders are required to walk several blocks to a bus stop.
- Riders do not have a direct connection between the east and west sides of the City (unless another alternative such as Radford - Carilion is also implemented).
 - Riders would need to transfer to other routes to access additional destinations in east Radford.

Route 2H, shown in Figure 4-10, serves Carilion New River Valley Medical Center, the Radford Recreation Center, and Fairlawn. The route would serve Carilion and travel north on Tyler Avenue, serving high density housing and the shopping center with Food Lion. Route 2H then loops around Radford University via Jefferson Street, East Main Street, and Tyler Avenue, before serving the Recreation Center. From there, the route returns to East Main Street and continues to Fairlawn. On the return route, the bus would serve the Recreation Center again, before looping around Radford University and taking Tyler Avenue back toward Carilion. Note that service to Carilion is only proposed during the week, and this route would end at Tyler Avenue and Auburn Avenue during weekends.

Advantages

- Provides direct service for Radford University students and City residents living along Tyler Avenue to reach Carilion on weekdays.
- Serves the Recreation Center.
- Could also serve the high density housing located across (2nd Avenue) from the Recreation Center.
 - Provides a direct connection for residents, including students, to reach Radford University, East Main Street, Fairlawn, and Tyler Avenue (i.e., Food Lion).
 - Meets some of the top needs for expanded service to locations in Radford and Fairlawn, as indicated in the Radford University survey.
- Residents living nearby could travel out to East Main Street for direct transit service to Fairlawn or Carilion.

Fig. 4-10: Route 2H: Fairlawn - East Radford - Recreation Center - Carilion



4-21



Disadvantages

- Stops are mostly located along major streets, requiring some riders to travel several blocks to a bus stop.
- Routing significantly overlaps with the proposed Campus - Fairlawn alternative, if both are implemented.
- Route is a bit circuitous, in serving the Recreation Center, for riders who board along Tyler Avenue or Jefferson Street and are going to East Main Street or Fairlawn; and in the return direction, for riders who board along East Main Street and are heading to Tyler Avenue or Carilion.
- Riders would need to transfer to other routes to access additional destinations in west Radford.

Route 2I, shown in Figure 4-11, connects the West End with Fairlawn and the Radford Recreation Center. From the Recreation Center, the route heads west on 2nd Avenue, continuing onto Park Road and Scott Street. The alternative serves the medical offices near 7th Street and Randolph Street, before turning west on 8th Street to connect to Wadsworth Street. Route 2I then runs south on Wadsworth Street, serves high density housing on Allen Avenue, and takes Rock Road to connect to West Main Street. The route continues north on West Main Street and heads toward Fairlawn. The return trip operates by the same routing in the reverse direction.

Advantages

- Provides a transit option for City residents in the West End to access the Recreation Center and West Main Street. (The Recreation Center, Wade's, and the post office were common destinations named in the City survey)
 - Serves major employers and shopping locations along West Main Street.
- Provides new service for City residents to Wal-Mart, Kroger, and other destinations in Fairlawn. (Fairlawn and Wal-Mart were top destinations specified as a need in the City survey.)
- Serves the medical offices near 6th Street and Randolph Street.
- Serves several high density housing complexes in west Radford.
- Provides a direct connection for residents at southern end of West Main Street to reach the fire station (via Rock Road) for the DSS monthly food distribution.

Disadvantages

- Riders would need to transfer to other routes to access additional destinations in east Radford or Carilion.
- Route is slightly circuitous for riders boarding near downtown West Main Street, traveling to the medical offices or the Recreation Center; and traveling in the other direction, for riders boarding along Wadsworth Street to reach the north part of West Main Street or Fairlawn.
- Route segment on Rock Road provides little opportunity for ridership.

Route 3: West Campus

This is the first of four alternatives that were primarily developed to serve students, faculty, and staff at Radford University, though the services would also be open to the public. Route 3 would serve the residential area west of the Radford University. Depicted in Figure 4-12, this route travels on 3rd Street, takes Fairfax Street towards campus, and loops around the campus via Tyler Avenue and Jefferson Street. The route then travels along East Main Street connecting back to 3rd Street. Parts of this proposed alternative replicate segments of the current Tartan Transit City Route.

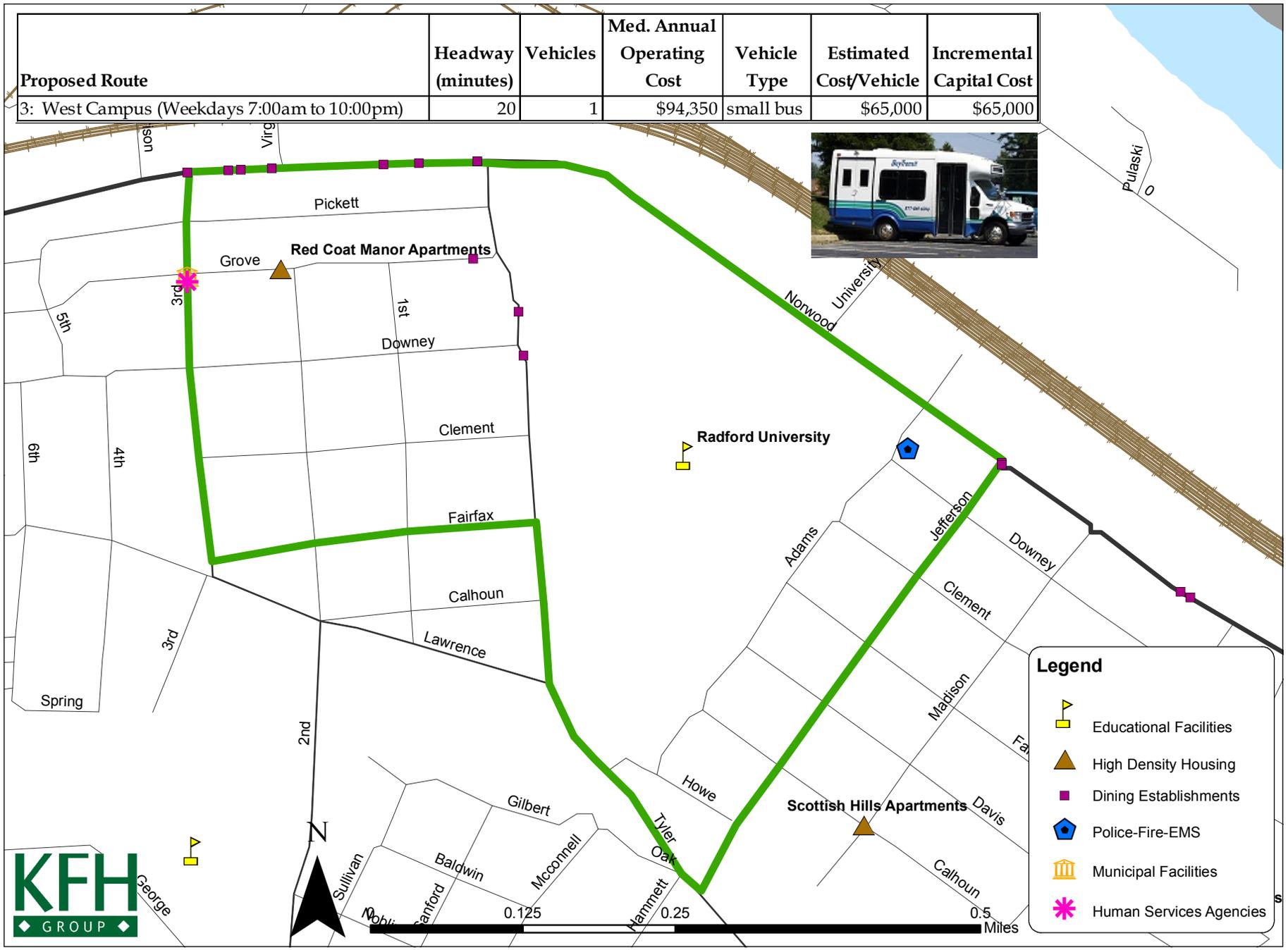
Advantages

- Offers direct transit service from residential areas west of Radford University to the other side of campus.
- Connects the east and west sides of campus (which was identified as a need in the Spring 2008 transportation survey for students, conducted in conjunction with the Campus Master Plan update).

Disadvantages

- Route serves some locations in City, but riders would need to use or connect to other routes to access shopping and other locations outside the East Main Street area.
- Overlaps with proposed East Campus Route around the campus.

Fig. 4-12: Route 3: West Campus



Route 4: East Campus

This route is shown in Figure 4-13, and would serve the residential area east of the Radford University campus. Route 4 travels on Fairfax Street, and takes Clement and Whitehall Streets to East Main Street. The route then travels west and turns left on Tyler Avenue, from where it completes a loop around the campus back to Jefferson Street and Fairfax Street. This alternative also includes segments of the current Tartan Transit City Route.

Advantages

- Offers direct transit service from residential areas east of Radford University to the other side of campus.
- Connects the east and west sides of campus (which was identified as a need in the Spring 2008 transportation survey for students, conducted in conjunction with the Campus Master Plan update).
- Serves large apartment complexes (mainly student housing) in the east side neighborhood.

Disadvantages

- Destinations served by this route are limited. Riders would need to use other routes or connect to other routes to access shopping and other locations in the City and surrounding area.
- Overlaps with proposed West Campus Route around the campus.

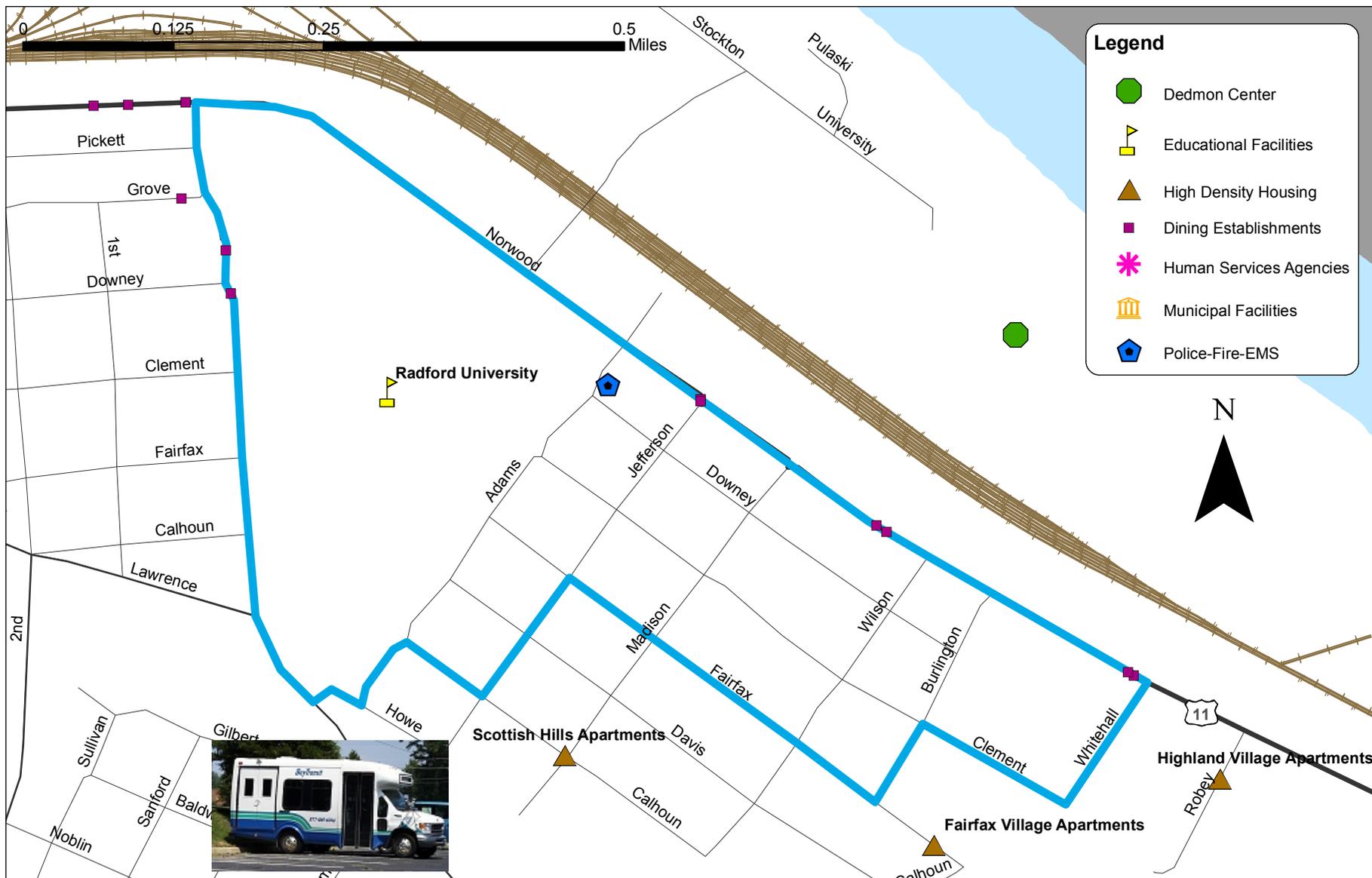
Route 5: Dedmon Center - Hunter's Ridge

Shown in Figure 4-14, this route essentially replicates the existing Tartan Transit Campus Loop, and serves the Hunter's Ridge Apartments, the Dedmon Center, remote parking, and the main campus.

Advantages

- Connects the main campus to major destinations that are technically on campus but perceived as a far distance to walk--the Dedmon Center and Hunter's Ridge Apartments.
- Connects remote parking lots and main campus.

Fig. 4-13: Route 4: East Campus



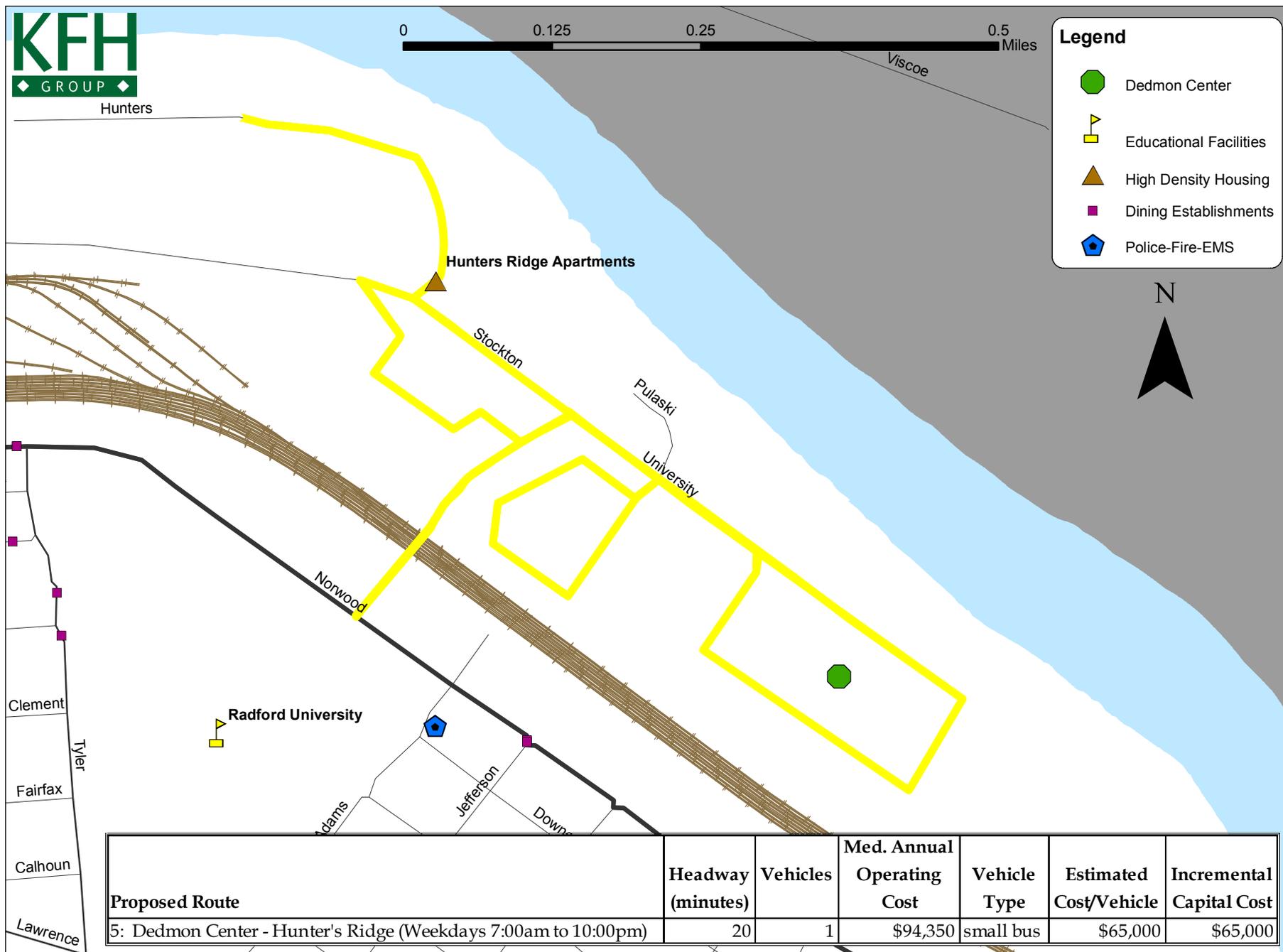
4-27



Leech Townhomes

Proposed Route	Headway (minutes)	Vehicles	Med. Annual Operating Cost	Vehicle Type	Estimated Cost/Vehicle	Incremental Capital Cost
4: East Campus (Weekdays 7:00am to 10:00pm)	20	1	\$94,350	small bus	\$65,000	\$65,000

Fig. 4-14: Route 5: Dedmon Center - Hunter's Ridge



4-28

Disadvantages

- Destinations served by this route are limited. Riders would need to connect to other routes to access shopping and other locations in the City and surrounding area.
- Riders coming from the residential areas adjacent to the main campus must walk to East Main Street to catch this bus, or transfer from the proposed East and West Campus routes.

Route 6: Campus – Fairlawn (Weekend)

This route is shown in Figure 4-15, and would serve the Hunter’s Ridge Apartments, the Dedmon Center, East Main Street, and destinations in Fairlawn. Route 6 is proposed as weekend service only, and would provide the connection between the Hunter’s Ridge Apartments, remote parking, and the Dedmon Center to main campus over the weekend (since Route 5 is proposed to operate on weekdays only).

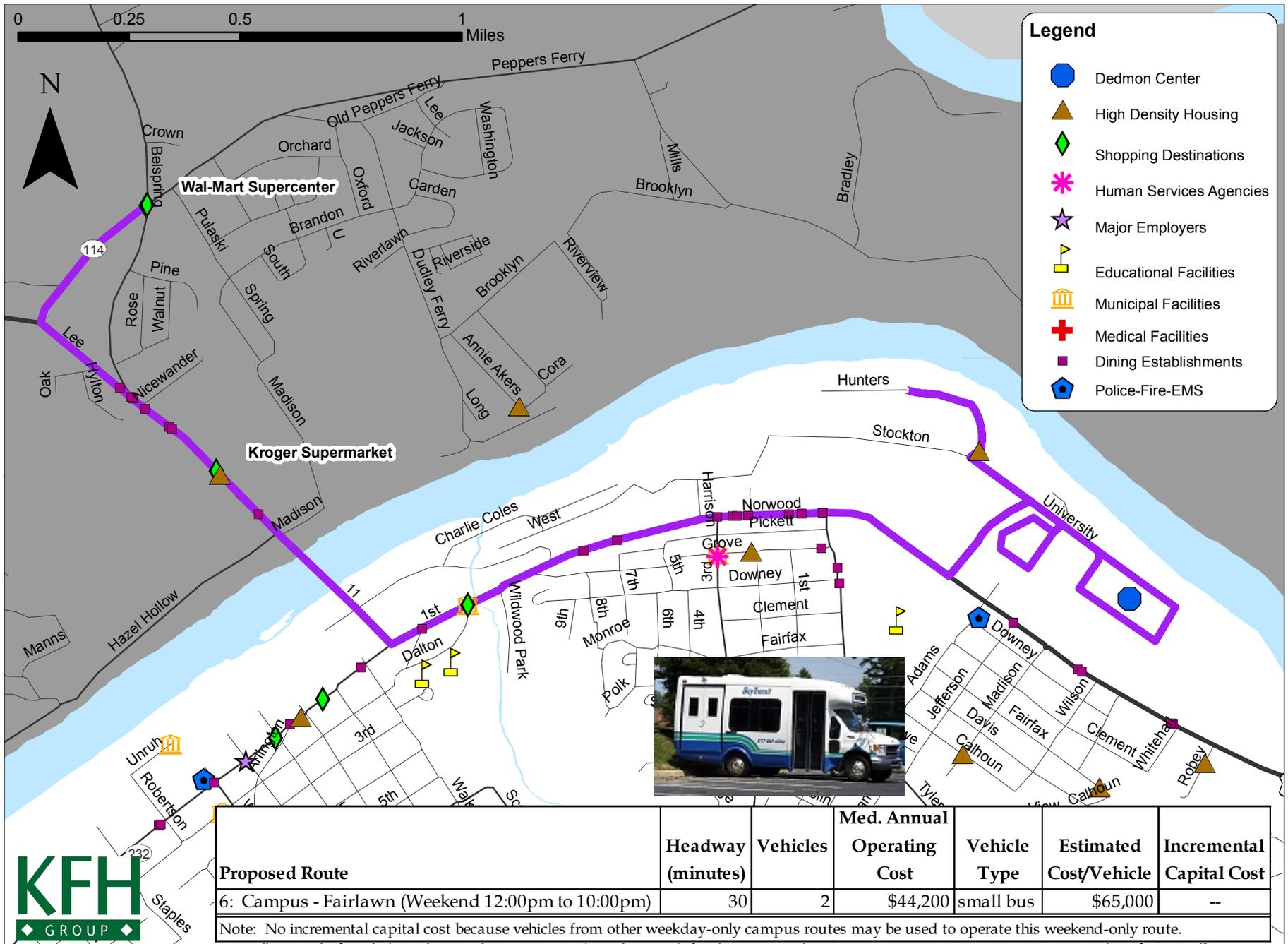
Advantages

- Provides direct transit service for residents at Hunter’s Ridge Apartments to access East Main Street and destinations in Fairlawn.
- Residents living nearby could travel out to East Main Street for direct transit service to Fairlawn.
- Provides a connection for students and staff between remote parking, the Dedmon Center, and main campus over the weekend.

Disadvantages

- Does not directly serve the residential areas adjacent to the University (though the other proposed campus routes and Radford – Fairlawn routes do).
- Routing significantly overlaps with the proposed Radford – Fairlawn routes, if both are implemented.

Fig. 4-15: Route 6: Campus - Fairlawn (Weekend)



4-30



Route 7: Radford-Christiansburg-Blacksburg

In addition to public transit services in and around the City of Radford, both the City and University expressed strong needs for transportation options to access locations in the region. This route would provide connections to Christiansburg and Blacksburg. Shown in Figure 4-16, four routing options were developed for this alternative, and all start at Radford University.

Route 7A, takes East Main Street and travels through Fairlawn, connecting to VA-114 and taking Price Forks Road to reach downtown Blacksburg. **Route 7B** starts out the same way but continues on VA-114 to the New River Valley Mall and K-Mart in Christiansburg, and then takes US-460/South Main Street to Blacksburg. **Route 7C** travels to Christiansburg via US-11 and connects to US-460, heading north to serve the K-Mart and New River Valley Mall, before continuing on to Blacksburg. **Route 7D** takes Tyler Avenue/Road south to Carilion and then heads toward Christiansburg via I-81, serving the Falling Branch Park and Ride Lot. This option then turns north on US-460, also serving the K-Mart and New River Valley Mall before continuing onto Blacksburg.¹

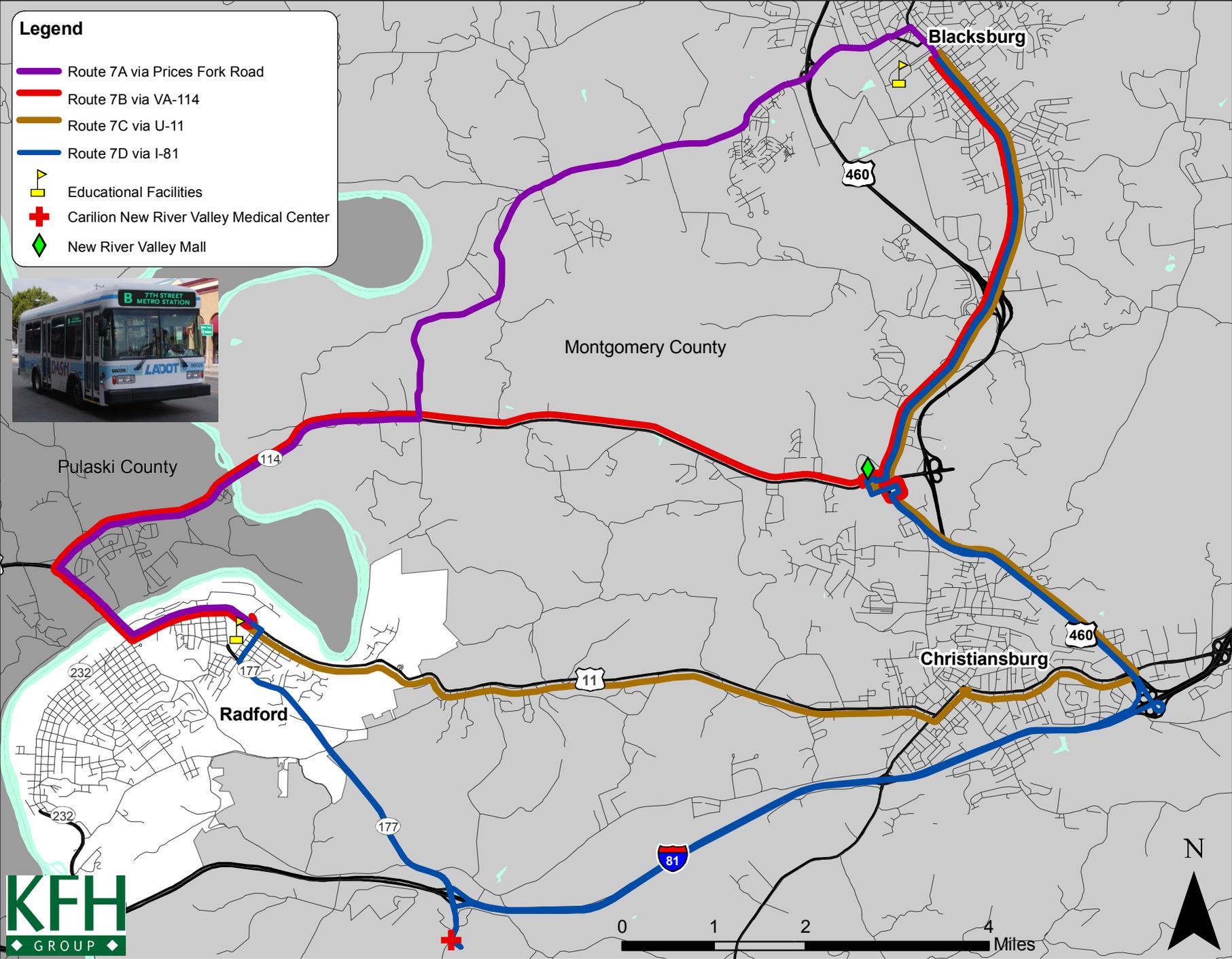
Since the options share several advantages and disadvantages, they are discussed together below. In deciding which options to implement, it is possible that different routes are used to meet different needs. Route 7A, for example, might be the preferred routing for late night, weekend service between Radford University and Virginia Tech, while Route 7D might be the preferred option to meet commuter needs for those employed at Carilion or in Roanoke (via a connection with the existing Smart Way Bus).

Advantages

- Provides important connections to jobs, services, and other destinations between Radford, Christiansburg, and Blacksburg.
 - Christiansburg, including the New River Valley Mall, was the third most requested destination specified in the City survey (after Fairlawn and Radford University); Blacksburg and Virginia Tech were also common destinations.
 - New service to Christiansburg and Blacksburg/Virginia Tech were the two highest priorities based on the Radford University Survey, administered as part of this study.

¹ In the longer term, these alternatives could even be combined to develop a bi-directional, regional loop to connect Radford, Christiansburg, and Blacksburg. The project advisory committee has provided input on combining Routes 7A and 7C to form such a regional loop.

Fig. 4-16: Route 7: Radford - Christiansburg - Blacksburg Alternatives



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- Provides connection between Radford University and Virginia Tech campuses.
- Provides connection to the Smart Way commuter bus service to Roanoke.
 - Route 7A could connect along South Main Street in downtown Blacksburg.
 - Routes 7B and 7C could connect at the K-Mart in Christiansburg, or at South Main Street in downtown Blacksburg.
 - Route 7D could connect at the Falling Branch Park and Ride Lot, which would be the fastest trip for riders connecting to Roanoke.
- Route 7A would provide the fastest connection from Radford to Blacksburg and Virginia Tech.
- Routes 7A and 7B would provide additional service to locations in Fairlawn.
- Routes 7B and 7C would provide service to Christiansburg and the New River Valley Mall, which were commonly requested destinations in the City survey.
- Route 7D would provide additional service from Radford and Radford University to Carilion, and provide a transit commute option for Carilion employees that live in Blacksburg, Christiansburg, and Roanoke (via connection with the Smart Way Bus).
- Route 7D could also serve the Target in Christiansburg, which was a somewhat common request in the Radford University survey.
- Route 7D could serve new development, including hotels and restaurants that is expected to occur near Carilion, along I-81, in the next several years.

Disadvantages

- Significant parts of the route (for all options) provide little opportunity for ridership since this service is primarily a “closed-door” route, with the possible exception of Route 7C, which travels by a number of residential areas along U-11 between Radford and Christiansburg.
- Routes 7C and 7D duplicate a segment of the Smart Way Bus route, between Blacksburg and Christiansburg.
- If Routes 7B, 7C, and 7D do not serve the Target in Christiansburg directly, which was a somewhat common request in the Radford University survey, then riders would need to transfer to the Shopper Express route, operated by Blacksburg Transit in Christiansburg.

SERVICE PACKAGE OPTIONS

The alternatives were grouped into several different packages that the City and Radford University may consider implementing as the initial transit system. These option groups were developed primarily to provide geographic coverage and serve as many major origins and destinations as possible. The advantages and disadvantages of each option group and potential operating and capital costs are described further below. Note that the primary Radford University alternatives (West Campus, East Campus, Dedmon Center - Hunter's Ridge, and Campus - Fairlawn) were included in all option groups, as was the regional route to Christiansburg and Blacksburg. Route 7B, the regional alternative via Route 114, was included in all the service package options for demonstration purposes. Routes 7A and 7C, via Prices Fork Road and U-11, respectively, could be selected instead at the same operating cost and capital requirement. Route 7D, via I-81, could also be implemented instead, though the estimated operating and capital costs would increase because this regional option was the longest.

All Options

When reviewing the package descriptions, it should be noted that a number of advantages and disadvantages are applicable to all the option groups (partly due to the five alternatives above being included in each package):

Advantages

- Network provides good geographic coverage of the City, including Main Street, the West End, the Recreation Center, and Tyler Avenue.
- Radford University is well served, including direct connections between adjacent residential areas to major destinations within the City and Fairlawn, as requested in the Radford University survey.
- Regional route provides direct service to Christiansburg, particularly the New River Valley Mall, and Blacksburg.
 - Christiansburg was the second most demanded destination among the City survey responses.
 - Service to both Christiansburg/New River Valley Mall and Blacksburg/Virginia Tech, including late night service, were popular requests in the Radford University survey.
 - Connection to the Smart Way Commuter Bus.
- Provides additional service to Fairlawn.

Disadvantages

- The Campus – Fairlawn route overlaps significantly with the Radford – Fairlawn alternatives during weekends.
 - However, the Campus – Fairlawn route provides direct service to the Hunter’s Ridge Apartments and the Dedmon Center, and the Radford – Fairlawn alternatives provide service through the neighborhood east of Radford University and along Tyler Avenue.
- The regional route would not serve the Target in Christiansburg, which was a somewhat common request in the Radford University survey.

The operating cost estimates were developed based upon services in communities similar in size to Radford. Operating costs per hour for these services are typically in the \$35-\$50 range. A competitive procurement process would ultimately determine the operator and the cost per hour for services.

In addition, costs vary with headways (time between buses), span of service (hours of operation per day), days of service (weekday, Saturday, Sunday), and school year/year-round service. These service characteristics were summarized in implementation and costing tables associated with each package described below.

In the tables, school year service is indicated at 148 days per year for weekday service, and 52 days per year for weekend service. Year-round service costs are estimated based on 254 days per year for weekday service and 100 days per year for weekend service. The implementation and costing tables also separate the services within the proposed network by those geared toward Radford University and those that mainly serve City residents. The service characteristics of each option group were developed based on the needs analysis and stakeholder input, and may be adjusted when the services are actually implemented.

Option Group A

Proposed Services:

- Route 1A: Radford – Carilion
- Route 2B: Radford – Fairlawn – East Side
- Route 2C: Radford – Fairlawn – West Side
- Route 3: West Campus
- Route 4: East Campus
- Route 5: Dedmon Center – Hunter’s Ridge
- Route 6: Campus – Fairlawn
- Route 7B: Radford – Christiansburg – Blacksburg

This proposed network is mapped in Figure 4-17a; Figure 4-17b displays the individual routes within the network. Table 4-1 provides a summary of implementation details.

Service Characteristics

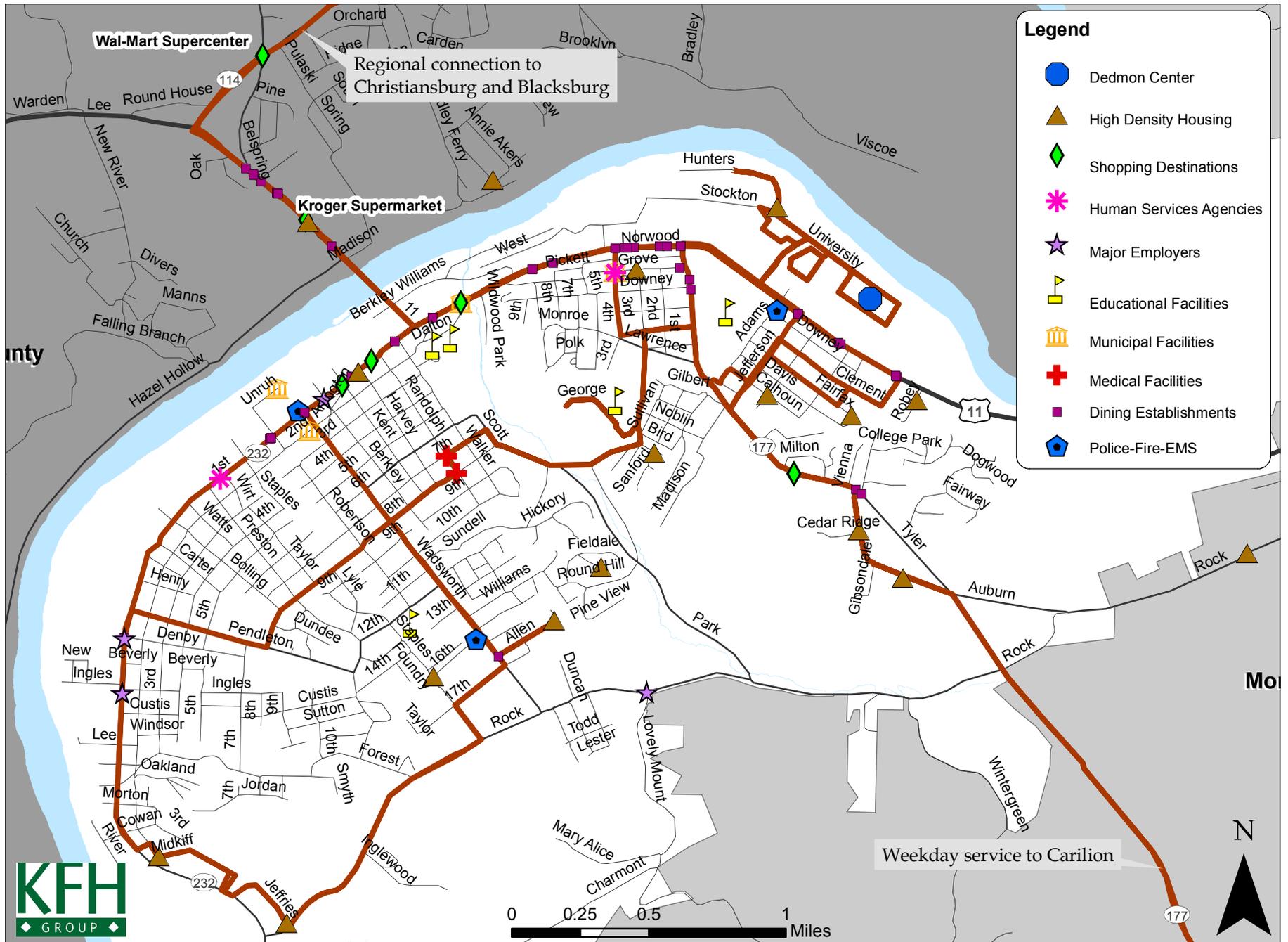
- Route 1A, Radford – Carilion, operates year-round on weekdays from 8:00 a.m. to 6:00 p.m. *This route is proposed to operate at two-hour headways.*
- The Radford – Fairlawn – East Side and West Side routes (Routes 2B and 2C) operate daily, from 7:00 a.m. to 9:00 p.m. on weekdays and 12:00 p.m. to 10:00 p.m. during the weekend, both at hourly headways. The East Side route only operates during the school year, while the West Side route operates year-round.
- The East Campus, West Campus, and Dedmon Center – Hunter’s Ridge routes operate during the school year on weekdays, from 7:00 a.m. to 10:00 p.m. at 20-minute headways, similar to the existing Tartan Transit Campus Loop.
- The Campus – Fairlawn route operates during the school year on weekends, from 12:00 p.m. to 10:00 p.m. at 30-minute headways.
- The regional Radford – Christiansburg – Blacksburg route (Route 7B) operates daily, year-round at hourly headways. On weekdays, the route operates during the peak periods and evenings, from 6:30 a.m. to 9:30 a.m. and from 3:30 p.m. to 10:30 p.m. During the weekend, the route operates from 12:00 p.m. to 10:00 p.m. Late night service, on Friday and Saturday from 10:00 p.m. to 2:00 a.m., will also be provided during the school year.

Estimated Costs

- Based on the service characteristics described above, the annual operating costs for this package of services would be between \$870,940 (low estimate) and \$1,244,200 (high estimate).
 - The break-out of operating costs based on the targeted ridership for the services would be between \$622,580 (low) and \$889,400 (high) for Radford University services, and between \$248,360 (low) and \$354,800 (high) for City services.
- Six small buses and two 30-foot medium duty buses would be required to run this proposed transit network, at an initial capital cost of \$812,000.²

² The capital costs were estimated at \$65,000 per small bus and \$211,000 per medium duty, low floor <30', 10-year/350,000 miles diesel bus, with cubic/GFI Odyssey farebox, air-ride suspension, bike rack, and miscellaneous options.

Fig. 4-17a: Option Group A - Proposed Network



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Fig. 4-17b: Option Group A - Individual Routes in Proposed Network

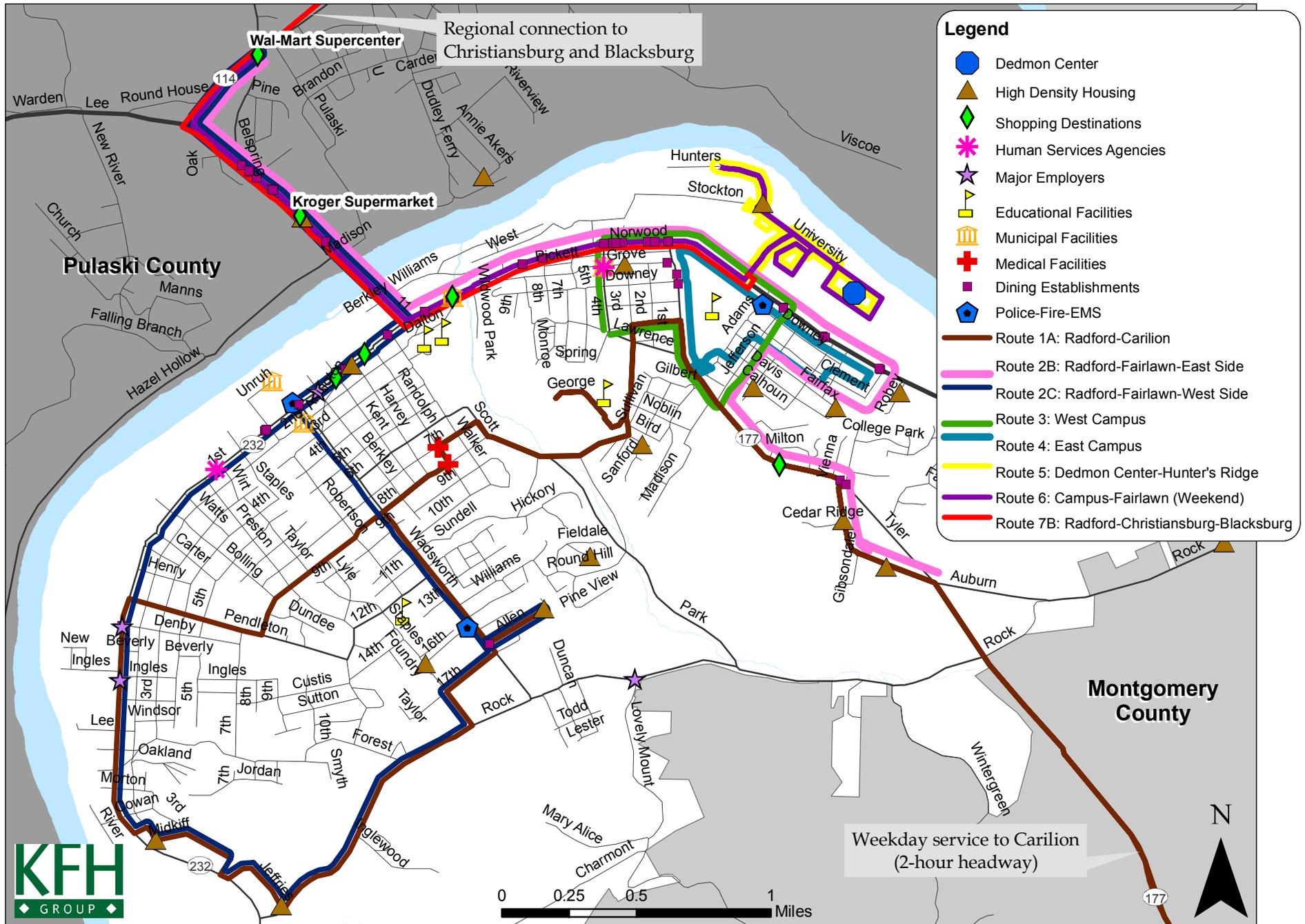


Table 4-1: Illustration of Possible Service Packages for the City of Radford & Radford University - Option Group A

Proposed Route	Headway	Vehicles	Total Trips	Daily Hours	Days per Year	High Cost per Hour	Medium Cost per Hour	Low Cost per Hour	High Annual Operating Cost	Med. Annual Operating Cost	Low Annual Operating Cost	Vehicle Type	Estimated Cost	Incremental Capital Cost
Radford University Proposed Service														
2B: Radford - Fairlawn - East Side (Weekdays 7:00am to 9:00pm)	60	1	14	14	148	\$50.00	\$42.50	\$35.00	\$103,600	\$88,060	\$72,520	small bus	\$65,000	\$65,000
2B: Radford - Fairlawn - East Side (Weekend 12:00pm to 10:00pm)	60	1	10	10	52	\$50.00	\$42.50	\$35.00	\$26,000	\$22,100	\$18,200	small bus	\$65,000	\$65,000
3: West Campus (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
4: East Campus (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
5: Dedmon Center - Hunter's Ridge (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
6: Campus - Fairlawn (Weekend 12:00pm to 10:00pm)	30	2	20	20	52	\$50.00	\$42.50	\$35.00	\$52,000	\$44,200	\$36,400	30' MD bus	\$211,000	\$422,000
7B: Radford - Christiansburg - Blacksburg	60	2	10	20	254	\$50.00	\$42.50	\$35.00	\$254,000	\$215,900	\$177,800	30' MD bus	\$211,000	\$422,000
(Weekdays 6:30am to 9:30am & 3:30pm to 10:30pm)														
7B: Radford - Christiansburg - Blacksburg (Weekend 12:00pm to 10:00pm)	60	2	10	20	100	\$50.00	\$42.50	\$35.00	\$100,000	\$85,000	\$70,000			
7B: Radford - Christiansburg - Blacksburg (Friday & Saturday Late Night 10:00pm to 2:00am)	60	2	4	8	52	\$50.00	\$42.50	\$35.00	\$20,800	\$17,680	\$14,560			
Total									\$889,400	\$755,990	\$622,580			\$682,000
City of Radford Proposed Service														
2C: Radford - Fairlawn - West Side (Weekdays 7:00am to 9:00pm)	60	1	14	14	254	\$50.00	\$42.50	\$35.00	\$177,800	\$151,130	\$124,460	small bus	\$65,000	\$65,000
2C: Radford - Fairlawn - West Side (Weekend 12:00pm to 10:00pm)	60	1	10	10	100	\$50.00	\$42.50	\$35.00	\$50,000	\$42,500	\$35,000	small bus	\$65,000	\$65,000
1A: Radford - Carilion (Weekdays 7:00am to 5:00pm)	120	1	5	10	254	\$50.00	\$42.50	\$35.00	\$127,000	\$107,950	\$88,900	small bus	\$65,000	\$65,000
Total									\$354,800	\$301,580	\$248,360			\$130,000

Notes: The University services are proposed to run during the school year only, while the City services are proposed to run year-round. See the "Vehicle Type" and "Incremental Capital Cost" columns to determine the total number of vehicles needed to operate this option group/package.

- The break-out of capital costs would be \$682,000 for four small buses and two 30-foot medium duty buses for Radford University services, and \$130,000 for two small buses to operate the City-gearred services.

Advantages

- Route 1A provides a faster trip (than Route 1B) for riders boarding along Tyler Avenue to reach the Recreation Center, medical offices, and other locations near the West End (since the bus does not travel around Radford University).
- The small loops in the Radford - Carilion (Route 1A) and Radford - Fairlawn (Routes 2B and 2C) routes proposed in this package provide patrons boarding at the south end of West Main Street with slightly shorter trip times heading toward destinations, including the medical offices, the Recreation Center, Fairlawn, and Carilion, than the other alternatives that do not include loops.
- Potentially the lowest total cost for the proposed initial network.
- Potentially the lowest cost option for the City, and one of the two lowest cost options for Radford University.

Disadvantages

- No direct connection between east and west Radford along Main Street.
 - Passengers would need to transfer between Routes 2B and 2C.
 - Route 1A, Radford - Carilion, provides a connection between east and west Radford, but travels along 8th Street and first serves the Recreation Center.
- The Radford - Carilion (Route 1A) and Radford - Fairlawn (Routes 2B and 2C) routes proposed in this package include small loops around the West End, where the segment on Rock Road would provide limited opportunity for ridership.
 - The small loops also translate into slightly longer trip times for patrons boarding at the front end of the loop (near Wadsworth Street and 8th Street), since the route only travels in one-direction along this segment.
- Two-hour headways for service to Carilion.

Option Group B1

Proposed Services:

- Route 1B: Radford - Carilion - Non-Loop
- Route 2D: Radford - Fairlawn - Combined
- Route 3: West Campus

- Route 4: East Campus
- Route 5: Dedmon Center – Hunter’s Ridge
- Route 6: Campus – Fairlawn (Weekend)
- Route 7B: Radford – Christiansburg – Blacksburg

This proposed network is mapped in Figure 4-18a, and Figure 4-18b shows the individual routes within the network. Table 4-2 provides a summary of the implementation details for this grouping option.

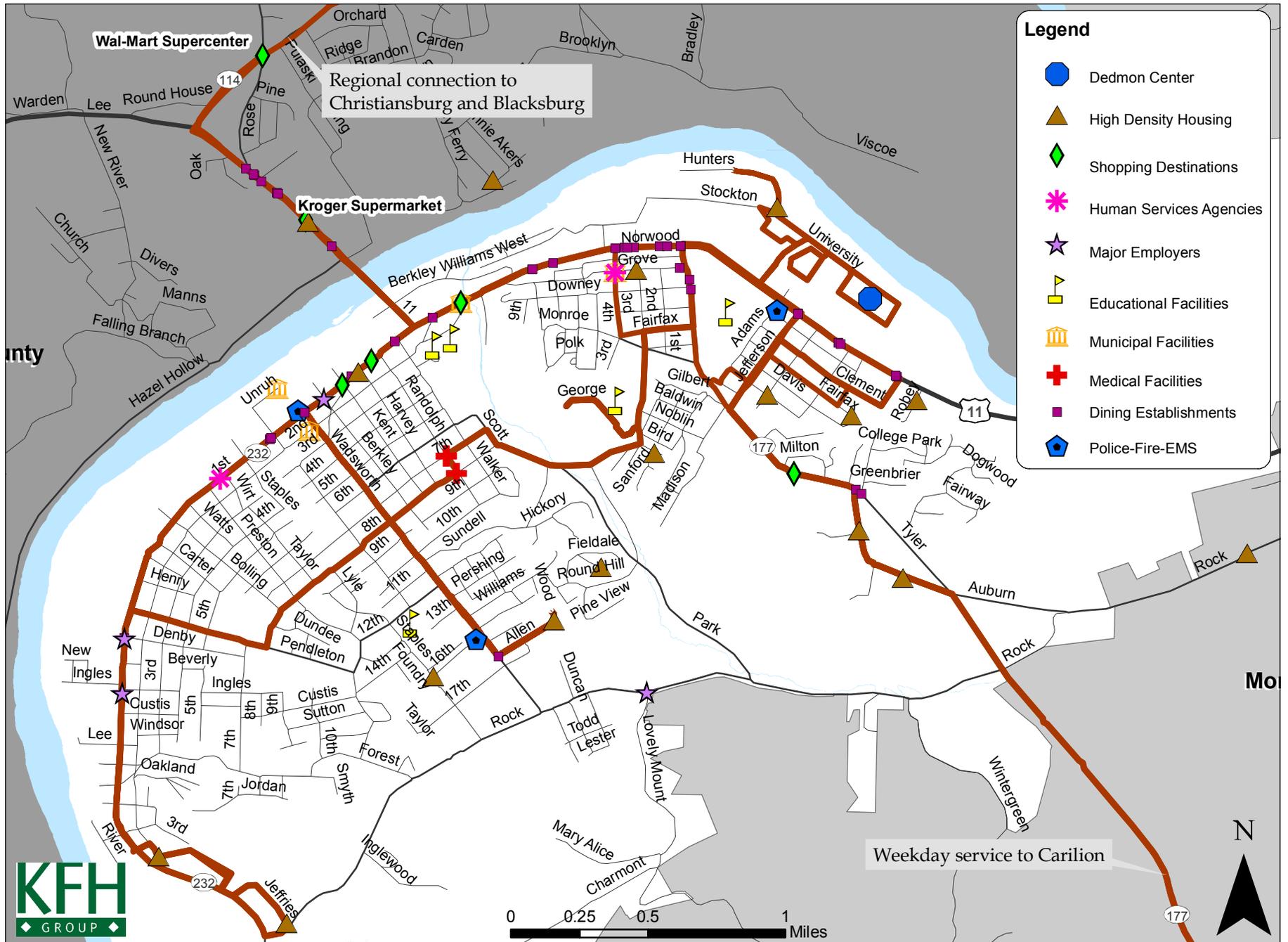
Service Characteristics

- Route 1B, Radford – Carilion – Non-Loop, operates year-round on weekdays from 8:00 a.m. to 6:00 p.m. *This route is proposed to initially run at two-hour headways.*
- Route 2D, Radford – Fairlawn – Combined, operates daily, from 7:00 a.m. to 9:00 p.m. on weekdays and 12:00 p.m. to 10:00 p.m. during the weekend, both at hourly headways.
- The East Campus, West Campus, and Dedmon Center – Hunter’s Ridge routes operate during the school year on weekdays, from 7:00 a.m. to 10:00 p.m. at 20-minute headways, similar to the existing Tartan Transit Campus Loop.
- The Campus – Fairlawn route operates during the school year on weekends, from 12:00 p.m. to 10:00 p.m. at 30-minute headways.
- The regional Radford – Christiansburg – Blacksburg route operates daily, year-round at hourly headways. On weekdays, the route operates during the peak periods and evenings, from 6:30 a.m. to 9:30 a.m. and from 3:30 p.m. to 10:30 p.m. During the weekend, the route operates from 12:00 p.m. to 10:00 p.m. Late night service, on Friday and Saturday from 10:00 p.m. to 2:00 a.m., will also be provided during the school year.

Estimated Costs

- Based on the service characteristics described above, the annual operating costs for this package of services would be between \$1,099,140 (low estimate) and \$1,570,200 (high estimate).
 - The break-out of operating costs based on the targeted ridership for the services would be between \$771,050 (low) and \$1,101,500 (high) for Radford University services, and between \$328,090 (low) and \$468,700 (high) for City services. These operating cost estimates included splitting the cost for the Radford – Fairlawn – Combined route in half between Radford University and the City.

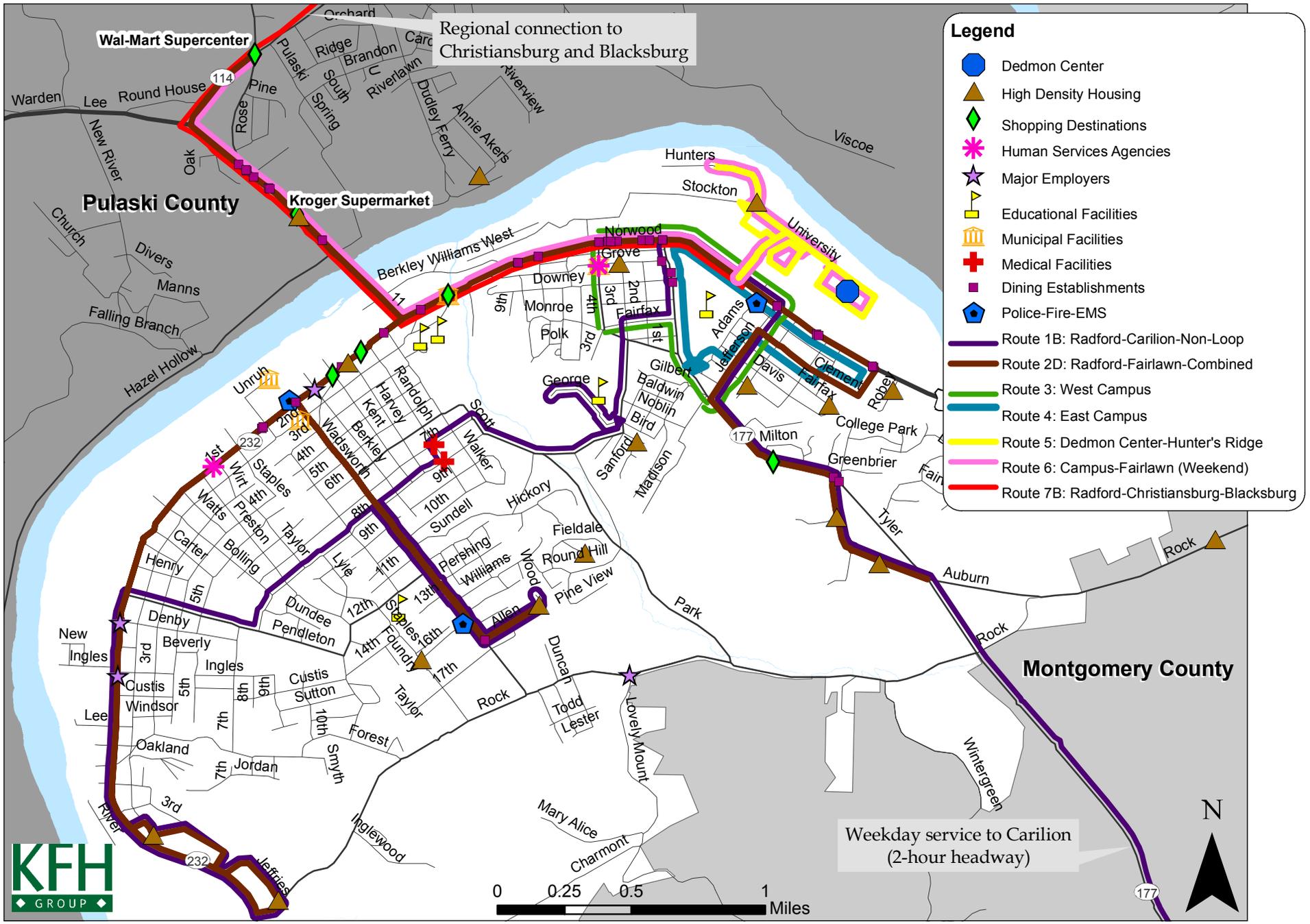
Fig. 4-18a: Option Group B1 - Proposed Network



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Fig. 4-18b: Option Group B1 - Individual Routes in Proposed Network



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Table 4-2: Illustration of Possible Service Packages for the City of Radford & Radford University - Option Group B1

Proposed Route	Headway	Vehicles	Total Trips	Daily Hours	Days per Year	High Cost per Hour	Medium Cost per Hour	Low Cost per Hour	High Annual Operating Cost	Med. Annual Operating Cost	Low Annual Operating Cost	Vehicle Type	Estimated Cost	Incremental Capital Cost
Radford University Proposed Service														
2D: Radford - Fairlawn - Combined (Weekdays 7:00am to 9:00pm) ¹	60	3	14	42	254	\$50.00	\$42.50	\$35.00	\$266,700	\$226,695	\$186,690	small bus	\$65,000	\$97,500
2D: Radford - Fairlawn - Combined (Weekend 12:00pm to 10:00pm) ¹	60	3	10	30	100	\$50.00	\$42.50	\$35.00	\$75,000	\$63,750	\$52,500	small bus	\$65,000	\$65,000
3: West Campus (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
4: East Campus (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
5: Dedmon Center - Hunter's Ridge (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
6: Campus - Fairlawn (Weekend 12:00pm to 10:00pm)	30	2	20	20	52	\$50.00	\$42.50	\$35.00	\$52,000	\$44,200	\$36,400	small bus	\$65,000	\$65,000
7B: Radford - Christiansburg - Blacksburg (Weekdays 6:30am to 9:30am & 3:30pm to 10:30pm)	60	2	10	20	254	\$50.00	\$42.50	\$35.00	\$254,000	\$215,900	\$177,800	30'MD bus	\$211,000	\$422,000
7B: Radford - Christiansburg - Blacksburg (Weekend 12:00pm to 10:00pm)	60	2	10	20	100	\$50.00	\$42.50	\$35.00	\$100,000	\$85,000	\$70,000			
7B: Radford - Christiansburg - Blacksburg (Friday & Saturday Late Night 10:00pm to 2:00am)	60	2	4	8	52	\$50.00	\$42.50	\$35.00	\$20,800	\$17,680	\$14,560			
Total									\$1,101,500	\$936,275	\$771,050			\$714,500
City of Radford Proposed Service														
2D: Radford - Fairlawn - Combined (Weekdays 7:00am to 9:00pm) ¹	60	3	14	42	254	\$50.00	\$42.50	\$35.00	\$266,700	\$226,695	\$186,690	small bus	\$65,000	\$97,500
2D: Radford - Fairlawn - Combined (Weekend 12:00pm to 10:00pm) ¹	60	3	10	30	100	\$50.00	\$42.50	\$35.00	\$75,000	\$63,750	\$52,500	small bus	\$65,000	\$65,000
1B: Radford - Carilion - Non-Loop (Weekdays 7:00am to 5:00pm)	120	1	5	10	254	\$50.00	\$42.50	\$35.00	\$127,000	\$107,950	\$88,900	small bus	\$65,000	\$65,000
Total									\$468,700	\$398,395	\$328,090			\$162,500

¹Interwoven City of Radford and Radford University Route - Cost of service split evenly.

Notes: The University services are proposed to run during the school year only, while the City services are proposed to run year-round. See the "Vehicle Type" and "Incremental Capital Cost" columns for the total number of vehicles needed to operate this option group/package.

- Seven small buses and two 30-foot medium duty buses would be required to run this proposed transit network, at an initial capital cost of \$877,000.
 - The break-out of capital costs would be about \$714,500 for four “and a half” small buses and two 30-foot medium duty buses for Radford University services, and about \$162,500 for two “and a half” small buses to operate the City-gearred services; the cost of the “half” buses relate to the third bus to be shared between the University and the City to operate the Radford – Fairlawn – Combined route.

Advantages

- The Radford – Carilion – Non-Loop (Route 1B) and Radford – Fairlawn – Combined (Route 2D) routes proposed in this package do not include small loops around the West End; bus travel in both directions would be more convenient and provide shorter trips for riders.
- Provides one-seat trip for travel between east and west Radford along Main Street.
- Implementing both Route 1B and Route 2D provides two options for one-seat rides from the West End to Radford University and Tyler Avenue.
- Route 1B provides more of a direct connection (than Route 1A) from the eastern and western neighborhoods adjacent to Radford University to the Recreation Center, the apartments near Miller Street and 2nd Avenue, and the Food Lion on Tyler Avenue.

Disadvantages

- Passengers on Route 2D, Radford – Fairlawn – Combined, looking to travel between east and west Radford must ride through Fairlawn.
- The schedules for both Route 1B and Route 2D may be confusing for patrons boarding along Wadsworth Street or Allen Avenue because they will need to make sure to get on the bus headed in the right direction for a shorter trip to their destination (i.e., look out for the east-bound bus to reach Fairlawn or Tyler Avenue, instead of riding the west-bound bus that travels along West Main Street before heading back to destinations in Fairlawn or east Radford).
- Two-hour headways for service to Carilion.
- Potentially the highest cost option for Radford University.

Option Group B2

Proposed Services:

- Route 1B: Radford – Carilion – Non-Loop

- Route 2E: East Radford – Fairlawn
- Route 2F: Central Radford – Fairlawn
- Route 2G: West Radford – Fairlawn
- Route 3: West Campus
- Route 4: East Campus
- Route 5: Dedmon Center – Hunter’s Ridge
- Route 6: Campus – Fairlawn (Weekend)
- Route 7B: Radford – Christiansburg – Blacksburg

This proposed network is mapped in Figure 4-19a, and Figure 4-19b portrays the individual routes within the network. Table 4-3 provides a summary of the implementation details for this package of services.

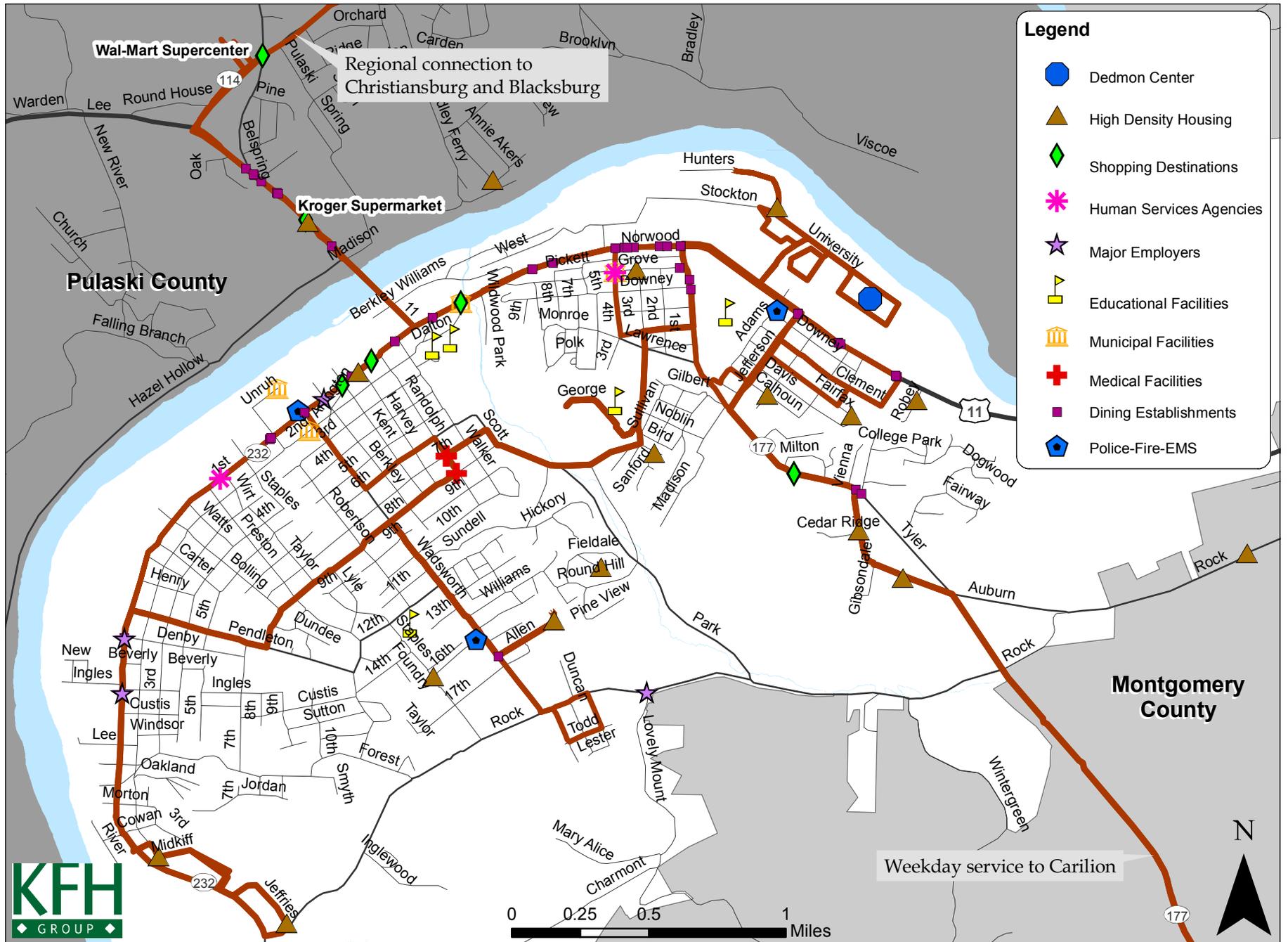
Service Characteristics:

- Route 1B, Radford – Carilion – Non-Loop, operates year-round on weekdays from 8:00 a.m. to 6:00 p.m. *This route is proposed to initially run with two-hour headways.*
- The Radford – Fairlawn split routes, Routes 2E, 2F, and 2G that serve East, Central, and West Radford, respectively, operate daily, from 7:00 a.m. to 9:00 p.m. on weekdays and from 12:00 p.m. to 10:00 p.m. during the weekend, both at hourly headways. Route 2E, serving East Radford, only operates during the school year, while Routes 2F and 2G operate year-round.
- The East Campus, West Campus, and Dedmon Center – Hunter’s Ridge routes operate during the school year on weekdays, from 7:00 a.m. to 10:00 p.m. at 20-minute headways, similar to the existing Tartan Transit Campus Loop.
- The Campus – Fairlawn route operates during the school year on weekends, from 12:00 p.m. to 10:00 p.m. at 30-minute headways.
- The regional Radford – Christiansburg – Blacksburg route operates daily, year-round at hourly headways. On weekdays, the route operates during the peak periods and evenings, from 6:30 a.m. to 9:30 a.m. and from 3:30 p.m. to 10:30 p.m. During the weekend, the route operates from 12:00 p.m. to 10:00 p.m. Late night service, on Friday and Saturday from 10:00 p.m. to 2:00 a.m., will also be provided during the school year.

Estimated Costs:

- Based on the service characteristics described above, the annual operating costs for this package of services would be between \$1,030,400 (low estimate) and \$1,472,000 (high estimate).

Fig. 4-19a: Option Group B2 - Proposed Network



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Fig. 4-19b: Option Group B2 - Individual Routes in Proposed Network

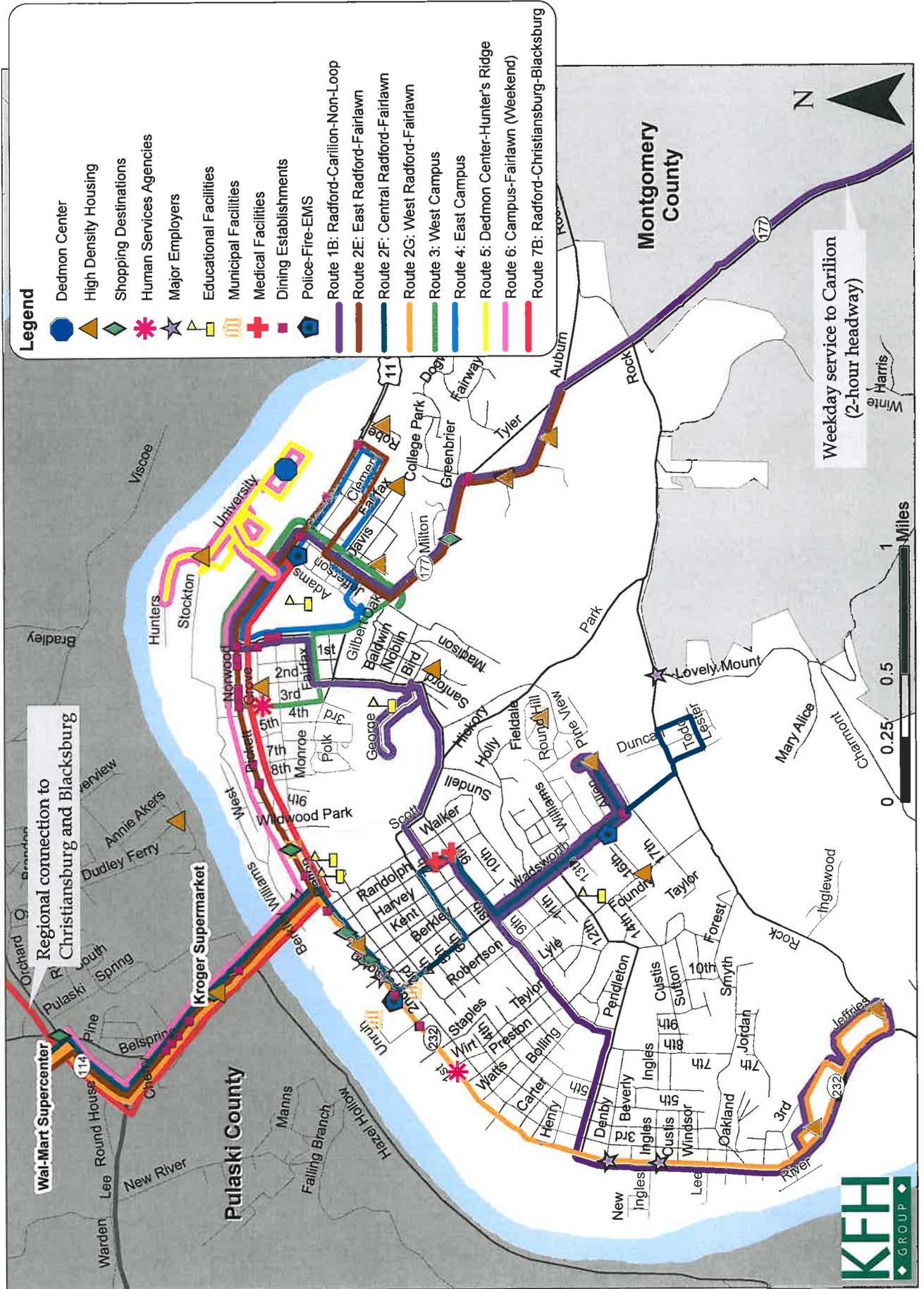


Table 4-3: Illustration of Possible Service Packages for the City of Radford & Radford University - Option Group B2

Proposed Route	Headway	Vehicles	Trips	Daily Hours	Days per Year	High Cost per Hour	Medium Cost per Hour	Low Cost per Hour	High Annual Operating Cost	Medium Annual Operating Cost	Low Annual Operating Cost	Vehicle Type	Estimated Cost	Incremental Capital Cost
Radford University Proposed Service														
2E: East Radford - Fairlawn (Weekdays 7:00am to 9:00pm)	60	1	14	14	148	\$50.00	\$42.50	\$35.00	\$103,600	\$88,060	\$72,520	small bus	\$65,000	\$65,000
2E: East Radford - Fairlawn (Weekend 12:00pm to 10:00pm)	60	1	10	10	52	\$50.00	\$42.50	\$35.00	\$26,000	\$22,100	\$18,200	small bus	\$65,000	\$65,000
3: West Campus (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
4: East Campus (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
5: Dedmon Center - Hunter's Ridge (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
6: Campus - Fairlawn (Weekend 12:00pm to 10:00pm)	30	2	20	20	52	\$50.00	\$42.50	\$35.00	\$52,000	\$44,200	\$36,400	30'MD bus	\$211,000	\$422,000
7B: Radford - Christiansburg - Blacksburg (Weekdays 6:30am to 9:30pm & 3:30pm to 10:30pm)	60	2	10	20	254	\$50.00	\$42.50	\$35.00	\$254,000	\$215,900	\$177,800	30'MD bus	\$211,000	\$422,000
7B: Radford - Christiansburg - Blacksburg (Weekend 12:00pm to 10:00pm)	60	2	10	20	100	\$50.00	\$42.50	\$35.00	\$100,000	\$85,000	\$70,000			
7B: Radford - Christiansburg - Blacksburg (Friday & Saturday Late Night 10:00pm to 2:00am)	60	2	4	8	52	\$50.00	\$42.50	\$35.00	\$20,800	\$17,680	\$14,560			
Total									\$889,400	\$755,990	\$622,580		\$682,000	\$195,000
City of Radford Proposed Service														
2F: Central Radford - Fairlawn (Weekdays 7:00am to 9:00pm)	60	1	14	14	254	\$50.00	\$42.50	\$35.00	\$177,800	\$151,130	\$124,460	small bus	\$65,000	\$65,000
2F: Central Radford - Fairlawn (Weekend 12:00pm to 10:00pm)	60	1	10	10	100	\$50.00	\$42.50	\$35.00	\$50,000	\$42,500	\$35,000	small bus	\$65,000	\$65,000
2G: West Radford - Fairlawn (Weekdays 7:00am to 9:00pm)	60	1	14	14	254	\$50.00	\$42.50	\$35.00	\$177,800	\$151,130	\$124,460	small bus	\$65,000	\$65,000
2G: West Radford - Fairlawn (Weekend 12:00pm to 10:00pm)	60	1	10	10	100	\$50.00	\$42.50	\$35.00	\$50,000	\$42,500	\$35,000	small bus	\$65,000	\$65,000
1B: Radford - Carilion - Non-Loop (Weekdays 7:00am to 5:00pm)	120	1	5	10	254	\$50.00	\$42.50	\$35.00	\$127,000	\$107,950	\$88,900	small bus	\$65,000	\$65,000
Total									\$582,600	\$495,210	\$407,820		\$65,000	\$195,000

Notes: The University services are proposed to run during the school year only, while the City services are proposed to run year-round. See the "Vehicle Type" and "Incremental Capital Cost" columns for the total number of vehicles needed to operate this option group/package.

- The break-out of operating costs based on the targeted ridership for the services would be between \$622,580 (low) and \$889,400 (high) for Radford University services, and between \$407,820 (low) and \$582,600 (high) for City services.
- Seven small buses and two 30-foot medium duty buses would be required to run this proposed transit network, at an initial capital cost of \$877,000
 - The break-out of capital costs would be \$682,000 for four small buses and two 30-foot medium duty buses for Radford University services, and \$195,000 for three small buses to operate the City-gearred services.

Advantages

- The three Radford – Fairlawn routes (Route 2E, 2F, and 2G) provide quicker, direct connections (compared to the combined alternative, Route 2D) from major residential areas to destinations along Main Street and Fairlawn.
- Route 1B provides more of a direct connection (than Route 1A) from the eastern and western side neighborhoods adjacent to Radford University to the Recreation Center, the apartments near Miller Street and 2nd Avenue, and the Food Lion on Tyler Avenue.
- Potentially one of the lowest cost options for Radford University.

Disadvantages

- No direct connection between east and west Radford along Main Street.
 - Passengers would need to transfer between Routes 2G or 2F and 2E.
 - Radford University students and City residents living in east Radford do not have a direct connection to destinations along West Main Street.
 - Route 1B, Radford – Carilion – Non-Loop, provides a connection between east and west Radford, but travels along 8th Street and first serves the Recreation Center.
- The schedule for Route 1B may be confusing for patrons boarding along Wadsworth Street or Allen Avenue because they will need to make sure to get on the bus headed in the right direction for a shorter trip to their destination (i.e., look out for the east-bound bus to reach east Radford or Carilion, instead of riding the west-bound bus that travels along West Main Street before heading back toward east Radford).
- Two-hour headways for service to Carilion.

Option Group C

Proposed Services:

- Route 2H: Fairlawn – East Radford – Recreation Center – Carilion

- Route 2I: Fairlawn – West Radford – Recreation Center
- Route 3: West Campus
- Route 4: East Campus
- Route 5: Dedmon Center – Hunter’s Ridge
- Route 6: Campus – Fairlawn (Weekend)
- Route 7B: Radford – Christiansburg – Blacksburg

This proposed network is mapped in Figure 4-20a, and Figure 4-20b portrays the individual routes within the network. Table 4-4 provides a summary of the implementation details for this grouping option.

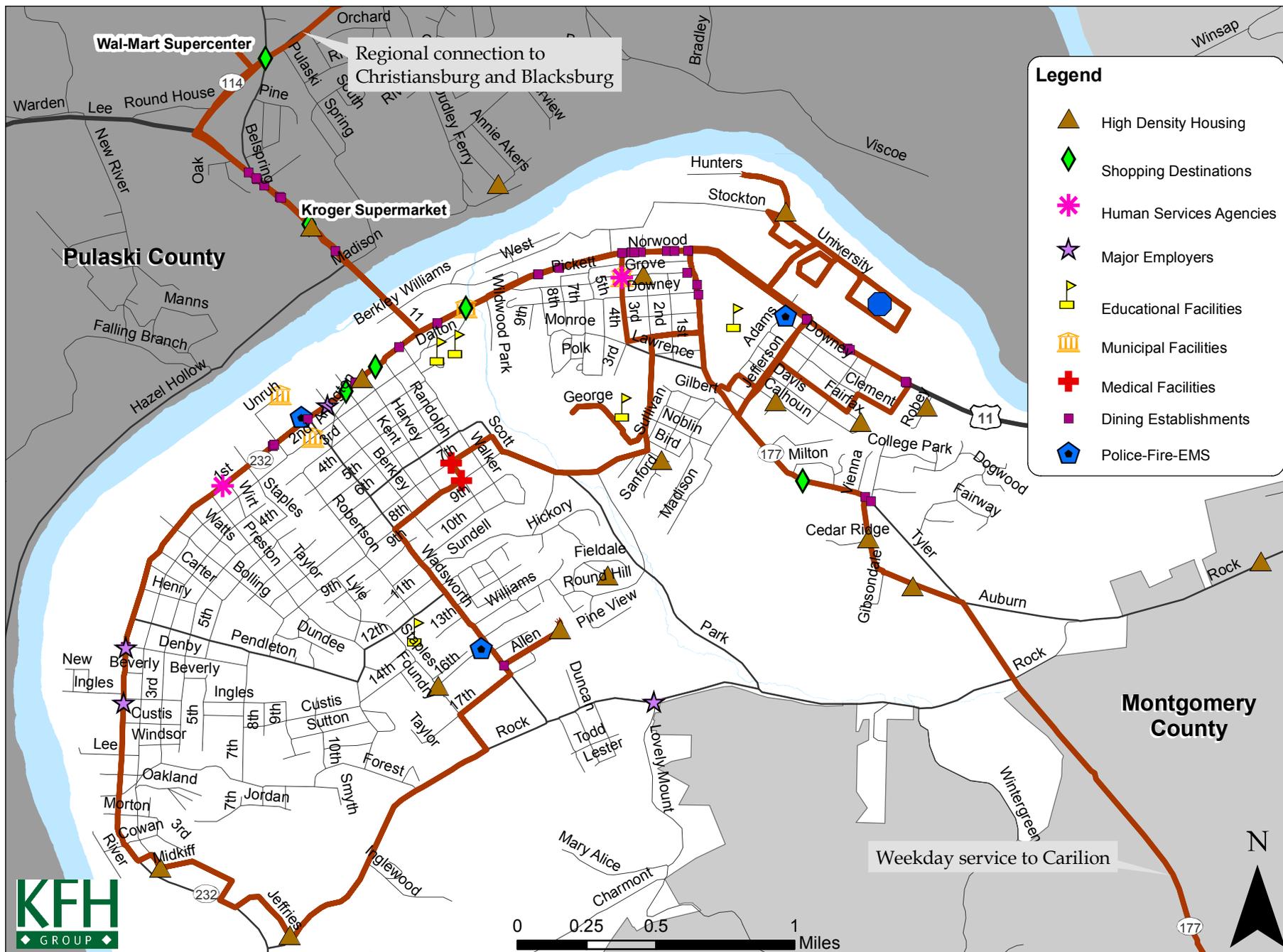
Service Characteristics:

- Both Route 2H, Fairlawn – East Radford – Recreation Center – Carilion, and Route 2I, Fairlawn – West Radford – Recreation Center, operate year-round on weekdays from 7:00 a.m. to 9:00 p.m. and during weekends from 12:00 p.m. to 10:00 p.m. *Note, on weekends, Route 2H stops at Tyler Avenue and Auburn Avenue, and does not serve Carilion. *Both alternatives are proposed to operate at hourly headways, including the service to Carilion.*
- The East Campus, West Campus, and Dedmon Center – Hunter’s Ridge routes operate during the school year on weekdays, from 7:00 a.m. to 10:00 p.m. at 20-minute headways, similar to the existing Tartan Transit Campus Loop.
- The Campus – Fairlawn route operates during the school year on weekends, from 12:00 p.m. to 10:00 p.m. at 30-minute headways.
- The regional Radford – Christiansburg – Blacksburg route operates daily, year-round at hourly headways. On weekdays, the route operates during the peak periods and evenings, from 6:30 a.m. to 9:30 a.m. and from 3:30 p.m. to 10:30 p.m. During the weekend, the route operates from 12:00 p.m. to 10:00 p.m. Late night service, on Friday and Saturday from 10:00 p.m. to 2:00 a.m., will also be provided during the school year.

Estimated Costs:

- Based on the service characteristics described above, the annual operating costs for this package of services would be between \$1,169,700 (low estimate) and \$1,671,000 (high estimate).
 - The break-out of operating costs based on the targeted ridership for the services would be between \$691,320 (low) and \$987,600 (high) for Radford University services, and between \$478,380 (low) and \$683,400 (high) for City services.

Fig. 4-20a: Option Group C - Proposed Network



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Fig. 4-20b: Option Group C - Individual Routes in Proposed Network

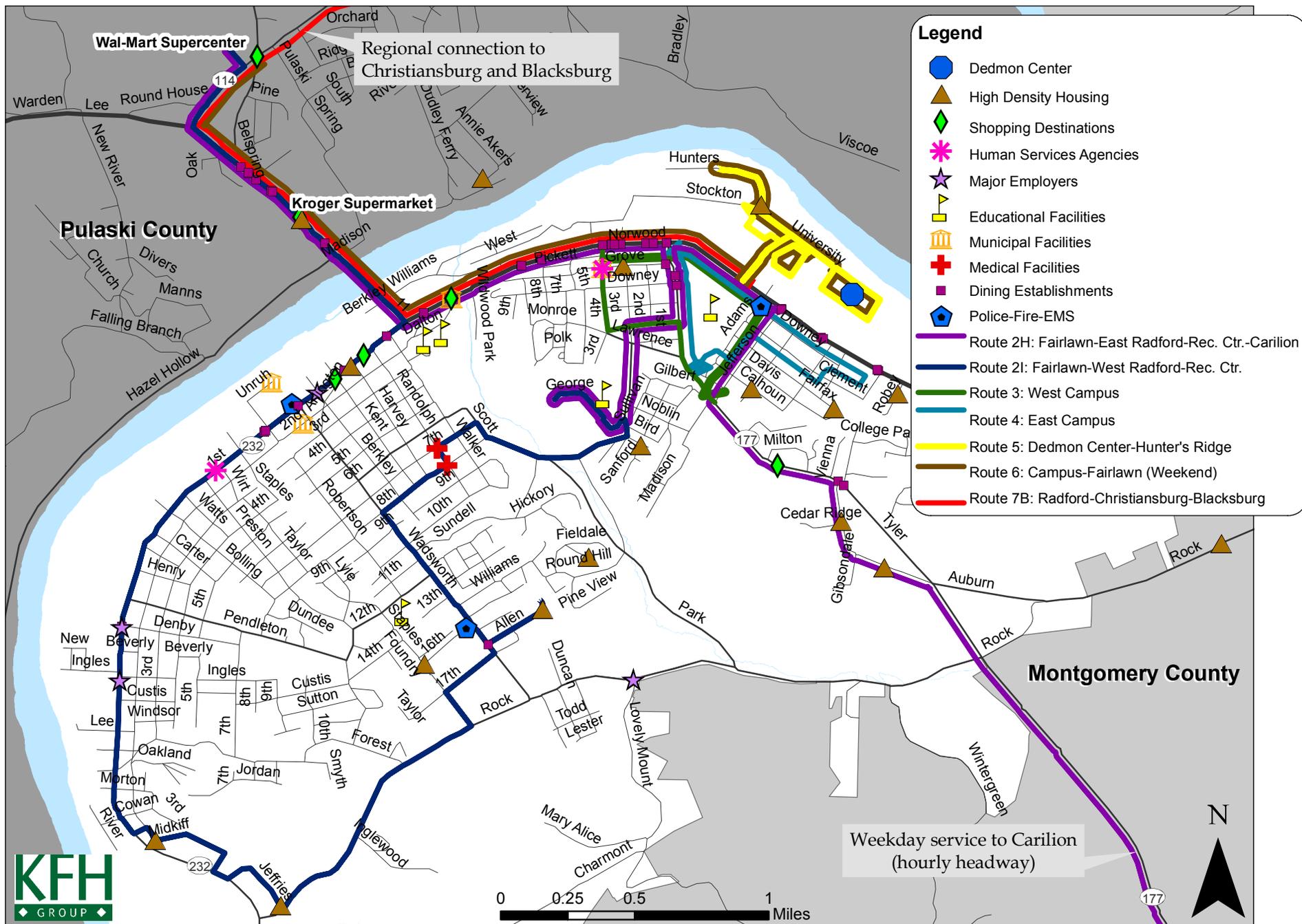


Table 4-4: Illustration of Possible Service Packages for the City of Radford & Radford University - Option Group C

Proposed Route	Headway	Vehicles	Total Trips	Daily Hours	Days per Year	High Cost per Hour	Medium Cost per Hour	Low Cost per Hour	High Annual Operating Cost	Med. Annual Operating Cost	Low Annual Operating Cost	Vehicle Type	Estimated Cost	Incremental Capital Cost
Radford University Proposed Service														
2H: Fairlawn - East Radford - Recreation Center - Carilion (Weekdays 7:00am to 9:00pm) ¹	60	2	14	28	254	\$50.00	\$42.50	\$35.00	\$177,800	\$151,130	\$124,460	small bus	\$65,000	\$65,000
2H: Fairlawn - East Radford - Recreation Center - Carilion (Weekend 12:00pm to 10:00pm) ¹	60	2	10	20	100	\$50.00	\$42.50	\$35.00	\$50,000	\$42,500	\$35,000			
3: West Campus (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
4: East Campus (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
5: Dedmon Center - Hunter's Ridge (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
6: Campus - Fairlawn (Weekend 12:00pm to 10:00pm)	30	2	20	20	52	\$50.00	\$42.50	\$35.00	\$52,000	\$44,200	\$36,400			
7B: Radford - Christiansburg - Blacksburg (Weekdays 6:30am to 9:30am & 3:30pm to 10:30pm)	60	2	10	20	254	\$50.00	\$42.50	\$35.00	\$254,000	\$215,900	\$177,800	30' M/D bus	\$211,000	\$422,000
7B: Radford - Christiansburg - Blacksburg (Weekend 12:00pm to 10:00pm)	60	2	10	20	100	\$50.00	\$42.50	\$35.00	\$100,000	\$85,000	\$70,000			
7B: Radford - Christiansburg - Blacksburg (Friday & Saturday Late Night 10:00pm to 2:00am)	60	2	4	8	52	\$50.00	\$42.50	\$35.00	\$20,800	\$17,680	\$14,560			
Total									\$987,600	\$839,460	\$691,320			\$682,000
City of Radford Proposed Service														
2H: Fairlawn - East Radford - Recreation Center - Carilion (Weekdays 7:00am to 9:00pm) ¹	60	2	14	28	254	\$50.00	\$42.50	\$35.00	\$177,800	\$151,130	\$124,460	small bus	\$65,000	\$65,000
2H: Fairlawn - East Radford - Recreation Center - Carilion (Weekend 12:00pm to 10:00pm) ¹	60	2	10	20	100	\$50.00	\$42.50	\$35.00	\$50,000	\$42,500	\$35,000			
2I: Fairlawn - West Radford - Recreation Center (Weekdays 7:00am to 9:00pm)	60	2	14	28	254	\$50.00	\$42.50	\$35.00	\$555,600	\$302,260	\$248,920	small bus	\$65,000	\$130,000
2I: Fairlawn - West Radford - Recreation Center (Weekend 12:00pm to 10:00pm)	60	2	10	20	100	\$50.00	\$42.50	\$35.00	\$100,000	\$85,000	\$70,000			
Total									\$683,400	\$580,890	\$478,380			\$195,000

¹ Interwoven City of Radford and Radford University Route - Cost of service split evenly.

Notes: During the weekend, Route 2H ends at Tyler and Auburn Avenues, and does not serve Carilion. The University services are proposed to run during the school year only, while the City services are proposed to run year-round. See the "Vehicle Type" and "Incremental Capital Cost" columns for the total number of vehicles needed to operate this option group/package.

- Seven small buses and two 30-foot medium duty buses would be required to run this proposed transit network, at an initial capital cost of \$877,000.
 - The break-out of capital costs would be \$682,000 for four small buses and two 30-foot medium duty buses for Radford University services, and \$195,000 for three small buses to operate the City-gearred services (which include two small buses to be shared in operating the Fairlawn - East Radford - Recreation Center - Carilion route).

Advantages

- Hourly service to Carilion (compared to two-hour headways in other packages).
- Direct connections from both east and west Radford to reach Fairlawn.
- Direct service for City residents that live along West Main Street and Wadsworth Street to reach the local medical offices and the Recreation Center (albeit a longer, indirect ride for those boarding near “downtown” West Main Street).
- The Recreation Center and Fairlawn serve as transfer points for service between east and west Radford (Routes 2H and 2I).

Disadvantages

- No direct connection between east and west Radford along Main Street.
 - Passengers would need to transfer between Routes 2H and 2I.
 - Radford University students and City residents living in east Radford do not have a direct connection to destinations along West Main Street.
 - City residents in the West End must transfer to reach East Main Street, Radford University, Tyler Avenue.
- Patrons traveling between Fairlawn or East Main Street and the neighborhood just east of Radford University or Tyler Avenue must ride out of their way to the Recreation Center.
- City residents in the West End do not have a direct connection to Carilion.
- Service in the West End primarily stays on major roads, so riders may need to travel several blocks to reach a bus stop.
- Segments of the services that travel along Rock Road and Tyler Avenue, toward Carilion, provide limited opportunity for ridership.
- Potentially the highest total cost for the proposed initial network.
- Potentially the highest cost option for the City.

Alternatives for the Regional Route

Table 4-5 portrays the service characteristics and estimated costs associated with alternatives for the regional route between Radford, Christiansburg, and Blacksburg. As described previously, these alternatives could be implemented in place of Route 7B, which was initially included in all the option groups. One routing could be selected as the regional route for all services (weekday, weekend, and late night services); or, specific routings could be implemented depending on the type of regional service. For example, Route 7A could be selected as the Friday and Saturday Late Night service because it is the fastest route between Radford and Blacksburg, and this particular service is geared toward students traveling between Radford University and Virginia Tech. Route 7C could be selected as the weekday service because U-11 is a popular connection between Radford and Christiansburg and provides opportunities for additional stops at residential areas.

FUNDING MECHANISMS

The service costs identified in the previous section include capital and operating cost estimates. They represent estimates of the total cost, but there are significant federal and state funding sources available to help Radford meet these costs. This section presents information about the funding sources that could be used to provide transportation to Radford, including the City and the University.

Public transportation in the United States is almost uniformly provided by funding partnership that includes the federal government, state and local government, other sponsoring organizations, and the users (through fares). Federal transit funding is provided to the states by the Federal Transit Administration (FTA), part of the U.S. Department of Transportation. In Virginia, these federal funds are administered by the state Department of Rail and Public Transportation (DRPT) for capital, operations, and planning. Most FTA public transportation programs allocate funding to the states on a formula apportionment basis, and most of the programs require non-federal match. DRPT administers these funding programs through its grant programs, meeting the federal requirements through the application process and subsequent compliance reviews and audits to ensure accountability. In addition, DRPT administers state funding for public transportation, which provides a portion of the required match.

Under the FTA program structure, Radford is considered as a “non-urbanized” area as the population of the urban cluster that includes Radford and the adjacent areas is less than 50,000. The FTA program that provides funding for public transportation in such areas is called Section 5311. Section 5311 funding can be used for operating assistance, capital (including vehicles and facilities), planning, and administration. The

Table 4-5: Regional Route Concepts - Potential Alternatives for the Option Groups

Route	Headway	Vehicles	Total Trips	Daily Hours	Days per Year	High Cost Per Hour	Medium Cost Per Hour	Low Cost Per Hour	High Annual Operating Cost	Medium Annual Operating Cost	Low Annual Operating Cost	Vehicle Type	Estimated Cost	Incremental Capital Cost
7A: Radford - Blacksburg via Prices Fork Road (Weekdays)	60	2	10	20	254	50.00	42.50	35.00	\$254,000	\$215,900	\$177,800	30'MD bus	\$211,000	\$422,000
Route 7A - VA-114 to Prices Fork Rd. to Main St. (6:30am-9:30am & 3:30pm-10:30pm)														
7A: Radford - Blacksburg via Prices Fork Road (Weekend)	60	2	10	20	100	50.00	42.50	35.00	\$100,000	\$85,000	\$70,000			
Route 7A - VA-114 to Prices Fork Rd. to Main St. (12:00pm-10:00pm)														
7A: Radford - Blacksburg via Prices Fork Road (Friday & Saturday Late Night)	60	2	4	8	52	50.00	42.50	35.00	\$20,800	\$17,680	\$14,560			
Route 7A - VA-114 to Prices Fork Rd. to Main St. (10:00pm-2:00am)														
7B: Radford - Christiansburg - Blacksburg via VA-114 (Weekdays)	60	2	10	20	254	50.00	42.50	35.00	\$254,000	\$215,900	\$177,800	30'MD bus	\$211,000	\$422,000
Route 7B - VA-114 to NRV Mall to Main St. (6:30am-9:30am & 3:30pm-10:30pm)														
7B: Radford - Christiansburg - Blacksburg via VA-114 (Weekend)	60	2	10	20	100	50.00	42.50	35.00	\$100,000	\$85,000	\$70,000			
Route 7B - VA-114 to NRV Mall to Main St. (12:00pm-10:00pm)														
7B: Radford - Christiansburg - Blacksburg via VA-114 (Friday & Saturday Late Night)	60	2	4	8	52	50.00	42.50	35.00	\$20,800	\$17,680	\$14,560			
Route 7B - VA-114 to NRV Mall to Main St. (10:00pm-2:00am)														
7C: Radford - Christiansburg - Blacksburg via U-11 (Weekdays)	60	2	10	20	254	50.00	42.50	35.00	\$254,000	\$215,900	\$177,800	30'MD bus	\$211,000	\$422,000
Route 7C - U-11 to U-460 to NRV Mall to Main St. (6:30am-9:30am & 3:30pm-10:30pm)														
7C: Radford - Christiansburg - Blacksburg via U-11 (Weekend)	60	2	10	20	100	50.00	42.50	35.00	\$100,000	\$85,000	\$70,000			
Route 7C - U-11 to U-460 to NRV Mall to Main St. (12:00pm-10:00pm)														
7C: Radford - Christiansburg - Blacksburg via U-11 (Friday & Saturday Late Night)	60	2	4	8	52	50.00	42.50	35.00	\$20,800	\$17,680	\$14,560			
Route 7C - U-11 to U-460 to NRV Mall to Main St. (10:00pm-2:00am)														
7D: Radford - Christiansburg - Blacksburg via I-81 (Weekdays)	60	3	10	30	254	50.00	42.50	35.00	\$381,000	\$323,850	\$266,700	30'MD bus	\$211,000	\$633,000
Route 7D - I-81 to Carilion to NRV Mall to Main St. (6:30am-9:30am & 3:30pm-10:30pm)														
7D: Radford - Christiansburg - Blacksburg via I-81 (Weekend)	60	3	10	30	100	50.00	42.50	35.00	\$150,000	\$127,500	\$105,000			
Route 7D - I-81 to Carilion to NRV Mall to Main St. (12:00pm-10:00pm)														
7D: Radford - Christiansburg - Blacksburg via I-81 (Friday & Saturday Late Night)	60	3	4	12	52	50.00	42.50	35.00	\$31,200	\$26,520	\$21,840			
Route 7D - I-81 to Carilion to NRV Mall to Main St. (10:00pm-2:00am)														

Note: Specific routing options could be used depending on type of service (i.e., Route 7D for peak period service geared toward commuters and connections to the Smart Way Bus, or Route 7A for Friday and Saturday Late Night service geared toward student travel between Radford University and Virginia Tech).

proposed Radford services would be eligible for Section 5311, if they meet the requirement that they are open to the general public.

Other federal funding sources have been discussed as a means of supporting the Radford services. Another federal program, the Job Access and Reverse Commute (JARC) program is providing funding to Blacksburg Transit for the operation of the Christiansburg local circulator service. However, JARC funding is intended primarily to support employment transportation for low income workers, and although the state's allocation is formula-based, the state administers the program as a competitive discretionary program. Thus the continuity of the funding is not assured. The proposed general public services for Radford, which would serve a broad variety of community needs, including student transportation, are not eligible for JARC.

Blacksburg Transit utilizes FTA Section 5307 funding, which is provided only to Urbanized Areas which have a population over 50,000. So Radford could not use that source. Community Transit in Radford is already a recipient of Section 5310 funding, which provides capital for non-profit agencies providing transportation to seniors and persons with disabilities. However, Section 5310-funded vehicles are limited in terms of their potential use for general public transportation.

So, the most likely source of federal funding for the Radford system is Section 5311, which is the source used in similar non-urbanized systems elsewhere in Virginia and across the country.

Section 5311 funds can be used for both operating assistance and capital (purchase of buses, computers, facilities, etc.). For operating expenses, the federal funds can be used for up to 50% of the net operating deficit. The net operating deficit is the remaining operating cost after farebox revenue is applied (or other revenue such as advertising). Of the remaining 50% of the net deficit, DRPT can provide state funding for a portion of the operating cost, at this time approximately 17%. The remaining local match requirement for the annual operations is approximately 33% of the net operating deficit.

For capital, in this case the purchase of buses, the federal share cannot exceed 80% of the cost of the vehicles. DRPT provides state funding towards the remaining 20% non-federal amount at a variable match ratio that has ranged in the past three years from 65-75%. Assuming the 65% amount, this equates to 13% of the remaining 20% required match.

Funding supplied by a university can be applied in two different ways. If a university has a contract with a public transit system for specific services, the money provided by the university would be considered as revenue, and it would reduce the

net operating deficit (generally by a significant amount). This is the model that is followed by James Madison University with the City of Harrisonburg's transit system. It has the effect that there remains a net deficit, and the City is forced to come up with the local match portion after the federal and state funding is applied. The alternative model involves the use of university funding as the local match, rather than revenue. In theory, the funding is provided as a contribution to the system, rather than as a quid pro quo for specific services, though it is possible to have a good understanding of the services that would benefit the university. This is the model followed in Blacksburg, where Virginia Tech's contribution is the local match, with no funding provided by the Town.

Table 4-6 presents the estimated local share requirements for the annual operating costs for each of the service packages presented above. In one case the funding from the university is shown as revenue, and in the other case the funding is shown as match. It is assumed that university riders (students, staff, faculty) would ride for no additional fare, so there would be no additional fare revenue from them. The non-university riders have been assumed to pay fares that cover 10% of the operating costs of the routes that are not primarily University oriented.

Capital costs are presented assuming that there is 80% federal funding and 13% state funding for the vehicles. The remaining local match cost is allocated to the City and the University based on the number of vehicles required to operate the particular route.

The availability of the federal funding for operations and capital for a combined system is a primary benefit to the University of joining in a public system, along with the improved mobility of the students, faculty and staff. The availability of federal capital allows the University to save most of the cost of replacing the current Tartan Transit fleet, and the additional benefit of federal operating assistance allows for expansion of service in terms of additional routes and more service. For the City, participation by the University allows for a higher level of service and more route options for City residents.

Table 4-6: Potential Funding of Option Packages Using Section 5311/DRPT State Funding: Using "Medium" Operating Costs of \$42.50 per Hour

		Annual Operating Costs					Capital Costs ²					
		Total Operating Cost	Farebox Revenue	Net Operating Deficit	Federal Share (50%)	State Share (17%) ¹	Remaining Local Share: University	City	Vehicle Cost	Federal Share (80%)	State Share (13%) ¹	Local Share: University
With University Funding Used as Match:												
Option Group A:												
University Routes	\$755,990	\$0	\$755,990	\$377,995	\$128,518	\$249,477	\$0	\$682,000	\$545,600	\$88,660	\$47,740	\$0
City Routes	\$301,580	\$30,158	\$271,422	\$135,711	\$46,142	\$0	\$89,569	\$130,000	\$104,000	\$16,900	\$0	\$9,100
Total System:	\$1,057,570	\$30,158	\$1,027,412	\$513,706	\$174,660	\$249,477	\$89,569	\$812,000	\$649,600	\$105,560	\$47,740	\$9,100
Option Group B1:												
University Routes	\$936,275	\$0	\$936,275	\$468,138	\$159,167	\$308,971	\$0	\$714,500	\$571,600	\$92,885	\$50,015	\$0
City Routes	\$398,395	\$39,840	\$358,556	\$179,278	\$60,954	\$0	\$118,323	\$162,500	\$130,000	\$21,125	\$0	\$11,375
Total System:	\$1,334,670	\$39,840	\$1,294,831	\$647,415	\$220,121	\$308,971	\$118,323	\$877,000	\$701,600	\$114,010	\$50,015	\$11,375
Option Group B2:												
University Routes	\$755,990	\$0	\$755,990	\$377,995	\$128,518	\$249,477	\$0	\$682,000	\$545,600	\$88,660	\$47,740	\$0
City Routes	\$495,210	\$49,521	\$445,689	\$222,845	\$75,767	\$0	\$147,077	\$195,000	\$156,000	\$25,350	\$0	\$13,650
Total System:	\$1,251,200	\$49,521	\$1,201,679	\$600,840	\$204,285	\$249,477	\$147,077	\$877,000	\$701,600	\$114,010	\$47,740	\$13,650
Option Group C:												
University Routes	\$839,460	\$0	\$839,460	\$419,730	\$142,708	\$277,022	\$0	\$682,000	\$545,600	\$88,660	\$47,740	\$0
City Routes	\$580,890	\$58,089	\$522,801	\$261,401	\$88,876	\$0	\$172,524	\$195,000	\$156,000	\$25,350	\$0	\$13,650
Total System:	\$1,420,350	\$58,089	\$1,362,261	\$681,131	\$231,584	\$277,022	\$172,524	\$877,000	\$701,600	\$114,010	\$47,740	\$13,650
With University Funding Used as Revenue (for Operations):												
Option Group A:												
University Routes	\$755,990	\$249,477	\$506,513	\$253,257	\$86,107	N/A	\$167,149	\$682,000	\$545,600	\$88,660	\$47,740	\$0
City Routes	\$301,580	\$30,158	\$271,422	\$135,711	\$46,142	\$0	\$89,569	\$130,000	\$104,000	\$16,900	\$0	\$9,100
Total System:	\$1,057,570	\$279,635	\$777,935	\$388,968	\$132,249	N/A	\$256,719	\$812,000	\$649,600	\$105,560	\$47,740	\$9,100
Option Group B1:												
University Routes	\$936,275	\$308,971	\$627,304	\$313,652	\$106,642	N/A	\$200,473	\$714,500	\$571,600	\$92,885	\$50,015	\$0
City Routes	\$398,395	\$39,840	\$358,556	\$179,278	\$60,954	\$0	\$118,323	\$162,500	\$130,000	\$21,125	\$0	\$11,375
Total System:	\$1,334,670	\$348,810	\$985,860	\$492,930	\$167,596	N/A	\$318,796	\$877,000	\$701,600	\$114,010	\$50,015	\$11,375
Option Group B2:												
University Routes	\$755,990	\$249,477	\$506,513	\$253,257	\$86,107	N/A	\$161,871	\$682,000	\$545,600	\$88,660	\$47,740	\$0
City Routes	\$495,210	\$49,521	\$445,689	\$222,845	\$75,767	\$0	\$147,077	\$195,000	\$156,000	\$25,350	\$0	\$13,650
Total System:	\$1,251,200	\$298,998	\$952,202	\$476,101	\$161,874	N/A	\$308,948	\$877,000	\$701,600	\$114,010	\$47,740	\$13,650
Option Group C:												
University Routes	\$839,460	\$277,022	\$562,438	\$281,219	\$95,614	N/A	\$179,743	\$682,000	\$545,600	\$88,660	\$47,740	\$0
City Routes	\$580,890	\$58,089	\$522,801	\$261,401	\$88,876	\$0	\$172,524	\$195,000	\$156,000	\$25,350	\$0	\$13,650
Total System:	\$1,420,350	\$335,111	\$1,085,239	\$542,620	\$184,491	N/A	\$352,267	\$877,000	\$701,600	\$114,010	\$47,740	\$13,650

¹State share for operating costs is 17%, this data was provided by DRPT.

²Capital costs do not include spare vehicles, therefore capital costs for the recommended service will be higher than the costs portrayed in this table.

³DRPT provides state funds towards the 20% non-federal capital requirement at a variable match ratio that has ranged from 65-75% in the last three years. Assuming the 65% amount, this equates to 13% of the total capital cost requirement.

Chapter 5

Organizational Alternatives

INTRODUCTION

A variety of organizational alternatives were considered to implement public transit services in Radford. This chapter reviews these options, and describes both a short term general model and a more long-term model for future consideration. Potential advantages and disadvantages of each are noted.

ORGANIZATIONAL OPTIONS

Short-Term Organizational Options

In the short-term, the key organizational questions concern the applicant for federal and state funding, and the operator. To some extent, these questions are linked to the funding sources, and the choice of operators may well be driven in part by the choice of applicant and the funding.

The Applicant

DRPT requires that the applicant for Section 5311 funding be a local governmental jurisdiction such as a city, town, or county. The normal model for a system similar to the proposed joint system for Radford would involve the local government as the applicant, and an agreement with the University regarding the amount of its contribution and any related conditions. This is the case in Blacksburg, Farmville, Fredericksburg, and Harrisonburg. This model would call for the City of Radford to be the applicant. In this case the University would need to have an agreement regarding the funding.

City of Radford as Applicant, University has Agreement with the City

The basic structure of this alternative included the following:

- The City would be the applicant for grant funding to DRPT.
- The City would provide local match for City-related services, the University would provide the local match for University-focused services.
- University control over its services would need to be specified in the agreement with the City.
- There would likely be a local Transit Advisory Board, which would need either proportional representation or weighted voting to reflect differences in the ridership, funding, and service levels.
- The City would contract for service operations, vehicles, and vehicle maintenance. Potential operators include Community Transit, Blacksburg Transit, or Pulaski Transit, or private transit management companies.

As discussed in the Advisory Committee to this study, the University would need to have a degree of control over the services provided to its community that is commensurate with the amount of funding—i.e. if 80% of the local match is from the University, it would want to have general control over the services used by the university community. One key step would be a general agreement on the routes, schedules, and hours of the overall service likely to have a majority of ridership from the University community. Because of the likelihood that service adjustments may be needed during the course of a year, there should be an Advisory Board structured to provide for University oversight of those services, whether through a Memorandum of Understanding, a contract, and/or through the Board structure. The University clearly would not like to be in a position of having only one vote and potentially having its service cut or other changes made. At the same time, the City of Radford and other interested parties would like to have the oversight of the services not primarily oriented to the University, again in proportion to the local funding.

Assuming that such an agreement can be crafted (it should be noted that the Advisory Committee to this study seemed to be in agreement that these should be the ground rules), the primary advantages included:

- University access to federal capital for 80% of the cost of the fleet providing service for its community.
- University access to federal and state operating assistance allowing for expanded routes and hours without paying the full cost.
- A significant increase in service that would allow the University community access to desired destinations at most times desired, potentially reducing the need for student vehicles or expansion of parking facilities on campus.

- For City residents, the ability to have local public transportation service to key desired destinations that would otherwise not be feasible, providing a mobility alternative for many in the community.
- The University would have an agreement with the City regarding its services (i.e. the City could not unilaterally change University-focused routes).
- The City would have an agreement providing for control over services not primarily focused on the University.
- There would be a basis for joint City-University service coordination on services, including joint oversight of shared services.
- Local branding of the services to reflect the Radford and Radford University communities.

Disadvantages include:

- The City does not have experience running a transit program (though it does in grant applications and grants management generally, and the contractor would be responsible for running the transit program).
- The University would not have direct, complete oversight of its services, but would need to consult with the City on desired service changes or quality issues.
- The University might still potentially have to maintain some of its own transportation capacity to provide services that might be deemed “charters” under federal regulation.
- Possible administrative costs related to grant application and management (preparing invoices to the state, compiling required reporting, etc.)—to the extent that these functions are not performed by the actual operator of the service. It should be noted that the agreements could address this issue.
- The risk that at some point the City might reduce its participation, making it difficult for the University to continue accessing federal and state funding (without going through another applicant).

Given that DRPT requires a local government to apply, another option that potentially exists is for the City to apply for Section 5311 funding for some services, and the University to have an agreement with another government who would apply for funding for its services, most likely the Town of Blacksburg. In general, DRPT prefers to have one applicant from a given area, but two separate applications is technically a possibility.

The only potential advantage is that the University would be making its contribution to a local government that already has an operating fixed-route transit system, Blacksburg Transit, with the administrative and operating experience that it has.

Disadvantages include:

- The likelihood that Blacksburg Transit would be the operator for the University services, with hourly operating costs similar to the current Tartan Transit, potentially reducing the scope for additional service for a given level of funding (as compared to the possibility of a lower cost operator).
- The possibility that a service plan geared specifically to the University might not be considered as general public service, at least raising the question of whether or not it is eligible for Section 5311 funding.
- The administrative costs involved with two applications, and two separate grants management processes.
- The loss of the ability to share costs on routes desired by both the City residents and the University community, including service to Fairlawn, to Christiansburg, to Blacksburg, and to the Carilion medical facilities.
- In the absence of any coordination mechanism, the likelihood of gaps in service, lack of coordination of transfers, and possible duplicate service if the City and the University both attempt to provide service to the same places.

A third technical possibility was the Town of Blacksburg being the applicant for combined Radford services, with funding provided by both the University and the City. However, that would put the City of Radford in the position of providing local match to a system that receives no local match from its own Town government (a potential political problem). In the longer-term, something like this may be part of a regional solution that has a single regional transit system with local match provided by a number of local governments and universities. The options for regional transit governance are discussed below, but it will not be possible to achieve regional consensus before applications for FY 2011 funding are due to DRPT.

The Operator

If the City is the applicant, it is very likely that it will in turn need to contract with a service operator. The possible options include Community Transit, Blacksburg Transit, Pulaski Transit, private for-profit transit management companies (such as Veolia, First Transit, and MV), and other private non-profit transit agencies. Under Section 5311 federal guidelines, funding can be passed to a designated operator who would otherwise be an eligible recipient (i.e. another public entity or a private non-profit agency) – without a competitive bid process. Recent DRPT practice has been to require a bid process, although this can be problematic when comparing bids from a public agency and a private for-profit firm.

Additional considerations included the different services that other providers in the area currently operate, and the impact that this may have on potential operating

costs. For instance, services offered by Community Transit are primarily demand-responsive and subscription, while Blacksburg Transit's services are primarily fixed-route public transit routes. Currently, both Pulaski Transit and Community Transit operate smaller vehicles than Blacksburg Transit. Also, a federal transit requirement is that no employee can be harmed as a result of receiving federal transit funds, so the possibility exists that operating costs could increase if the ultimate contractor is required to take on the University's transit staff and maintain wage and benefit levels (i.e. if they are not shifted to other work at the University).

The major advantage to Blacksburg Transit is that it already does fixed-route, fixed-schedule campus-oriented service for Virginia Tech. However, even with the advantage of the large maintenance facility in Blacksburg and the existing fleet, it is possible that its capacity for near-term service expansion may be limited by the large amount of service it already provides, and the recent expansions in Christiansburg. It is likely that Blacksburg Transit would also have to do vehicle procurements (like other potential operators) to replace the capacity of the existing Tartan Transit fleet, and add capacity for other services.

LONG-TERM ORGANIZATIONAL OPTIONS

As depicted in the alternatives and documented in Chapter 2, there are regional transportation needs that go beyond the Radford City limits. A variety of long-term organizational alternatives were considered to meet these current and future regional transit needs, and in addition ensure more efficient coordination of transportation services and more effective integration of land use and transit planning:

- Create a new Transportation District
- Create a new Service District
- Create a new Regional Transit Authority

This section reviews each option and describes the potential advantages and disadvantages of each.

Create a New Transportation District

In Virginia, local governments have a number of different ways to come together to create joint enterprises to perform public functions, including the provision of public transportation. The Transportation District Act of 1964 and the Virginia Code Chapters 15.2-4504-4526 provide the authority for jurisdictions to create a Transit District. This statute is summarized as follows:

Chapter 15.2-4504 to 4526

Chapter 15.2-4504. Procedure for creation of districts; single jurisdictional districts; application of chapter to port authorities and airport commissions. “Any two or more counties or cities, or combinations thereof, may, in conformance with the procedure set forth herein, or as otherwise may be provided by law, constitute a transportation district... A transportation district may be created by ordinance adopted by the governing body of each participating county and city...Such ordinances shall be filed with the Secretary of the Commonwealth.

Chapter 15.2-4506. Creation of Commission to Control Corporation

Chapter 15.2-4507. Members of transportation district commissions. This would appear to state that the commission members must be appointed by the governing bodies of the members, but need not be members of the governing bodies (if the commission is one with powers set forth in subsection A of 15.2-4515).

Chapter 15.2-4515. Powers and functions generally. This includes preparation of a transportation plan, construction and acquisition of facilities, power to enter into agreements or leases with private companies for operation of facilities, and the ability to contract or agreement within the district (or with adjoining governments) regarding operation of services or facilities.

An example of a regional Transportation District in Virginia is the Potomac and Rappahannock Transportation Commission (PRTC). PRTC is comprised of five jurisdictions: Prince William and Stafford Counties and the Cities of Manassas, Manassas Park, and Fredericksburg. PRTC was established in 1986 to help create and oversee the Virginia Railway Express (VRE) commuter rail service and also to assume responsibility for bus service implementation. Currently, PRTC offers a comprehensive network of commuter and local bus services in Prince William County and the Cities of Manassas and Manassas Park, as well as a free ridematching service.

A Transportation District would be a new legally recognized agency, and have all of the powers necessary to operate a regional transit system. These responsibilities include the power to prepare transportation plans, construct and acquire the transportation facilities included in the transportation plan, operate or contract for the operation of transportation services, and enter into contracts and agreements. A Transportation District would be governed by a Commission, with the composition determined by the participating jurisdictions. This governing Commission would determine an equitable funding allocation among the participating jurisdictions.

An advantage of the creation of a Transportation District is that with the existing Virginia Code already in place, enabling legislation is not required. In addition, more seamless transit services could be provided. A downside is that the creation of a Transportation District does not provide any new revenue opportunities.

Create a New Service District

Virginia Code Chapters 15.2-2400-2403 also provides local governments in Virginia with authority to establish a regional entity, in this case a Service District. Similar to a Transportation District, it would be comprised of the City and County. A major difference, however, is that a Service District could generate additional revenue through the ability to levy higher property taxes within the service district. The development of a Service District would not require enabling legislation.

This statute is summarized as follows:

Chapter 15.2-2400 to 2403

Chapter 15.2-2400. Creation of Service Districts: Provides authority for “any two or more localities” to form a service district by ordinance; requires public hearing.

Chapter 15.2-2401. Creation of Service Districts by Court Order in Consolidated Cities: Courts can order the creation of service districts in any city which results from the consolidation of two or more localities.

Chapter 15.2-2402. Description of Proposed Service District: Lists elements required in the ordinance or petition to create a service district—name, boundaries, purpose, facilities, plan for providing, and benefits.

Chapter 15.2-2403. Powers of Service Districts: Lists 13 powers of a service district. Subdivision 2 states that “in addition to services authorized by subdivision 1, transportation and transportation services within a service district, including, but not limited to: public transportation systems serving the district;” are authorized. Subdivision 3 provides authority to own facilities, equipment, property, etc. to provide such services. Subdivision 4 authorizes the district “To contract with any person, municipality or state agency to provide the governmental services authorized by subdivisions 1 and 2...” Subdivision 6 authorizes districts to levy and collect property taxes to pay for the services authorized.

Service Districts can be created by a single city or county, or by combinations of cities and/or counties. Service Districts are governed by a development board or other body, with responsibilities agreed upon by the participating jurisdictions. Service Districts can construct, maintain, and operate the facilities and equipment that are necessary to provide a wide range of services, including public transportation systems. Similar to a Transportation District, a Service District could operate transportation services or enter into contracts and agreements.

Create Regional Transit Authority (RTA)

A RTA would provide for the widest range of options and would have the fewest limitations. It would be a true regional entity, and be a legal entity that would have all of the powers necessary to operate and expand transit service and facilities and provide for the development of new dedicated transportation funding source. The responsibilities of an RTA could be limited to transit, or they could be expanded to other transportation services and facilities.

There is precedent in Virginia for establishment of a RTA. The Northern Virginia and Hampton Roads areas have established authorities, and recently in Williamsburg, James City County, the City of Williamsburg, the College of William and Mary, and the Colonial Williamsburg Foundation partnered to form a regional authority. Regional transit authorities are also under consideration in the Charlottesville and Fredericksburg areas.

The creation of an RTA would require a strong regional consensus and subsequent enabling legislation. Many aspects related to formation of a regional transit authority would need to be considered and determined, including the role and structure of a governing board.

The advantages of a regional authority include the ability to develop a dedicated funding source. The disadvantages include the possible addition of another administrative layer and potential loss by the jurisdictions of local autonomy.

Chapter 6

Conceptual Plan

INTRODUCTION

The service and organizational alternatives described in Chapters 4 and 5 were presented to the Radford Public Transit Committee for their review and comments. Ultimately, a subcommittee that included representatives from the City of Radford and Radford University selected Option Group A for the City-funded routes and Option Group B for the University-funded routes. In addition, the subcommittee decided to modify the proposed service to Christiansburg and Blacksburg from daily service to only Thursday, Friday, and Saturday service initially. This regional route would operate from 12:00 p.m. to 3:00 a.m., with the last trip leaving Blacksburg at 2:00 a.m. These routes and associated costs are detailed in the conceptual plan that is proposed in this chapter.

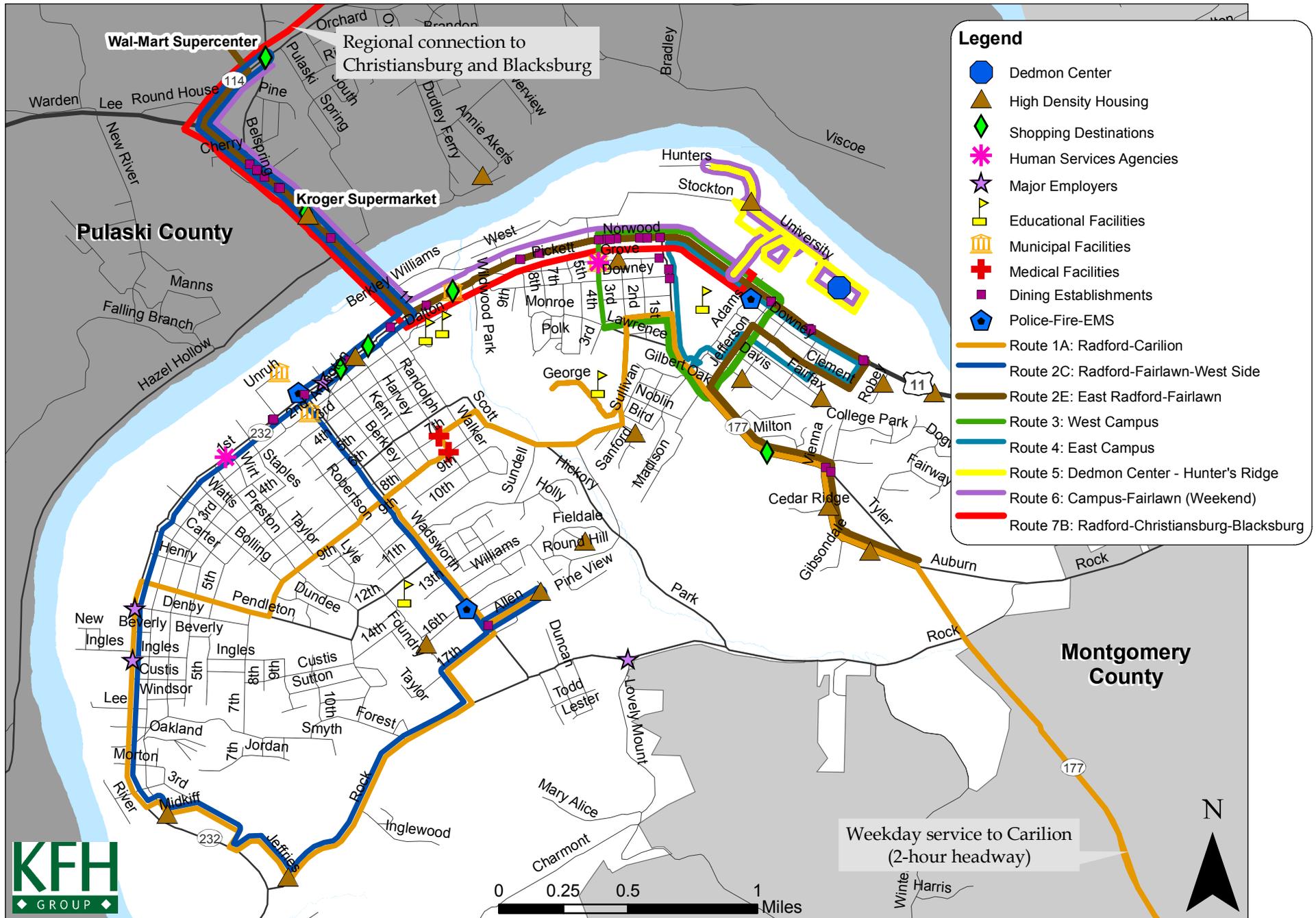
This chapter also describes the proposed organizational structure, and provides two timelines – one for the application process to DRPT for requesting transit funding, and another for the implementation of services. The chapter concludes with remaining issues that will need to be addressed and considered as Radford moves forward in developing a transit system.

PROPOSED SERVICE PLAN

As the two major local sources of funding for proposed transit services, the City and the University each reviewed the service alternatives described in Chapter 4 and selected their preferred services to include as the proposed network in this conceptual plan. The proposed network is shown in Figure 6-1.

City representatives on the Radford Public Transit Committee chose the City services developed in Option Group A (Routes 1A: Radford-Carilion and 2C: Radford-Fairlawn-West Side), while University representatives chose the University services

Fig. 6-1: Proposed Network



developed in Option Group B2 (Routes 2E: East Radford-Fairlawn, 3: West Campus, 4: East Campus, 5: Dedmon Center-Hunter's Ridge, 6: Campus-Fairlawn, and 7B: Radford-Christiansburg-Blacksburg). The University also requested that Route 7B start out as Thursday, Friday, and Saturday service only, operating from 12:00 p.m. to 3:00 a.m. during the school year only.

Table 6-1 provides a summary of implementation details for this proposed network. The service characteristics of the individual routes are as follows:

- Route 1A, Radford – Carilion, operates year-round on weekdays from 7:00 a.m. to 5:00 p.m. *This route is proposed to operate at two-hour headways.*
- Route 2C, Radford – Fairlawn – West Side, operates daily, from 7:00 a.m. to 9:00 p.m. on weekdays and 12:00 p.m. to 10:00 p.m. during the weekend, both at hourly headways. This service operates year-round.
- Route 2E, East Radford – Fairlawn, operates daily, from 7:00 a.m. to 9:00 p.m. on weekdays and from 12:00 p.m. to 10:00 p.m. during the weekend, both at hourly headways. This service only operates during the school year.
- The East Campus, West Campus, and Dedmon Center – Hunter's Ridge routes operate during the school year on weekdays, from 7:00 a.m. to 10:00 p.m. at 20-minute headways, similar to the existing Tartan Transit Campus Loop.
- The Campus – Fairlawn route operates during the school year on weekends, from 12:00 p.m. to 10:00 p.m. at 30-minute headways.
- The regional Radford – Christiansburg – Blacksburg route (Route 7B) operates on Thursdays, Fridays, and Saturdays, from 12:00 p.m. to 3:00 a.m. This service runs at hourly headways during the school year.

The costs, including vehicle requirements associated with this proposed network, are described below with the proposed first year budget.

AMERICANS WITH DISABILITIES ACT (ADA) IMPLICATIONS

As noted in Chapter 4, an issue to consider in terms of implementation is the need to meet the requirements of the ADA. The ADA requires public transit agencies that provide fixed-route service to provide “complementary paratransit” services to

Table 6-1: City of Radford & Radford University Proposed Network

Proposed Route	Headway	Vehicles	Total Trips	Daily Hours	Days per Year	High Cost per Hour	Medium Cost per Hour	Low Cost per Hour	High Annual Operating Cost	Medium Annual Operating Cost	Low Annual Operating Cost	Vehicle Type	Estimated Cost	Incremental Capital Cost
Radford University Proposed Service														
2E: East Radford - Fairlawn (Weekdays 7:00am to 9:00pm)	60	1	14	14	148	\$50.00	\$42.50	\$35.00	\$103,600	\$88,060	\$72,520	small bus	\$65,000	\$65,000
2E: East Radford - Fairlawn (Weekend 12:00pm to 10:00pm)	60	1	10	10	52	\$50.00	\$42.50	\$35.00	\$26,000	\$22,100	\$18,200	small bus	\$65,000	\$65,000
3: West Campus (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
4: East Campus (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
5: Dedimon Center - Hunter's Ridge (Weekdays 7:00am to 10:00pm)	20	1	45	15	148	\$50.00	\$42.50	\$35.00	\$111,000	\$94,350	\$77,700	small bus	\$65,000	\$65,000
6: Campus - Fairlawn (Weekend 12:00pm to 10:00pm)	30	2	20	20	52	\$50.00	\$42.50	\$35.00	\$52,000	\$44,200	\$36,400	small bus	\$65,000	\$65,000
7B: Radford - Christiansburg - Blacksburg (Thursday, Friday, Saturday 12:00pm to 3:00am)	60	2	15	30	78	\$50.00	\$42.50	\$35.00	\$117,000	\$99,450	\$81,900	30'MD bus	\$211,000	\$422,000
Total		6							\$631,600	\$536,860	\$442,120			\$682,000
City of Radford Proposed Service														
2C: Radford - Fairlawn - West Side (Weekdays 7:00am to 9:00pm)	60	1	14	14	254	\$50.00	\$42.50	\$35.00	\$177,800	\$151,130	\$124,460	small bus	\$65,000	\$65,000
2C: Radford - Fairlawn - West Side (Weekend 12:00pm to 10:00pm)	60	1	10	10	100	\$50.00	\$42.50	\$35.00	\$50,000	\$42,500	\$35,000	small bus	\$65,000	\$65,000
1A: Radford - Carlton (Weekdays 7:00am to 5:00pm)	120	1	5	10	254	\$50.00	\$42.50	\$35.00	\$127,000	\$107,950	\$88,900	small bus	\$65,000	\$65,000
Total		2							\$354,800	\$301,580	\$248,360			\$130,000

Notes: The University services are proposed to run during the school year only, while the City services are proposed to run year-round. In the 'Vehicles' column, the gray numbers indicate that the weekend service will utilize the same vehicles as the weekday service, so these numbers were not included in the totals for Radford University and City services.

people with disabilities who cannot use the fixed-route bus service because of a disability.

To meet ADA requirements, the proposed transit services would operate as deviated fixed routes, where the buses may deviate up to three-quarters of a mile from the planned route to pick up eligible passengers, who call in advance for such deviations. The proposed routes that serve the City would be conducive to this approach. Typically, this approach is also viable for university system's as well.

If it is determined that the University service on-time performance is suffering by employing a deviated fixed-route system, modifications to the system's schedule would be required. Another approach to fulfill ADA requirements is to directly provide demand-response services, where patrons call ahead (by the close of business the day before the desired trip) to schedule trips, and an accessible van or small bus transports them between a specific origin and destination. Such door-to-door service often provides higher quality transportation, but at higher costs because more vehicles and operators are needed, among other resources, to operate this type of service. If the proposed routes that serve the University would necessitate this approach because the headways and cycle times proposed for these routes do not leave enough flexibility to implement deviation services, additional funds would be required (which are detailed later in this chapter). Therefore, the proposed budget does not include funding for the ADA demand-response transportation at this time. However, estimates of potential ADA complementary paratransit costs are presented in the discussion of the budget.

PROPOSED ORGANIZATIONAL PLAN

As noted in Chapter 5, the key initial organizational question concerned the applicant for federal and state funding, and the operator of transit services. After discussions between the City and University, it was determined that the City will apply to DRPT for both FTA Section 5311 and State Aid for Transportation funding and will enter into an agreement with the University regarding the amount of its contribution and any related conditions. Under this agreement, the City will contract for service operations, vehicles, and vehicle maintenance. A Request for Proposal (RFP) will be developed and issued to determine a service contractor.

An additional organizational component is the creation of a Transit Advisory Board, a group of representatives of different interests related to public transportation in Radford. The Transit Advisory Board would provide guidance on the development and improvement of transit services to serve Radford residents, organizations, and businesses, and work with the City Council to develop appropriate budgetary guidelines. While the current Radford Public Transit Committee is a natural starting

point, there will need to be discussions regarding the composition of the Board in terms of either proportional representation or weighted voting to reflect differences in ridership, funding, and service levels of stakeholders. The Board should also include a representative from DRPT, the primary funding agency.

PROPOSED APPLICATION SCHEDULE

The City's application to DRPT will include appropriate components of this conceptual plan. The following schedule details the application process:

ACTIVITY	DUE DATE
Submit application to DRPT for FY 2011 funding through FTA Section 5311 Program.	February 1, 2010
Submit application to DRPT for intern position.	February 1, 2010
DRPT reviews, includes a draft Program of Projects (POP)	May 2010
Approval by Commonwealth Transportation Board	June 17, 2010
Funding available	October 1, 2010
Grant agreements executed with DRPT	Mid-October, 2010
Technical assistance from DRPT	On-going

PROPOSED IMPLEMENTATION PLAN

Assuming the application process is successful, funding from DRPT will be available on October 1, 2010. However, some activities such as the development and distribution of the RFP need to take place in the preceding months. In addition, appropriate preparations such as bus stop signage and development of marketing materials will need to be coordinated in the months before the system is implemented. DRPT provides funding for an intern position that could assist in these efforts and activities. The application is due at the same time as the application for FTA Section 5311 funding, on February 1, 2010, and is noted in the application schedule.

More details on the proposed implementation are included in the following schedule:

ACTIVITY	DUE DATE
Finalize agreement between City and University (including oversight board composition)	April 1, 2010
Hire intern	July 1, 2010
Develop and issue Request for Proposal (RFP) for service operator	September-October, 2010
Select and complete contract with service operator (hire interim transit manager)	October, 2010
Complete appropriate preparations (marketing, brochures, signage, etc)	On-going beginning July 1, 2010
Contractor begins providing services.	January 18, 2011 (or specific date for beginning of Spring 2011 semester)

PROPOSED BUDGET

Based on the service package selected by the Radford subcommittee, a first year budget was developed for inclusion in the application to DRPT and can be found in Table 6-2. This budget is based on the “medium” operating costs of \$42.50 per hour as noted in Chapter 4. The total operating costs for the first nine months of service (from January through September 2011, the end of the federal fiscal year) are approximately \$402,600 and \$226,200 for the University-oriented and City-oriented services, respectively. After taking into account expected farebox revenues and federal and state funding for operating assistance, the local shares of operating costs for the University and City over this time period are estimated at \$132,900 and \$67,200, respectively. If ADA Complementary Paratransit Service is required, an additional \$84,000 would need to be built into the budget - \$56,280 federal and state funding and \$27,720 local share for the University.

Table 6-3 portrays the vehicle requirements for the proposed network. The proposed services geared toward the University are estimated to require four small buses and two 30-foot, medium-duty buses, at a cost of \$682,000. The services proposed to primarily serve the City will require two small buses, at a cost of \$130,000. After considering federal and state assistance for these capital needs, the local shares for the University and the City are estimated at approximately \$47,700 and \$9,100, respectively.

Table 6-2 : Estimated First-Year Budget of Proposed Network - Using "Medium" Operating Costs of \$42.50 per Hour

	Operating Costs					Capital Costs							
	Total Operating Cost	Farebox Revenue	Net Operating Deficit	Federal Share (50%)	State Share (17%) ¹	Remaining Local Share: University	City	Vehicle Cost ²	Other Costs	Federal Share	State Share	University	City
Intern ³									\$10,000	\$8,000	\$9,500	\$250	\$250
Start-up Capital - Bus Stops/Signage (@ \$100/bus stop, 100 stops)									\$10,000		\$1,300	\$350	\$350
Administrative Start-up (October through December 2010):													
Interim Transit Manager ⁴	\$16,250			\$8,125	\$2,763	\$2,681	\$2,681						
Marketing Materials ⁵	\$25,000			\$12,500	\$4,250	\$4,125	\$4,125						
Proposed Network, Costs associated with nine months of service (January through September 2011):													
University Routes	\$402,645	\$0	\$402,645	\$201,323	\$68,450	\$132,873	\$0	\$682,000		\$545,600	\$88,660	\$47,740	\$0
City Routes	\$226,185	\$22,619	\$203,567	\$101,783	\$34,606	\$0	\$67,177	\$130,000		\$104,000	\$16,900	\$0	\$9,100
Total System:	\$628,830	\$22,619	\$606,212	\$303,106	\$103,056	\$132,873	\$67,177	\$812,000		\$649,600	\$105,560	\$47,740	\$9,100
Start-up Capital - 1 spare 30' Medium-Duty bus								\$211,000		\$168,800	\$27,430	\$14,770	\$0
Start-up Capital - 1 spare small bus								\$65,000		\$52,000	\$8,450	\$0	\$4,550
Totals:	\$670,030	\$22,619	\$606,212	\$323,731	\$110,068	\$139,679	\$73,983	\$1,055,000	\$20,000	\$878,400	\$152,240	\$63,110	\$14,250

¹State share for operating costs is estimated to be 17%; this data was provided by DRPT.

²Federal share of vehicle capital costs is 80%, State share is estimated to be 13%, and local share covers the remainder. DRPT provides State funds towards the 20% non-federal capital requirement at a variable match ratio that has ranged from 65-75% in the last three years. Assuming the 65% amount, this equates to 13% of the total vehicle capital cost requirement.

³Intern would work full-time (40-hour work weeks) for two months (July and August 2010), starting to organize the transit program on behalf of the City and Radford University. Then the intern could shift to part-time (about 25 hours per week) when the school year starts and work another four months (September through December 2010), assisting the Interim Transit Manager. Cost was estimated using an hourly rate of \$13.

⁴Interim Transit Manager would ideally be hired through the contractor that operates the proposed services. This person would work for three months (October through December 2010), planning to initiate services and conducting other start-up work. Cost was estimated based on an annual salary of \$65,000.

⁵Marketing materials would include brochures, schedules, and advertisements of the proposed services.

Table 6-3: Vehicle Requirement for Proposed Network

Proposed Route	Number of Vehicles	Vehicle Type	Estimated Cost	Incremental Capital Cost
Radford University Proposed Service				
2E: East Radford - Fairlawn (Weekdays 7:00am to 9:00pm)	1	small bus	\$65,000	\$65,000
2E: East Radford - Fairlawn (Weekend 12:00pm to 10:00pm)	1	small bus	\$65,000	\$65,000
3: West Campus (Weekdays 7:00am to 10:00pm)	1	small bus	\$65,000	\$65,000
4: East Campus (Weekdays 7:00am to 10:00pm)	1	small bus	\$65,000	\$65,000
5: Dedmon Center - Hunter's Ridge (Weekdays 7:00am to 10:00pm)	2	small bus	\$65,000	\$65,000
6: Campus - Fairlawn (Weekend 12:00pm to 10:00pm)	2	30'MD bus	\$211,000	\$422,000
7B: Radford - Christiansburg - Blacksburg (Thursday, Friday, Saturday 12:00pm to 3:00am)	2	30'MD bus	\$211,000	\$422,000
Total University Vehicles	6			\$682,000
City of Radford Proposed Service				
2C: Radford - Fairlawn - West Side (Weekdays 7:00am to 9:00pm)	1	small bus	\$65,000	\$65,000
2C: Radford - Fairlawn - West Side (Weekend 12:00pm to 10:00pm)	1	small bus	\$65,000	\$65,000
1A: Radford - Carilion (Weekdays 7:00am to 5:00pm)	1	small bus	\$65,000	\$65,000
Total City Vehicles	2			\$130,000
Spare Vehicles				
30' Medium-Duty bus	1		\$211,000	\$211,000
Small bus	1		\$65,000	\$65,000
Total Spare Vehicles	2			\$276,000
OVERALL TOTAL	10			\$1,088,000

Notes: In the 'Number of Vehicles' column, the gray numbers indicate that the weekend service will utilize the same vehicles as the weekday service, so these numbers were not included in the vehicle totals for Radford University and City services.

A spare of each type of vehicle is also included in the budget, with the local share of the 30-foot medium-duty bus, about \$14,800, proposed as the University's responsibility and the local share of the small bus, about \$4,600, proposed as the City's responsibility. It is worth noting that the cost per vehicle for the medium-duty bus includes bike racks, though this amenity may incur additional costs on the small buses.

The first year budget also includes both start-up administrative and other capital expenses. The interim transit manager and marketing materials are estimated as operating costs, at about \$16,300 and \$25,000, respectively. After taking federal and state funding assistance into account, the local shares of these costs are approximately \$5,400 and \$8,300, respectively. The University and City are proposed to share these costs evenly. As mentioned previously, DRPT has funding available for the City to hire an intern to assist in start-up projects. The other capital expense included in this first year budget covers the installation of bus stops and other signage, estimated to cost \$10,000 total. After considering federal and state assistance for capital, the local share to cover these costs would be \$700, to be shared equally between the University and the City.

REMAINING ISSUES

Transportation for Special Events

There may be occasions when the University will require transportation for special events (i.e., athletic events and graduation ceremonies). During these times, service on the current routes could be added to meet this demand. Depending on the frequency of these service additions, operating budgets in future years may require additional contributions from the University. Any special transportation for University events will need to adhere to federal charter regulations.

Additional Capital Needs

Aside from the vehicle requirements and capital expenses described in the first year budget, other capital investments may complement implementation of the proposed network. These capital investments could include radios aboard the buses, dispatching software, and amenities at the bus stops such as benches, shelters, and display boards for route maps and schedules. Both the City and University may also consider evaluating paths to bus stops and improving sidewalks or adding crosswalk signals to optimize pedestrian safety and comfort.

SUMMARY

This conceptual plan provides the foundation for applying for funding and implementing transit services in Radford. Key next steps will include briefing elected officials and others on this plan, submitting applications to DRPT for FTA Section 5311 funding and an intern position, completing the agreement between the City and University, and creating a formal advisory board or entity. Ongoing discussions between the City and University will be vital as the implementation of the service moves forward.

Appendix A

Advisory Committee Roster

Appendix A

City of Radford Public Transit Committee Contact Information

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Appendix B

Goals and Objectives

Appendix B

City of Radford/Radford University Transit Service Plan Goals and Objectives from Kick-off Meeting

As part of the kick-off meeting for the City of Radford/Radford University Transit Service Plan project, the committee a variety of needs and issues for the study. Based on this discussion, the following goals and objectives have been developed to help shape the planning process, though both can be revisited based on new issues or needs that arise during the project:

Goal: *Connect Radford University students to off-campus destinations outside walking distance and City of Radford residents to area locations and services.*

Objectives:

- Expand transportation services from University to area grocery stores (i.e. Food Lion and Wade's), restaurants (i.e. Applebee's and Sal's), locations in Pulaski County (i.e. Wal-Mart, Kroger, banks), Virginia Tech, Christiansburg, and Smart Way commuter bus service to Roanoke.
- Implement transportation services to connect City of Radford residents to similar locations, as well as other services (i.e. medical facilities, Department of Social Services offices).
- Identify opportunities to build upon current services operated by Radford University and New River Valley Community Services.

Goal: *Support City of Radford's desire to "go green" and reduce the number of cars on the road and Radford University's to be a "green" campus.*

Objectives:

- Explore park-and-ride opportunities, especially for student who live off campus and to limit traffic in downtown Radford.
- Identify appropriate vehicle fleet for serving residential halls.
- Provide sufficient transit services to allow University to reconsider car use policy.
- Promote the development of intermodal transportation connections, facilities, and services.

Goal: *View transportation services from a regional perspective.*

Objectives:

- Provide access to regional destinations (i.e. Carilion New River Valley Medical Center, Virginia Tech, Roanoke).
- Provide transportation connections between the campuses of Radford University, Virginia Tech, and New River Community College.

Goal: *Engage and involve the community in the transportation planning process.*

Objectives:

- Conduct appropriate outreach activities (i.e. surveys) to gain information on specific needs.
- Keep local elected officials and other key community stakeholders informed of planning process through appropriate outreach activities.

Goal: *Identify organizational arrangement to allow Radford University not to operate transportation services.*

Objectives:

- Determine appropriate funding by the University to support alternative transportation operator.

Goal: *Provide easy access to information on available mobility options.*

Objectives:

- Maintain central location for information on transportation services and options, including consideration of New River Valley Planning District Commission's mobility manager project.
- Promote awareness and use of all transportation alternatives through marketing and education.

Goal: Provide transportation services in support of economic development.

Objectives:

- Provide access to area retailers, restaurants, and other services and locations.
- Provide transportation services that promote downtown Radford

Appendix C

City of Radford Resident Survey



Looking for new ways to get around Radford? Need to get to places around the City, but face transportation issues? Now is the chance for you to have your say!



PLEASE TAKE THE TIME TO COMPLETE THIS IMPORTANT TRANSIT SERVICE PLAN SURVEY

With assistance from the Virginia Department of Rail and Public Transportation, the City of Radford and Radford University are developing a Transit Service Plan to help address the transportation needs of City residents and University students, faculty, and staff. An important part of this effort is your input! **If you've not already completed a survey, we ask that you take a few minutes to share your opinions. Completed surveys will be received through September 30, 2009.**

Individual survey responses will be kept confidential, and will not be identified by the name of the respondent. If you have any questions concerning the survey, please contact the KFH Group (the firm that is conducting the Transit Service Plan) at 301-951-8660 or ddalton@kfhgroup.com or you may contact Jim Hurt, Radford City Engineer, at (540)-731-3604 or by E-mail at hurtjh@radford.va.us Thank you!

1. Please indicate the number of people in your household by age group:

- (A) Under 12:____ (B) 12-15:____ (C) 16-18:____ (D) 19-24:____ (E) 25-44:____
 (F) 45-59:____ (G) 60-69:____ (H) 70-79:____ (I) 80-89:____ (J) 90+:____

2. Please indicate how many of these individuals (who are eligible) have a driver's license:

- (A) 0 (B) 1 (C) 2 (D) 3 (E) 4 or more

3. How many working vehicles (cars/trucks/motorcycles) are available in your household?

- (A) 1 (B) 2 (C) 3 (D) 4 or more

4. Please check all that apply:

- (A) I am a Radford City resident (B) I am a student at Radford University
 (C) I am on the staff at Radford University (D) I am on the faculty of Radford University

5. What is your current primary mode of transportation to access work, school, shopping, medical appointments, and other life activities?

- (A) Drive myself (B) Ride with family or friend
 (C) Bicycle (D) Walk (E) Taxi
 (F) Transportation services provided by City of Radford (School Bus)
 (G) Tartan Transit services provided by Radford University (T2)
 (H) Transportation services provided by New River Valley Community Services (Community Transit)
 (I) Other:_____

6. We anticipate that any new transit services in Radford would use small buses to operate several routes in the City and adjacent areas, with marked bus stops and service open to anybody who wishes to ride and pay the fare. Do you think there is a need for this type of public transit service in the City of Radford?

- (A) Yes (B) No If no, please explain why not: _____

(Please complete other side)

7. If you think public transit services are needed, please indicate what types of services would be most useful (please check only three and where appropriate note locations):
- (A) Downtown Circulator
 - (B) Service to Pulaski County
 - (C) Service to Blacksburg
 - (D) Service to Christiansburg
 - (E) Service to Roanoke
 - (F) Services to Radford University campus
 - (G) Service to Fairlawn
 - (H) Service geared to medical and social services (Location: _____)
 - (I) Services geared to shopping centers and major stores (Location: _____)
 - (J) Services geared to employment locations (Location: _____)
 - (K) Services geared to Radford Government Offices
 - (L) Other: _____

8. Would you or members of your household use public transit services in or around Radford?
- (A) Yes (B) No (C) If yes, how often: _____

9. What is the reasonable fare you would be willing to pay for a one-way public transit trip?
- (A) \$0.25 (B) \$0.50 (C) \$0.75 (D) \$1.00 (E) \$1.25
- (F) \$1.50 (G) More than \$1.50 (How much? \$ _____)

10. What days of the week should services operate? (Check all that apply)
- (A) All Weekdays (B) Only some weekdays (C) Saturdays (D) Sundays

11. How early and late should public transit services operate to be convenient for you and members of your household? (Please complete for only those days you and other household members would use public transit services)

	Weekdays	Saturdays	Sundays
How early?	(A) ____:____	(C) ____:____	(E) ____:____
How late?	(B) ____:____	(D) ____:____	(F) ____:____

12. In what part of the City is your home or business located? Please indicate the nearest intersection to your home or business (for example, Tyler Avenue and Calhoun Street).
- _____

13. Where do you travel to the most during the week? Please indicate the location, nearest intersection and the town/county (for example, Carilion New River Valley Medical Center, 2900 Lamb Circle, Christiansburg) of your three most frequently visited places. How long does this trip typically take?

Location	Typical Trips Length in Minutes

14. Please provide your comments regarding the need for public transportation in the City of Radford:

Appendix D

Radford University On-Line Survey

Radford University Transit Service Plan Survey

1. Radford University Transit Service Plan Introduction

Last year, you may have participated in the Radford University Transit and Parking Study that was conducted as part of the overall 2008-2018 Campus Master Plan. This survey takes a more focused look at public transit services, and is part of a plan being developed for the University and the City of Radford with assistance from the Virginia Department of Rail and Public Transportation to help address the transportation needs of University students, faculty, and staff, and City residents.

In developing a Transit Service Plan, Radford University welcomes your input and recommendations on potential new services. We ask that you take a few minutes to share your opinions by completing this survey. Your time and assistance will assist in identifying the potential and unmet transit service needs. If you have any questions concerning the survey, please contact the KFH Group (the firm that is conducting the Transit Service Plan) at 301-951-8660 or ddalton@kfhgroup.com. Thank you!

Radford University Transit Service Plan Survey

2. Radford University Transit Service Plan Survey

1. Where do you live during the semester?

- On-campus
- Off-campus in Hunter's Ridge
- Off-campus in Radford, but not in Hunter's Ridge (please indicate the nearest intersection to your residence in the line below)
- Blacksburg
- Christiansburg
- Dublin
- Fairlawn
- Pulaski
- Somewhere else (please specify below)

please specify

2. What is your current primary mode of transportation to commute to campus?

- Drive myself
- Carpool or dropped off by someone going to campus
- Dropped off by someone not going to campus
- Motorcycle/moped
- Bicycle
- Tartan Transit
- Walk
- Other transportation (please specify below)

please specify

Radford University Transit Service Plan Survey

3. What time of day do you typically arrive at Radford University?

- Before 7 a.m.
- 7 a.m. - 9 a.m.
- 9 a.m. - 12 noon
- 12 noon - 3 p.m.
- 3 p.m. - 6 p.m.
- After 6 p.m.

4. What time of day do you typically depart Radford University?

- Before 12 noon
- 12 noon - 4 p.m.
- 4 p.m. - 6 p.m.
- 6 p.m. - 9 p.m.
- After 9 p.m.

5. Off campus, which locations do you most need to access? Please list up to three in the space below, and be as specific as possible (for example, Food Lion on Tyler Avenue, or Carilion New River Valley Medical Center).

First

Second

Third

6. What is your current primary mode of transportation to access the off campus locations given in question 5?

- Drive myself
- Ride with family or friend
- Taxi
- Motorcycle/moped
- Bicycle
- Tartan Transit
- Walk
- Other transportation (please specify below)

please specify

Radford University Transit Service Plan Survey

7. If new or improved public transit services were provided, which of the following should be the highest priority? Please check only three, and explain in the comment box below why these three are important to you (for example, I need new service to Christiansburg to get to the New River Valley Mall).

- Expanded service around the campus
- Expanded service to locations in Radford
- Expanded service to Fairlawn (i.e. Walmart)
- New service to Blacksburg / Virginia Tech
- New service to Christiansburg
- New service to Roanoke
- New service to New River Valley Community College
- New service to Carilion New River Valley Medical Center
- New call-a-ride late night service between campus and locations in Radford
- New late night scheduled bus service between campus and locations in Radford
- New late night scheduled bus service between campus and locations outside Radford (i.e. Blacksburg/VT)
- Other (please specify below)

Comment Box

Radford University Transit Service Plan Survey

10. Which improvements to off campus transit services are most important to you? Please rank from 1-5, with 1 being the highest priority. (The Tartan Transit (T2) City Loop currently operates every hour from 2:30 p.m. to 8:30 p.m., Monday through Friday.)

	1	2	3	4	5
Higher frequency on weekdays	<input type="radio"/>				
Earlier service on weekdays	<input type="radio"/>				
Later service on weekdays	<input type="radio"/>				
New service on Saturdays	<input type="radio"/>				
New service on Sundays	<input type="radio"/>				
Other (please explain below and add to ranking)	<input type="radio"/>				

Other (please explain)

11. With regard to question 10, please select your preference for improvements to off campus transit services from the dropdown menu options. (The Tartan Transit (T2) City Loop currently operates every hour from 2:30 p.m. to 8:30 p.m., Monday through Friday.)

	Higher frequency on weekdays	Earlier service on weekdays starting at	Service on weekdays ending at	New service on Saturdays starting at	New service on Saturdays ending at	New service on Sundays starting at	New service on Sundays ending at
Improvements to off campus transit services	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

12. Would you support an increase in student activity fees to cover the cost of expanded public transit services that meet your needs?

- Yes
- No

Radford University Transit Service Plan Survey

13. If your answer to question 12 is yes, how much of an increase per semester would you be willing to pay?

- \$25
- \$50
- \$75
- \$100
- \$200 or more

14. How else could expanded public transit services meet your needs in the future?

15. Please select the group to which you belong:

- Faculty
- Staff
- Undergraduate
- Graduate
- Other

16. If you are an undergraduate, what class year are you?

- Freshman
- Sophomore
- Junior
- Senior

Appendix E

Detailed Report of Radford University On-Line Survey

City of Radford/Radford University Transit Service Plan

Radford University Survey Results

This memorandum summarizes the results of an online survey conducted for the City of Radford/Radford University Transit Service Plan. The survey was offered to the entire Radford University community in October of 2009. This survey is different from the survey conducted for the Transit and Parking Study as part of the 2008-2018 Campus Master Plan. The current survey takes a more focused look at Tartan Transit, the existing transit service provided by Radford University, and asks respondents to identify specific improvements to transit services that would best meet their transportation needs. The survey results can help identify appropriate hours of service and frequency of service to meet the needs of Radford University's community. The survey results along with the other elements in the Transit Service Plan lays the ground work for improving transit services at Radford University and the City of Radford.

Section 1 summarizes the significant findings that came out of the survey. Section 2 lists the key results by question.

Section 1: Summary of Significant Issues

The findings highlight the need and support for expanding transit service geographically to additional off campus locations, expanding the hours of operation for weekday transit service to start earlier and end later, establishing late night transit service between campus and locations in Radford, and for establishing new transit service on Saturdays. Respondents placed a high priority for transit service from Radford University to off campus locations such as retail shopping (i.e. Food Lion, Walmart, Kroger, etc.) and to Blacksburg/Virginia Tech, Christiansburg, and other areas. Respondents also ranked new service on Saturday around campus and off campus as a high priority for Tartan Transit (T2).

The number of responses (825) for this survey was much lower than the 2008 Transit and Parking Study survey (over 2,800 responses). However these responses are important to help identify priority improvements to transit service and are part of the public outreach for the Transit Service Plan.

Analysis of survey responses based on where respondents live can identify which improvements to transit service are most important to each group. Of the 300 respondents who live off campus in Radford, but not in Hunter's Ridge, the majority

(56 percent) walk to campus followed by drive myself (over 34 percent). Two-thirds of this group are undergraduate students. None of these respondents took Tartan Transit as their primary mode to commute to campus. When accessing off campus locations (shopping centers, etc.) over 8 in 10 (82 percent) drive themselves. Among respondents, the three highest priority improvements to public transit service are: new late night scheduled bus service between campus and locations in Radford, new service to Christiansburg, and expanded service to locations in Radford. Over 68 percent would support an increase in student activity fees to cover the cost of expanded public transit services.

The 45 respondents who live off campus in Hunter's Ridge primarily took Tartan Transit as their primary mode to commute to campus (71 percent) and are undergraduate students (96 percent). Over 86 percent drive themselves when accessing off campus locations. Among this group, the three highest priority improvements to public transit service are: new late night scheduled bus service between campus and locations in Radford, expanded service around the campus, and expanded service to locations in Radford. 56 percent would support an increase in student activity fees to cover the cost of expanded public transit services.

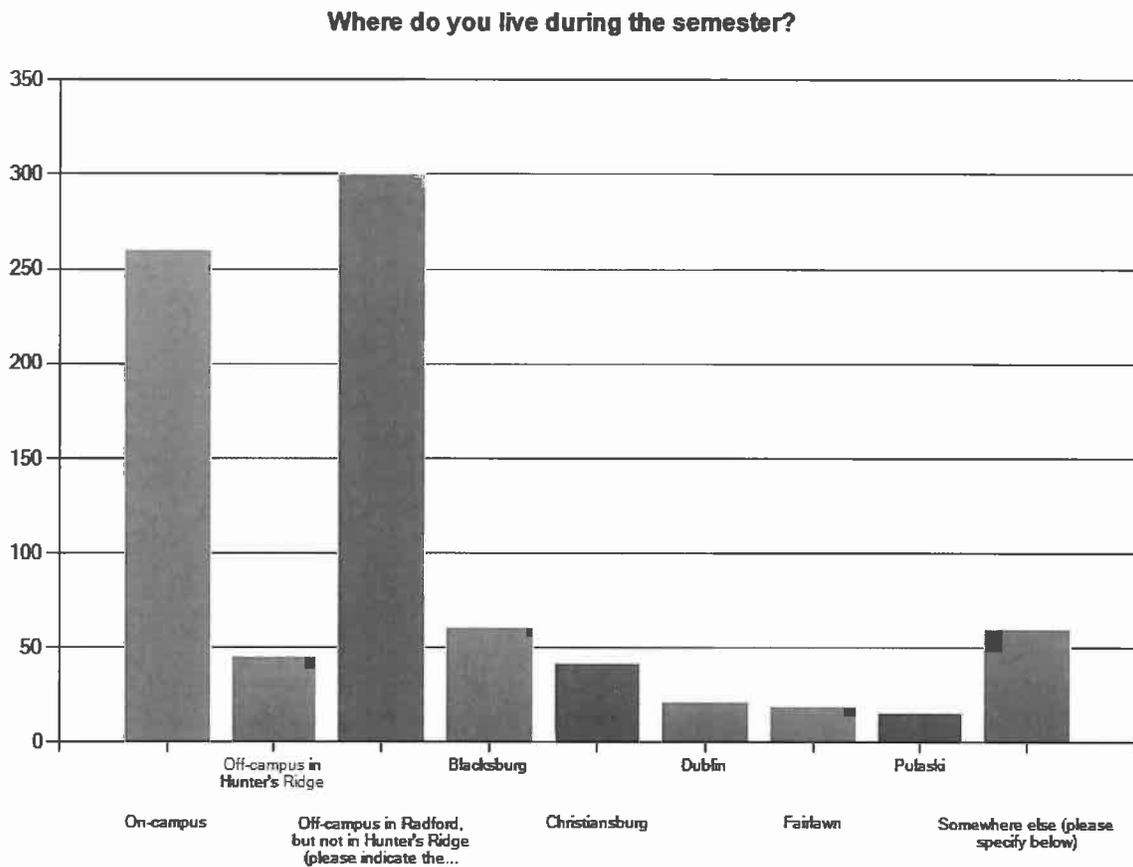
Of the 260 respondents who live on-campus, over 78 percent walk, 12 percent drive alone, and 3 percent take Tartan Transit as their primary mode to campus. Over 96 percent this group are undergraduate students. When accessing off campus locations (shopping centers, etc.) 43 percent get a ride with family or friend and 40 percent drive themselves. Among respondents, the three highest priority improvements to public transit service are: new service to Christiansburg, new service to Blacksburg / Virginia Tech, and new late night scheduled bus service between campus and locations in Radford. Over 60 percent would support an increase in student activity fees to cover the cost of expanded public transit services.

The results from this survey confirm the findings from the 2008 survey that Tartan Transit (T2) is used by only a small percentage of students, and very few faculty or staff. Only 4 percent of respondents use Tartan Transit as their primary mode to commute to campus, and all are undergraduate students. 84 percent of this group live off campus in Hunter's Ridge while the rest live on-campus. When accessing off campus locations (shopping centers, etc.) 79 percent drive themselves. This indicates that even among the Tartan Transit users, driving alone is the primary mode of choice to off campus locations. In this group, the three highest priority improvements to public transit service are: new late night scheduled bus service between campus and locations in Radford, expanded service

around the campus, and new service to Christiansburg. Over 51 percent would support an increase in student activity fees to cover the cost of expanded public transit services.

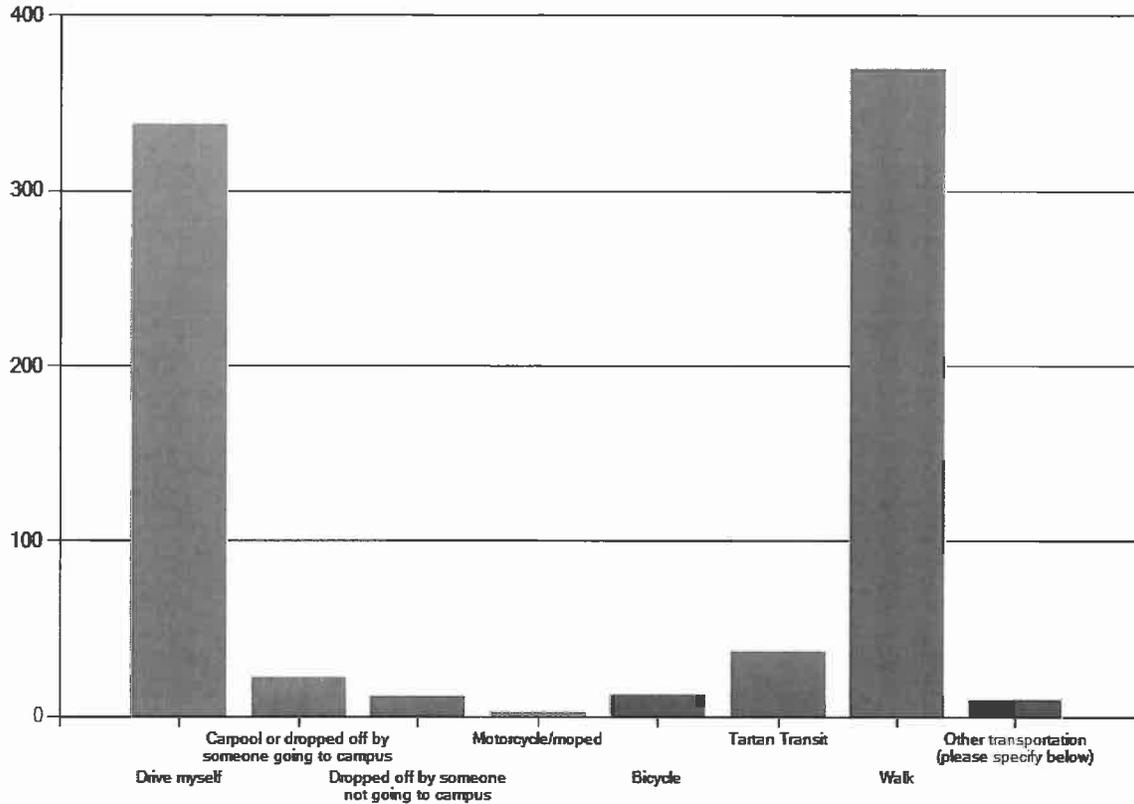
Section 2: Key Results by Question

Of the 827 respondents that started the survey, 825 surveys were completed (over 99 percent completion rate). The first question asked where respondents live during the semester. The largest group of respondents, with over 36 percent, live off campus in Radford, but not in Hunter's Ridge. The next largest group of respondents at 31 percent are those living on campus.



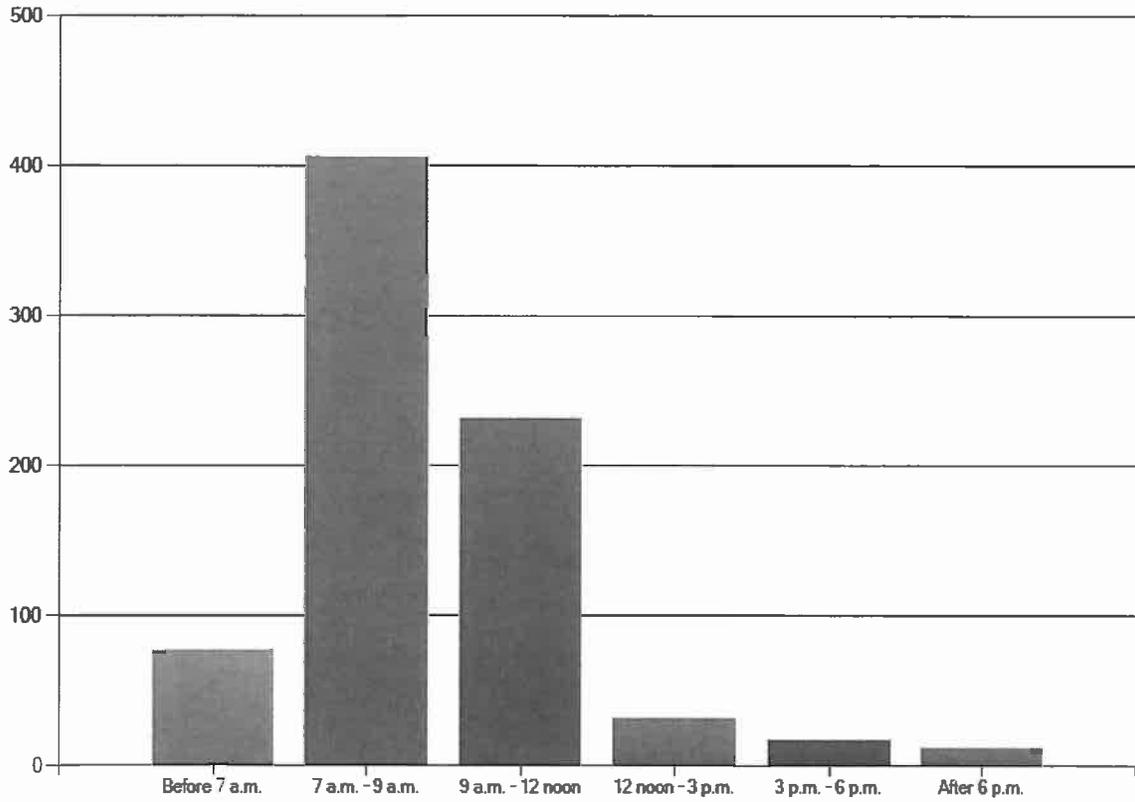
Respondents were asked to select the primary mode of transportation to commute to campus. Over 45 percent walk to campus, followed by drive alone at over 41 percent.

What is your current primary mode of transportation to commute to campus?

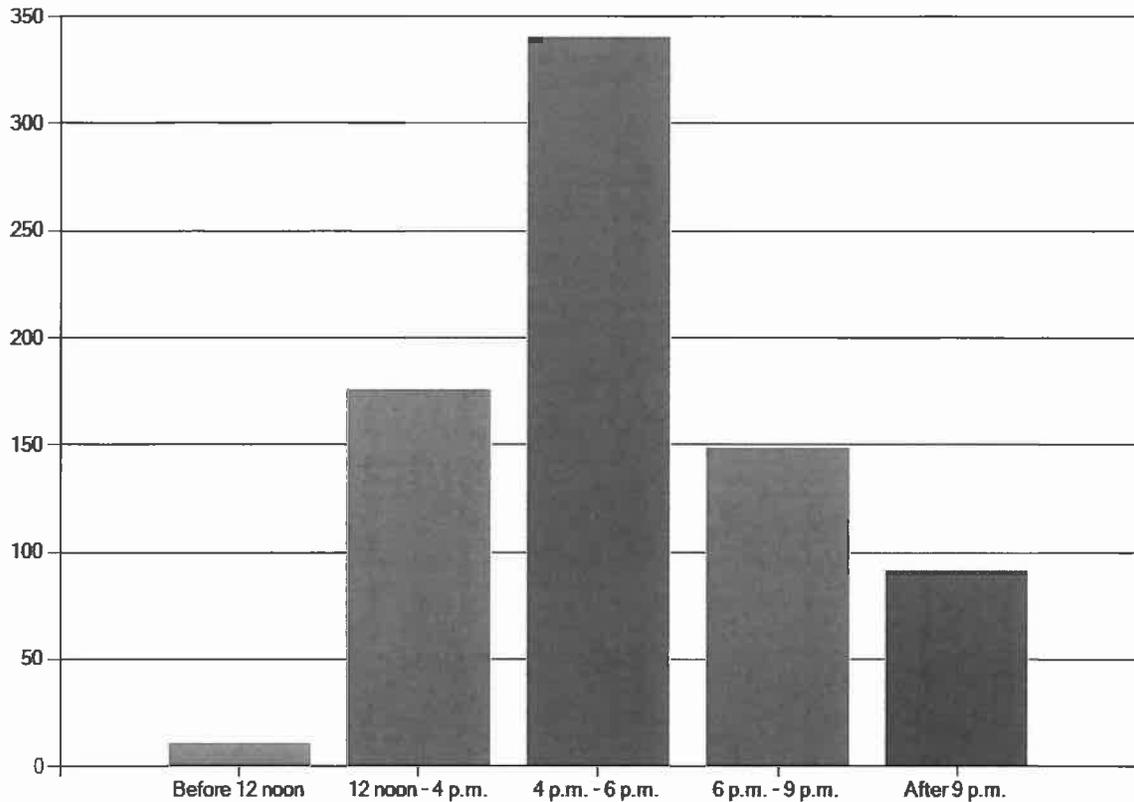


The next set of questions ask what time of day respondents arrive and depart Radford University. Over half the respondents arrive at Radford University between 7 am - 9 am, while just over 44 percent depart campus between 4 pm - 6 pm. Understanding the current travel patterns can help determine most favorable operating hours for transit service.

What time of day do you typically arrive at Radford University?

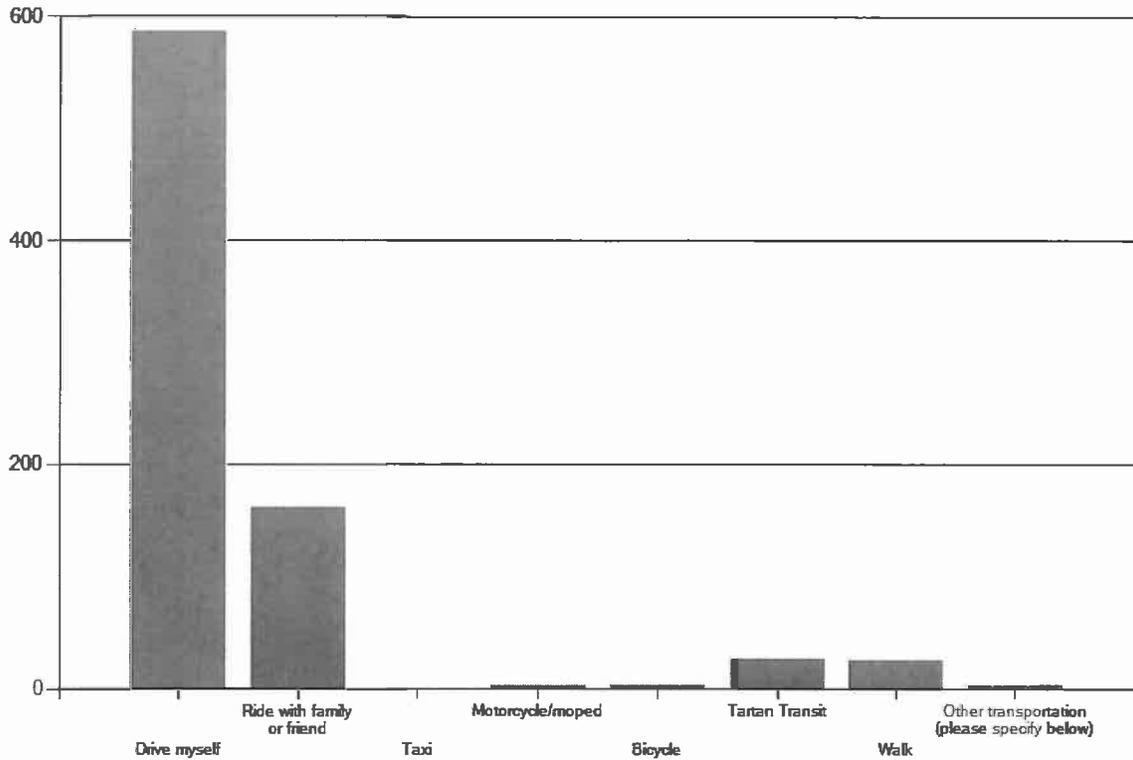


What time of day do you typically depart Radford University?



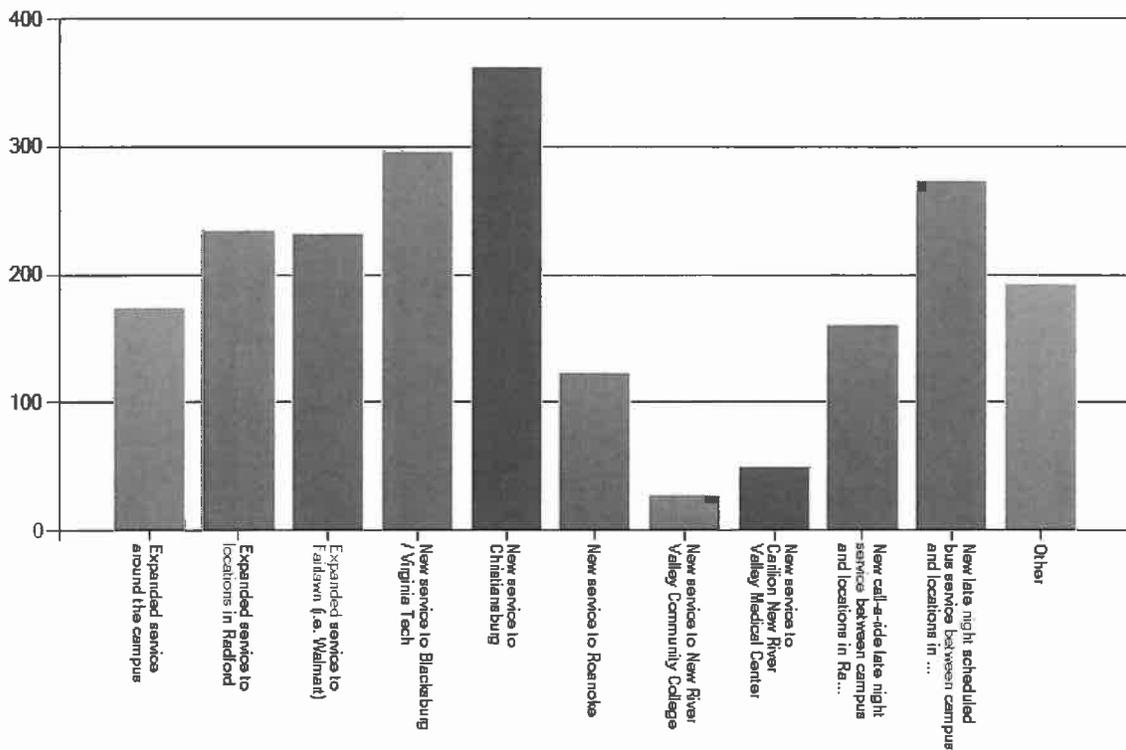
Respondents were asked which off campus locations they needed to access the most. The most commonly listed locations (in alphabetical order) include: Blacksburg/Virginia Tech, the Carilion New River Valley Medical Center, Christiansburg, Downtown Radford, Food Lion, Kroger, New River Valley Mall, and Walmart. When accessing off campus locations, over 72 percent of respondents drive followed by 20 percent who get a ride with family or a friend.

What is your current primary mode of transportation to access the off campus locations given in question 5?



The next question asked respondents for their three highest priority improvements to public transit service. The responses indicate a desire for new service to Christiansburg, new service to Blacksburg/Virginia Tech, and new late night scheduled bus service between campus and locations in Radford.

If new or improved public transit services were provided, which of the following should be the highest priority? Please check only three, and explain in the comment box below why these three are important to you (for example, I need new service to Christiansburg to get to the New River Valley Mall).



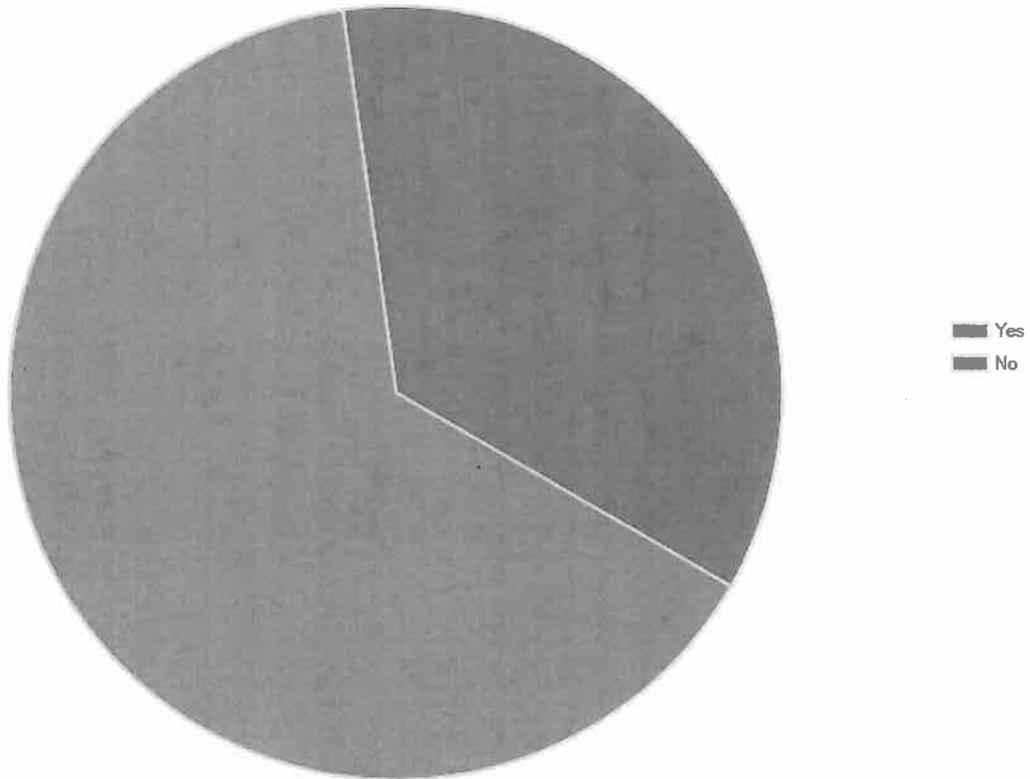
Respondents were asked to rank improvements to current transit services around campus that are most important to them. New service on Saturday s and higher frequency on weekdays were the highest priority improvements to transit service around campus. When asked specifically about the improvements to current transit services around campus, 43 percent felt the current T2 Campus Loop should operate every 10 minutes on weekdays. Conversely over 45 percent felt the current frequency of 15 minutes is fine. The responses gathered can assist in determining which improvements are most preferred.

Respondents were also asked to rank improvements to off campus transit services that are most important to them. New service on Saturday s and higher frequency on weekdays were selected as the highest priority improvements to off campus transit service. When asked about the frequency of off campus transit service (T2 City Loop operates every hour), over 47 percent preferred service every 15 minutes on weekdays.

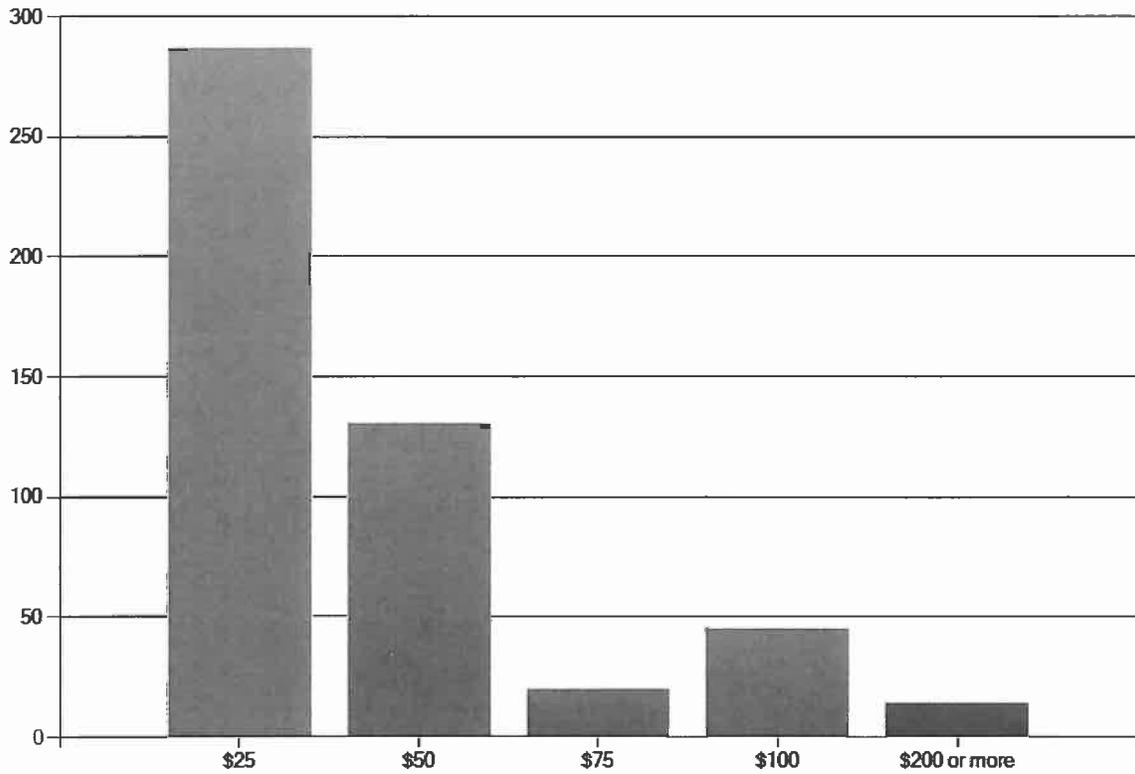
There was also a clear preference for weekday transit service to start earlier and end later than it currently does.

A clear majority of respondents would support an increase in student activity fees to cover the cost of expanded public transit services. Of those who would support an increase in fees, over 57 percent would be willing to pay an increase of \$25 per semester.

Would you support an increase in student activity fees to cover the cost of expanded public transit services that meet your needs?

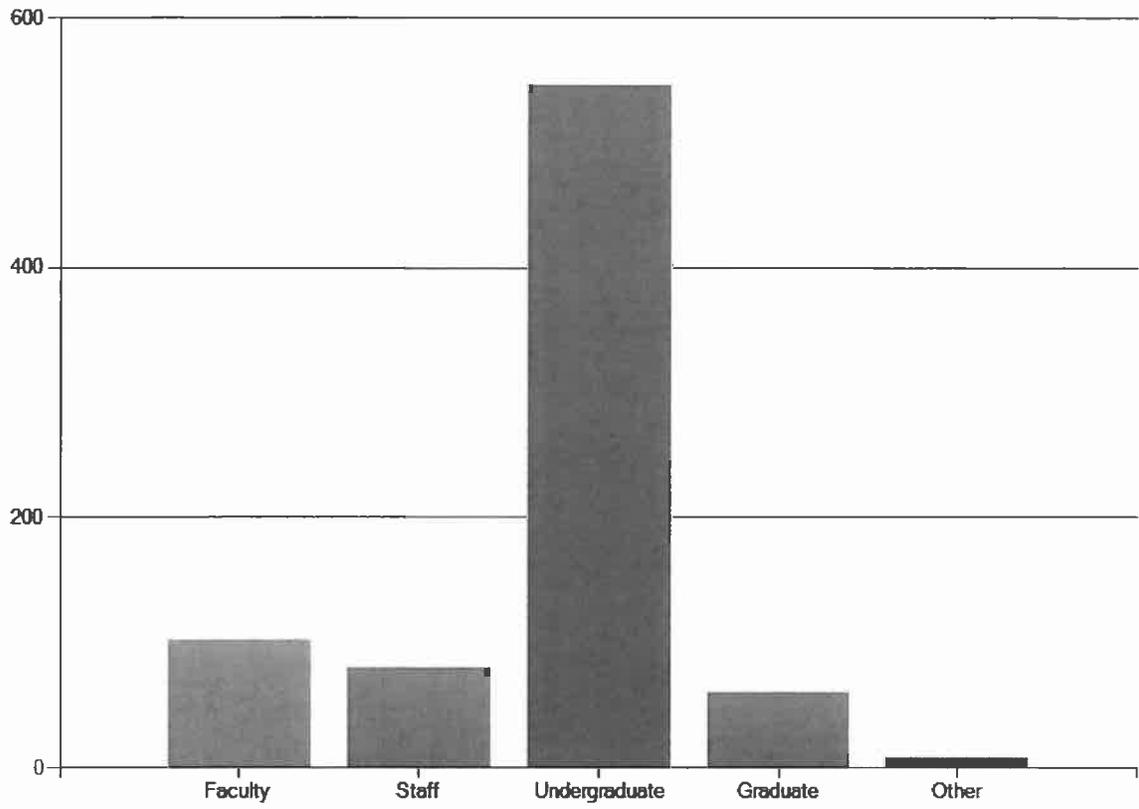


If your answer to question 12 is yes, how much of an increase per semester would you be willing to pay?



Over 68 percent of respondents identified themselves as Undergraduate students.

Please select the group to which you belong:

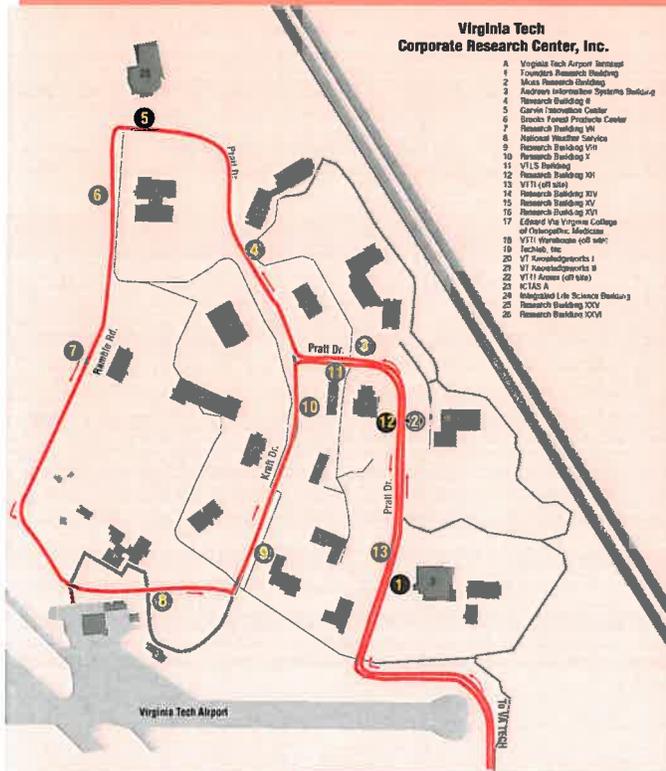
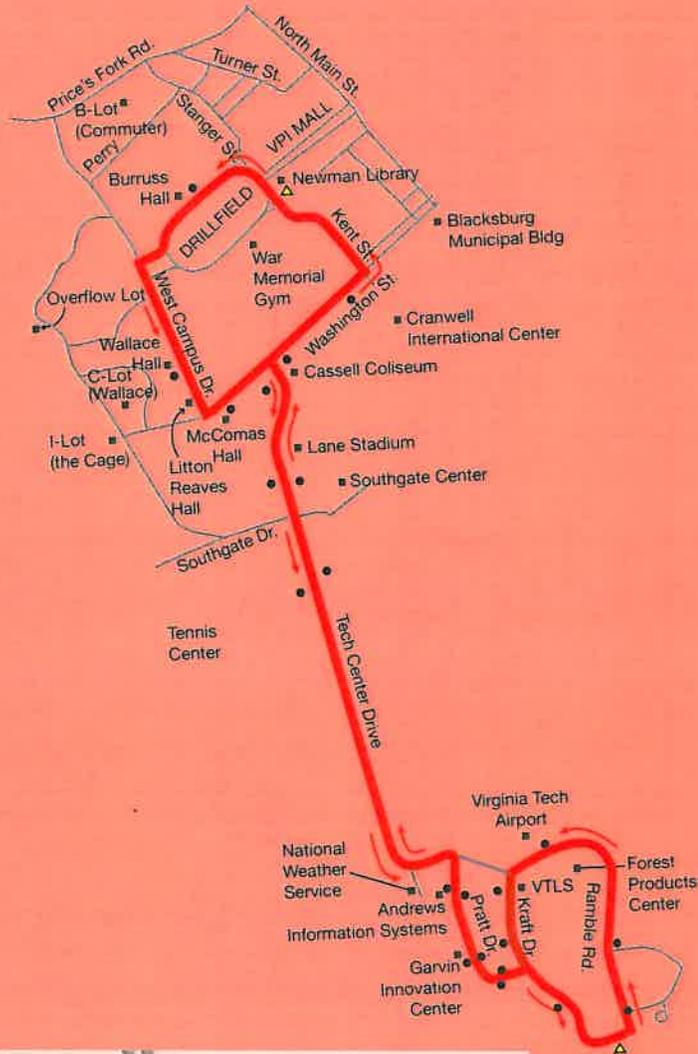


Appendix F

Blacksburg Transit Individual Route Maps

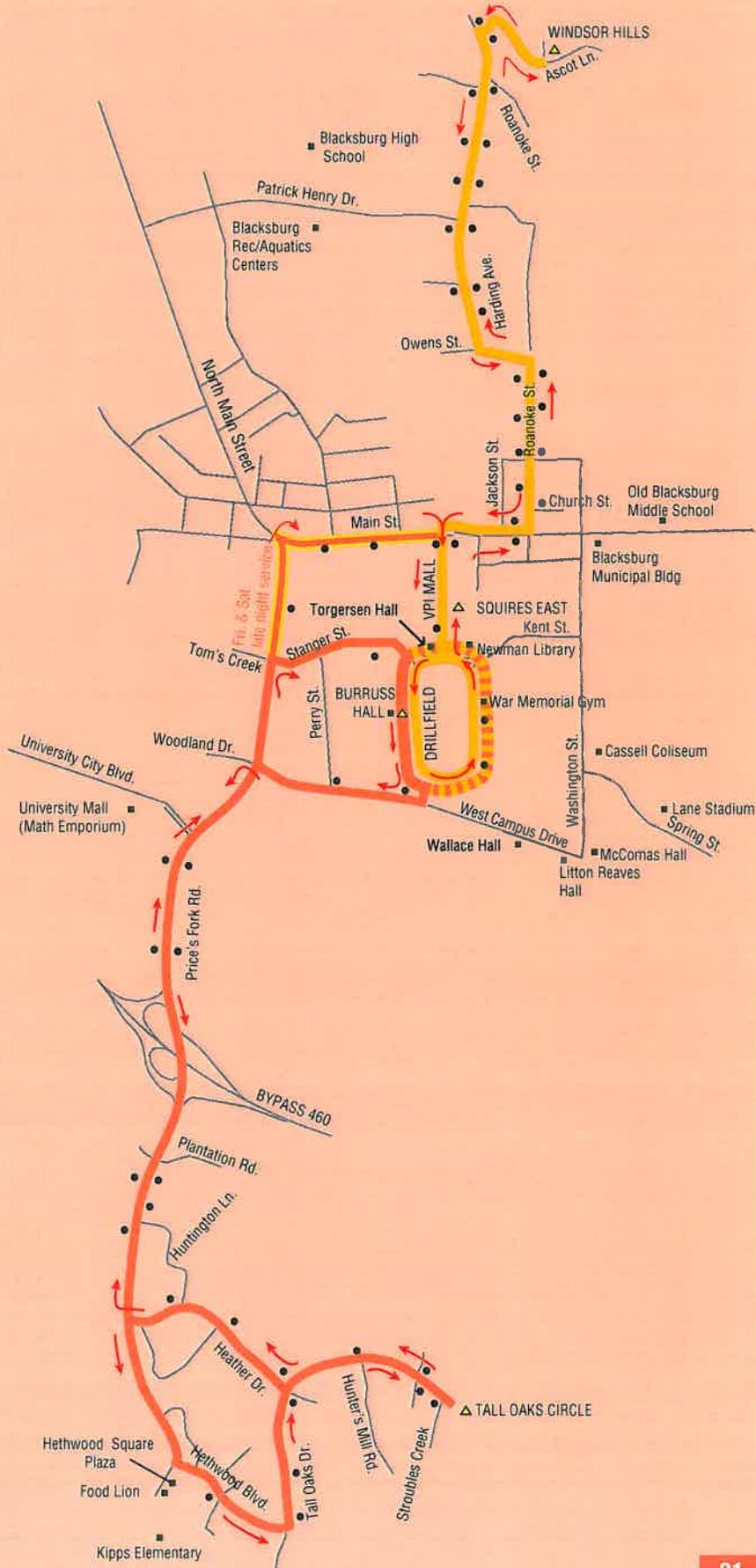
- Bus Route
- ▲ Time Checks*
- Points of Interest
- Bus Stops

* Buses that arrive at a time check early will leave at the scheduled time.

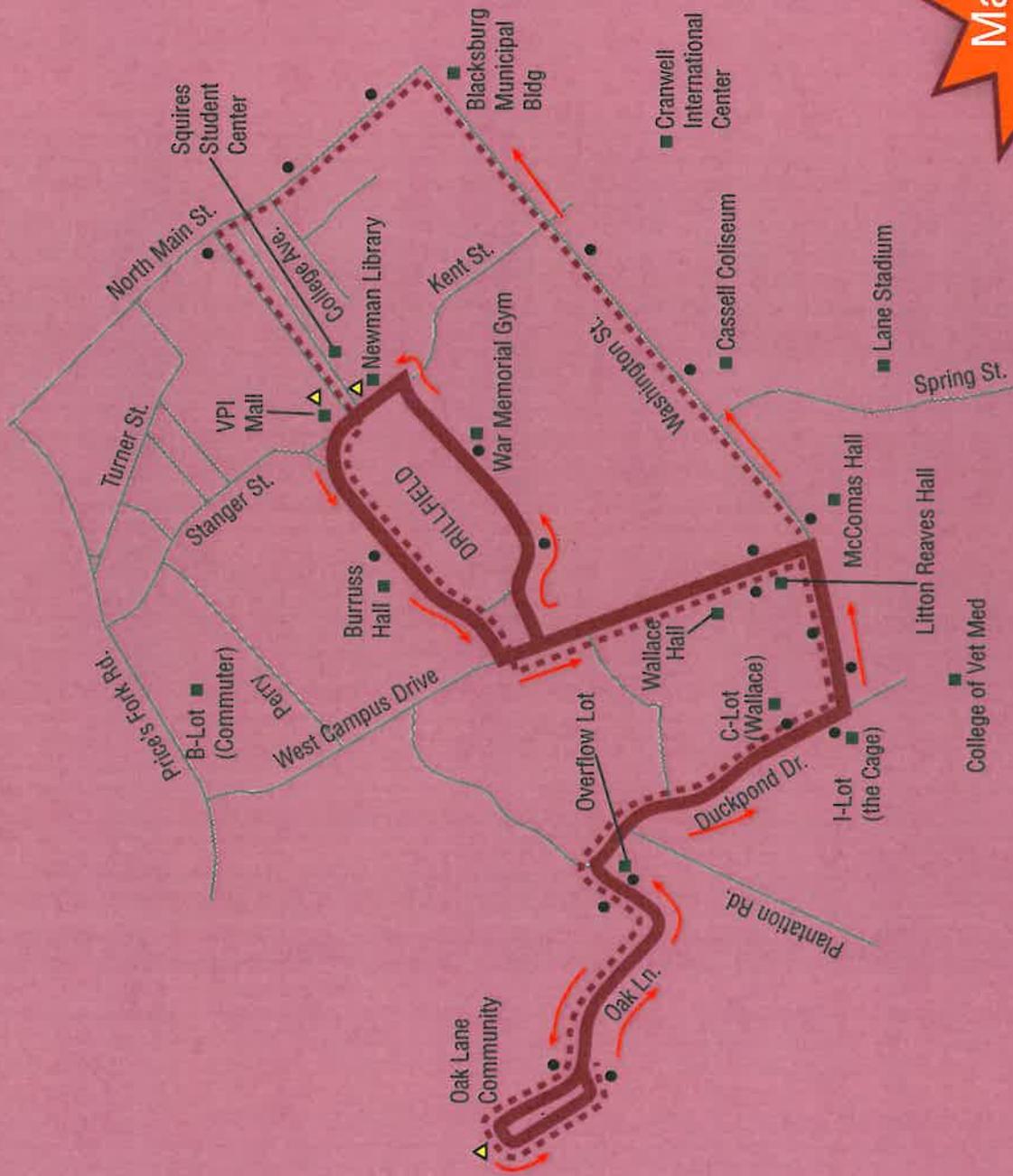


- Bus Route
- Late Night
- ▲ Time Checks*
- Points of Interest
- Bus Stops

* Buses that arrive at a time check early will leave at the scheduled time.



Major Fall 2008 Detour

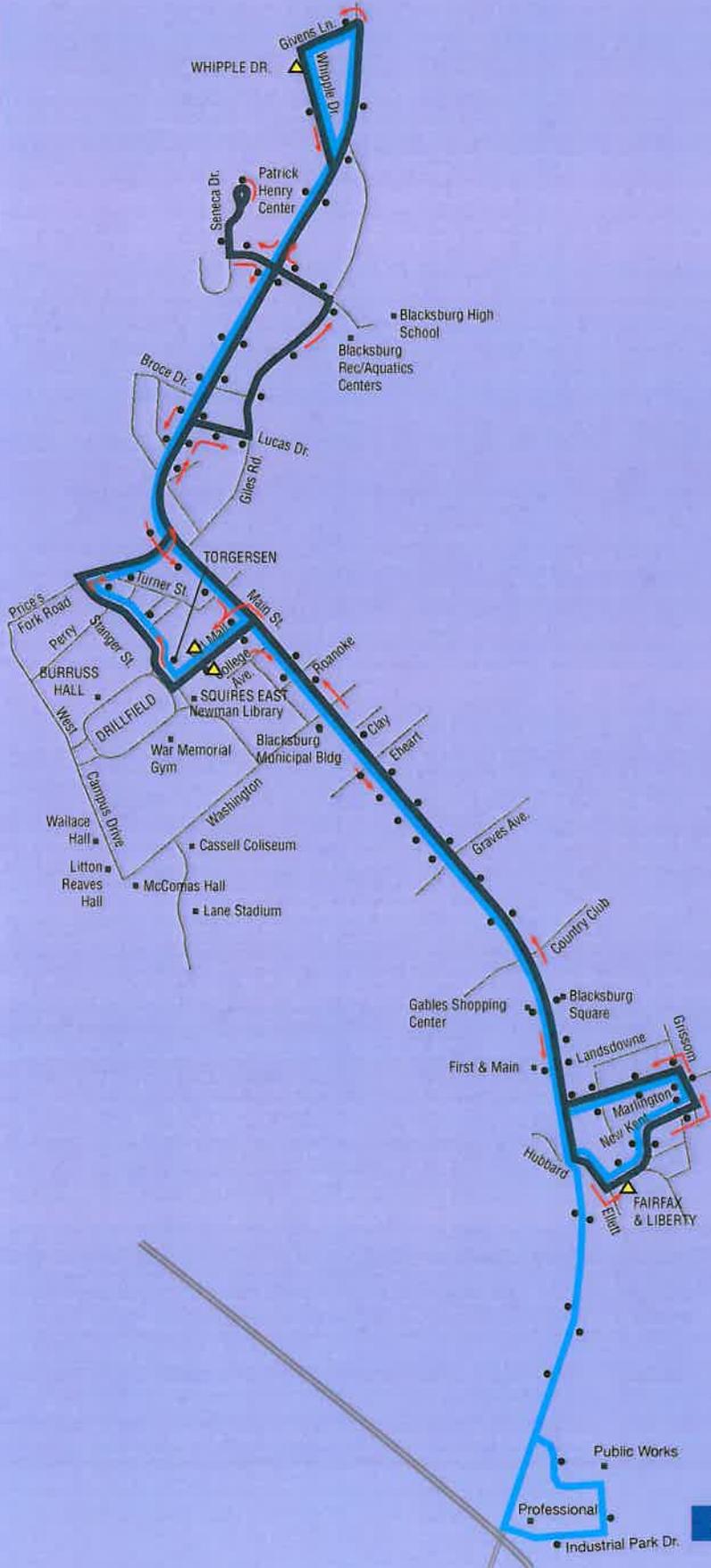


- Bus Route
- - - Alternate Route
- ▲ Time Checks*
- Points of Interest
- Bus Stops

* Buses that arrive at a time check early will leave at the scheduled time.

- Bus Route
- Main St. via Industrial Drive
- ▲ Time Checks*
- Points of Interest
- Bus Stops

* Buses that arrive at a time check early will leave at the scheduled time.



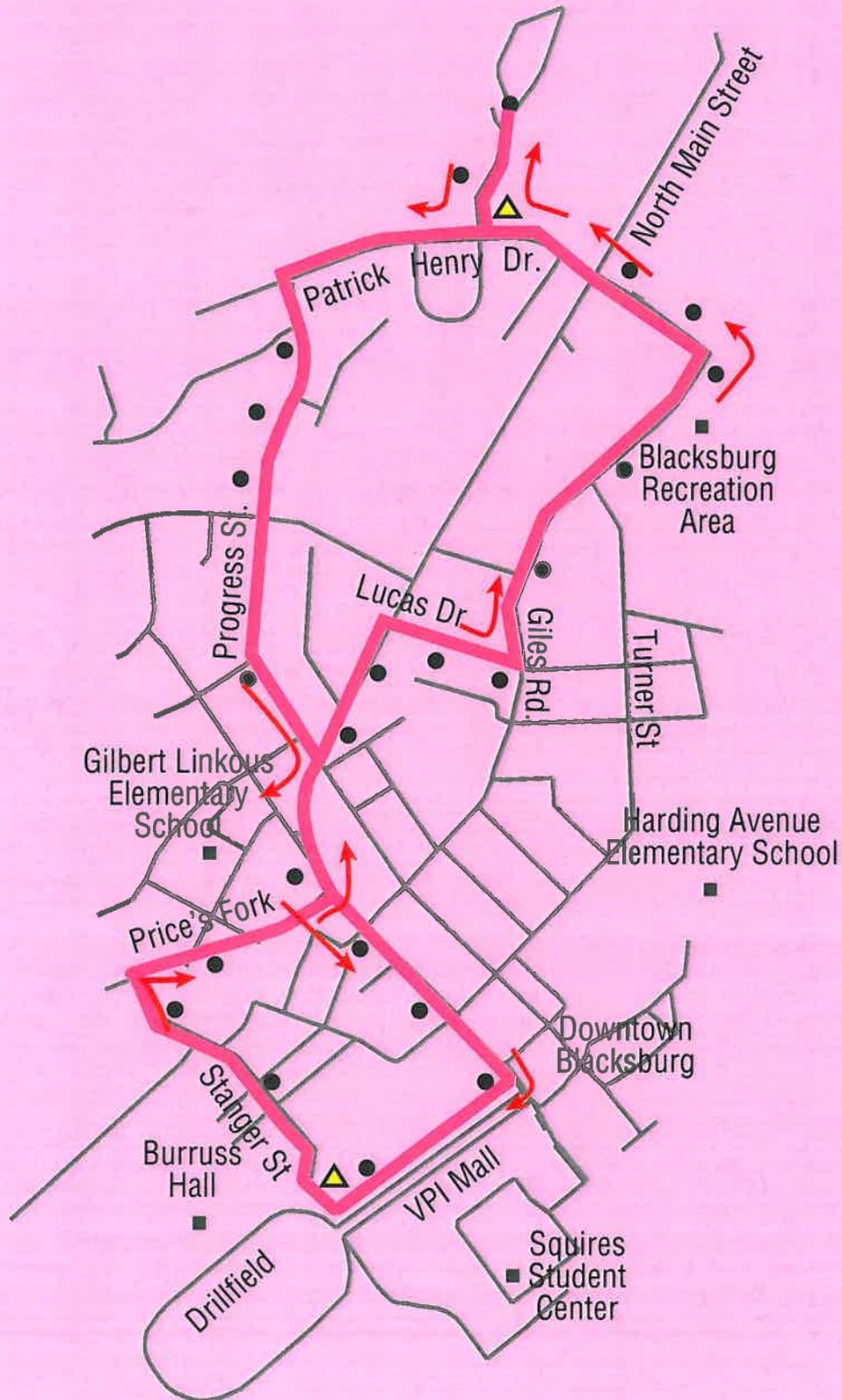
— Bus Route

▲ Time Checks*

■ Points of Interest

● Bus Stops

* Buses that arrive at a time check early will leave at the scheduled time.



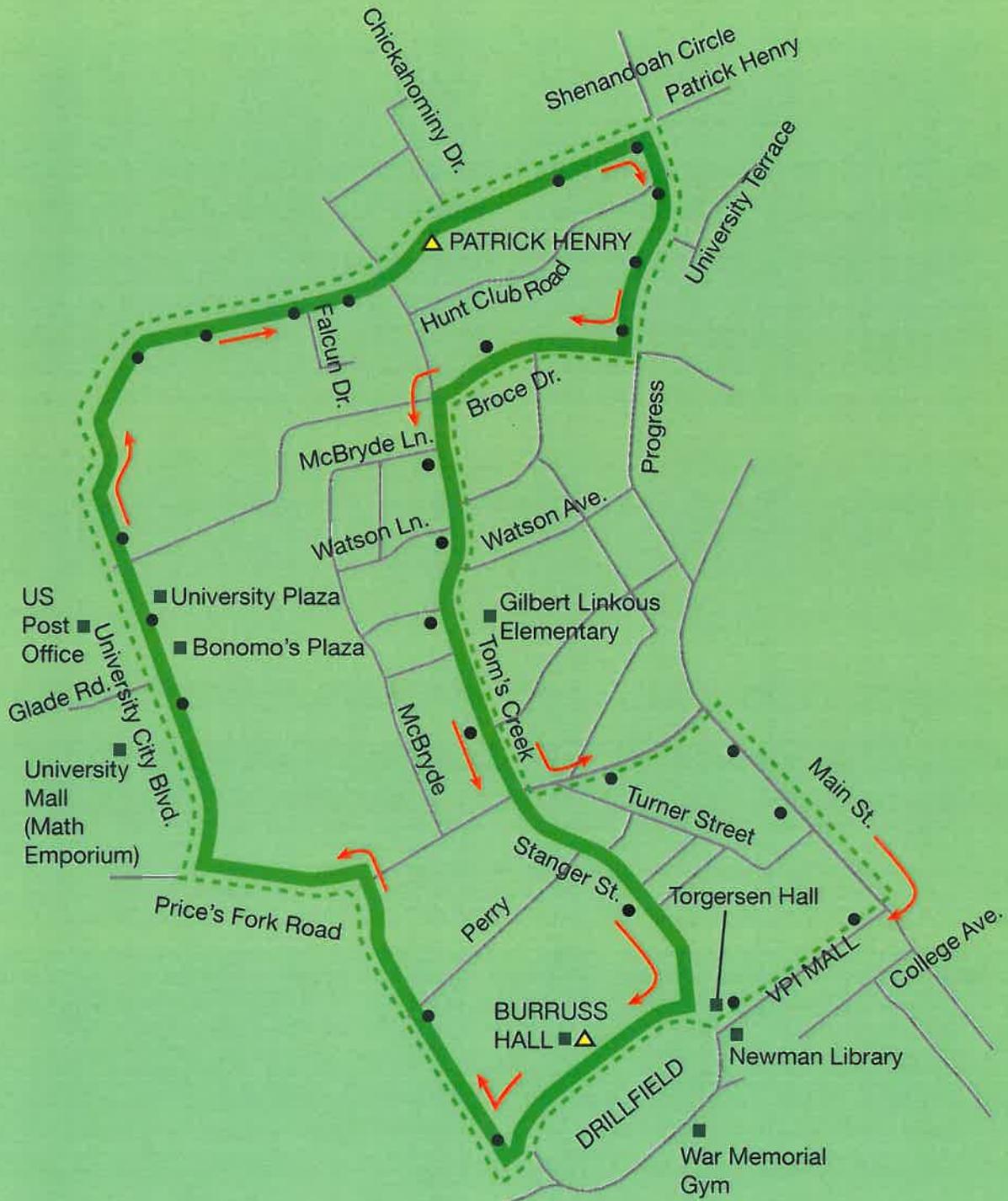
- Bus Route
- ▲ Time Checks*
- Points of Interest
- Bus Stops

* Buses that arrive at a time check early will leave at the scheduled time.



- Bus Route
- - - Alternate Bus Route
- ▲ Time Checks*
- Points of Interest
- Bus Stops

* Buses that arrive at a time check early will leave at the scheduled time.





Two Town Trolley - Blacksburg Route and Schedule Changes

The Two Town Trolley - Blacksburg timechecks at Squires East on Alumni Mall, and travels down South Main Street to Montgomery Regional Hospital, Wal-Mart and New River Valley Mall. For more information, contact Blacksburg Transit at 540-961-1186 or visit www.btransit.org.

Trolley service to the following stops has been discontinued:

Newman Library, Burruss Hall, Cassell Coliseum, and Hardee's on Prices Fork Road

New stops include:

Campus to NRV Mall - Squires East, Downtown U.S. Post Office, and First & Main

NRV Mall to Campus - First & Main at Main/Ardmore and Downtown U.S. Post Office

— Bus Route
▲ Time Checks*

■ Points of Interest
● Bus Stops

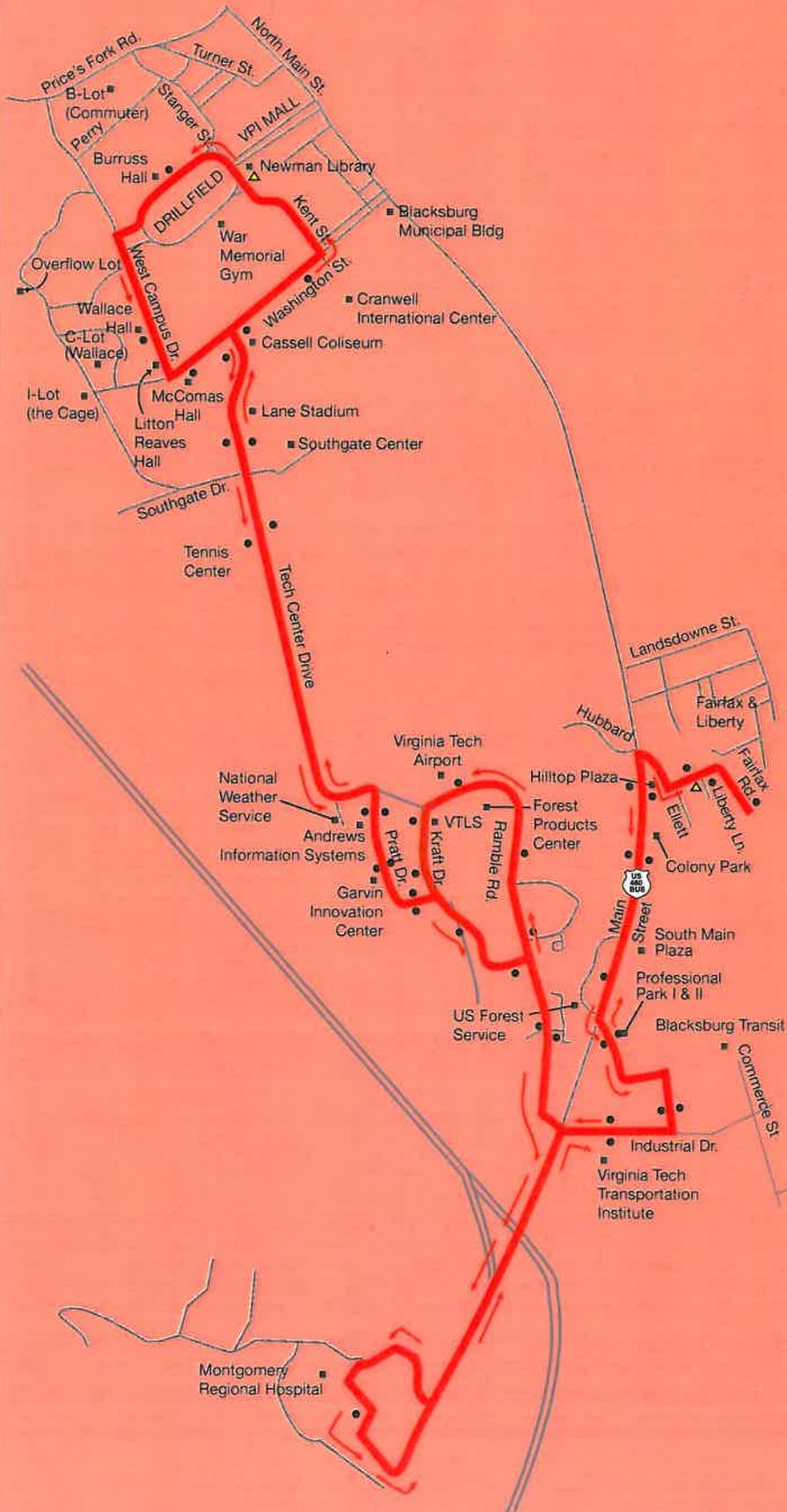
* Buses that arrive at a time check early will leave at the scheduled time.



— Bus Route
▲ Time Checks*

■ Points of Interest
● Bus Stops

* Buses that arrive at a time check early will leave at the scheduled time.



Appendix G

Operational Data from Blacksburg Transit's 2007 NTD Report

Blacksburg Transit (BT)

Town Manager: Mr. Marc Verniel
 (540) 961-1185

General Information

Urbanized Area (UZA) Statistics - 2000 Census

Blacksburg, VA	
Square Miles	26
Population	57,236
Population Ranking out of 465 UZAs	413
Other UZAs Served	

Service Area Statistics

Square Miles	28
Population	56,260

Financial Information

Fare Revenues Eamed	\$2,085,866
Sources of Operating Funds Expended	
Fare Revenues (47%)	\$1,797,693
Local Funds (0%)	0
State Funds (19%)	722,434
Federal Assistance (34%)	1,324,942
Other Funds (0%)	0
Total Operating Funds Expended	\$3,845,069
Sources of Capital Funds Expended	
Local funds (0%)	\$0
State Funds (15%)	349,721
Federal Assistance (80%)	1,861,215
Other Funds (5%)	115,493
Total Capital Funds Expended	\$2,326,429

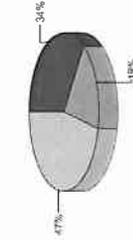
Summary of Operating Expenses

Salary, Wages and Benefits	\$2,477,941
Materials and Supplies	643,443
Purchased Transportation	0
Other Operating Expenses	723,685
Total Operating Expenses	\$3,845,069
Reconciling Cash Expenditures	\$0

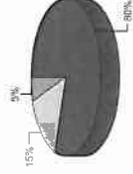
Vehicles Operated in Maximum Service and Uses of Capital Funds

	Directly Operated	Purchased Transportation ¹	Revenue Vehicles	Systems and Guideways	Facilities and Stations	Other	Total
Bus	24	0	\$853,103	\$176,968	\$1,146,966	\$90,943	\$2,267,980
Demand Response	4	0	\$58,449	\$0	\$0	\$0	\$58,449
Total	28	0	\$911,552	\$176,968	\$1,146,966	\$90,943	\$2,326,429

Sources of Operating Funds Expended



Sources of Capital Funds Expended

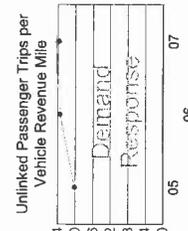
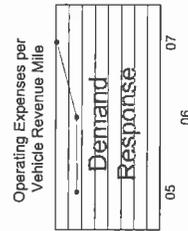
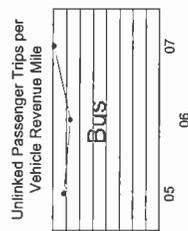
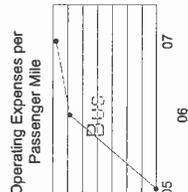
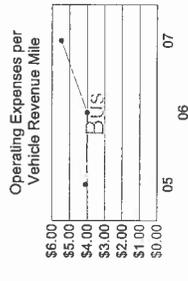


Modal Characteristics

	Operating Expenses ¹	Fare Revenues	Uses of Capital Funds	Annual Passenger Miles	Annual Vehicle Revenue Hours	Annual Revenue Trips	Annual Vehicle Revenue Miles	Unlinked Trips	Fixed Guideway Vehicles Available for Maximum Service	Average Fleet Age In Years	Vehicles Operated In Maximum Service	Peak to Base Ratio	Percent Spares
Bus	\$3,358,400	\$2,075,863	\$2,267,980	4,945,916	67,814	2,431,250	67,814	35	35	7.1	24	1.00	46%
Demand Response	\$486,669	\$10,003	\$58,449	39,144	6,663	14,549	6,663	8	8	5.9	4	N/A	100%

Performance Measures

	Service Efficiency		Service Effectiveness	
	Operating Expense per Vehicle Revenue Mile	Operating Expense per Passenger Mile	Unlinked Passenger Trips per Vehicle Revenue Mile	Unlinked Passenger Trips per Hour
Bus	\$5.48	\$49.52	3.96	35.85
Demand Response	\$7.93	\$73.04	0.24	2.18



1 Excludes data for purchased transportation reported separately

