



Transit Development Plan

September 2018

Welcome to
Charlottesville
VIRGINIA

Prepared by:



Page Intentionally Left Blank

Contents

Executive Summary	3
Key Findings and Recommendations	3
1 Overview of the Transit System.....	1-9
1.1. History	1-9
1.1.1. Current Initiatives	1-10
1.2. Governance.....	1-11
1.3. Organizational Structure	1-11
1.4. Services Provided, and Areas Served.....	1-12
1.4.1. Fixed Route Bus	1-12
1.4.2. Other Transportation Services	1-16
1.4.3. Transit Hubs/Downtown Station.....	1-17
1.4.4. Bus Stops and Shelters.....	1-18
1.4.5. Park and Ride Facilities	1-19
1.5. Fare Structure	1-19
1.6. Fleet	1-19
1.7. Existing Facilities.....	1-20
1.8. Transit Security Program	1-20
1.9. Intelligent Transportation System (ITS) Program	1-21
1.9.1. Fareboxes	1-21
1.9.2. Real Time Arrival Information.....	1-21
1.10. Data Collection, Ridership and Reporting Methodology	1-21
1.11. Coordination with other Transportation Service Providers.....	1-22
1.12. Public Outreach.....	1-22
2 Goals, Objectives and Service Design Standards	2-27
2.1. Previous Goals and Objectives.....	2-27
2.2. Alignment with Regional Goals/Regulations (State, Federal).....	2-29
2.3. Rationale for Change	2-33
2.4. New Goals and Objectives.....	2-33
2.5. Service Design Standards.....	2-37
2.6. Measuring Performance	2-39
3 Service and System Evaluation	3-45
3.1. Service Overview	3-45
3.1.1. Fixed Route Service	3-45
3.1.2. Paratransit Service.....	3-51
3.2. System Analysis.....	3-51



3.2.1.	Ridership.....	3-51
3.2.2.	Service Effectiveness	3-55
3.2.3.	Cost Efficiency.....	3-57
3.2.4.	Service Quality.....	3-58
3.3.	Trend Analysis.....	3-61
3.3.1.	Service Productivity	3-61
3.3.2.	Cost Efficiency.....	3-63
3.3.3.	Trend Analysis Conclusion.....	3-64
3.4.	Transit Potential Analysis	3-64
3.5.	Transit Propensity Analysis.....	3-65
3.5.1.	Transit-Oriented Populations Index.....	3-66
3.5.2.	Commuter Populations Index	3-67
3.5.3.	Work Destinations Index.....	3-68
3.5.4.	Non-Work Destinations Index	3-69
3.6.	Rider Surveys.....	3-70
3.6.1.	On-Board Survey	3-70
3.6.2.	Online Regional Transit Survey.....	3-71
3.7.	Gaps Analysis	3-72
3.7.1.	Coverage Gaps	3-72
3.7.2.	Service Level Gaps.....	3-73
4	Service & Capital Improvement Plan	4-79
4.1	Short-Term (1-3 Years) Service Improvements and Needs Identification.....	4-79
4.1.1.	Recommendation: Split Route 1 Into Two Routes; Streamline Alignments; Serve Pantops Area.....	4-82
4.1.3.	Recommendation: Extend Route 2 to Mill Creek and PVCC; Provide Bi-Directional Service	4-84
4.1.4.	Recommendation: Shift Route 3 Service to Avon via 5 th Street Station; End Route in Downtown Charlottesville	4-85
4.1.6.	Recommendation: Extend Route 4 to 5 th Street Station; Eliminate Service Between UVA Hospital and Downtown Charlottesville	4-86
4.1.7.	Recommendation: Eliminated Route 5 Service to Fashion Square Mall; Consolidate with Route 8.....	4-87
4.1.8.	Recommendation: Provide Bi-Directional Route 6 Service Between UVA Hospital and 5th Street Station; Eliminate Service between Downtown Charlottesville and UVA Hospital ...	4-88
4.1.9.	Recommendation: Eliminate Route 7 Service to the Shops at Stonefield; Extend Route to Walmart; Replace Route 12 on Sundays.....	4-89
4.1.10.	Recommendation: Extend Route 9 to Fashion Square Mall via Hydraulic Road; Add Service to McIntire/Harris Area.....	4-90

4.1.11.	Recommendation: Provide Bi-Directional Route 10 Service; Shift Service to Avemore Apartments to Route 1A	4-91
4.1.12.	Recommendation: Streamline Route 11; Extend Service to Walmart	4-92
4.1.13.	Short-Term Operating Plan	4-93
4.1.14.	Short-Term Ridership Estimates.....	4-97
4.2.	Mid-Term (3-10 Years) Service Improvements and Needs Identification	4-108
4.2.1.	Mid-Term Ridership Estimates.....	4-112
4.3.	Long-Term (10+ Years) Service Improvements and Needs Identification	4-113
4.4.	Capital Improvement Plan	4-114
4.4.1.	Other Capital Needs.....	4-115
5	Implementation Plan.....	5-119
5.1.	Rolling Stock Utilization	5-119
5.1.1.	Fleet Inventory.....	5-119
5.1.2.	Vehicle Replacement	5-122
5.1.3.	Vehicle Expansion	5-123
5.1.4.	Baseline and Expansion Comparisons.....	5-124
5.2.	Major System Maintenance and Operations Facilities	5-126
5.3.	Passenger Amenities.....	5-126
5.4.	New Technology Systems or Upgrades	5-126
6	Financial Plan	6-131
6.1.	Data Assumptions and Sources.....	6-131
6.1.1.	Operating Budget Assumptions.....	6-131
6.1.2.	Capital Budget Assumptions	6-132
6.2.	Operating Budget	6-132
6.3.	Capital Budget.....	6-132
6.4.	Conclusion	6-133
7	Regional Coordination	7-139
7.1.	Seamless Connections.....	7-139
7.1.1.	Regional Travel Planning.....	7-139
1.1.1	Regional Fares	7-140
7.2.	Regional Services.....	7-141
7.2.1.	US-29 BRT Service.....	7-141
7.2.2.	Subsidized TNCs and Microtransit	7-141
8	Appendix A: On-Board Survey Results	8-145
8.1.	Respondent Profile	8-145
8.1.1.	Surveys Returned by Route.....	8-145
8.2.	Use of System	8-146

8.2.1.	Rider Frequency of Use.....	8-146
8.2.2.	Routes Used for Trip	8-147
8.2.3.	Rider Origin	8-148
8.2.4.	Rider Destination.....	8-148
8.2.5.	Reasons to use CAT	8-149
8.3.	Fare Payment	8-149
8.3.1.	Smart Card Usage	8-149
8.3.2.	Fare Payment Type	8-150
8.3.3.	Alternative Transportation Modes.....	8-151
8.4.	Customer Satisfaction.....	8-151
8.4.1.	Satisfaction Metrics	8-151
8.4.2.	Customer Preferences	8-152
8.5.	Demographic Information	8-153
8.5.1.	Primary Language Spoken.....	8-153
8.5.2.	Age.....	8-153
8.5.3.	Employment Status	8-154
8.5.4.	Household Income	8-154
8.5.5.	Race/Ethnicity	8-155
8.5.6.	Gender	8-155
8.6.	Customer Comments.....	8-156
9	Appendix B: Route Profiles	9-163
9.1.	Route 1: PVCC & Woolen Mills.....	9-164
9.1.1.	Service Description	9-164
9.1.2.	Operating Characteristics.....	9-165
9.1.3.	Weekday Service Productivity	9-165
	Passengers per Hour.....	9-165
	On-Time Performance.....	9-165
9.1.4.	Ridership.....	9-166
	Ridership by Trip	9-168
9.1.5.	Summary of Observations	9-169
9.2.	Route 2: 5 th Street Station.....	9-171
9.2.1.	Service Description	9-171
9.2.2.	Operating Characteristics.....	9-172
9.2.3.	Weekday Service Productivity	9-172
	Passengers per Hour.....	9-172
	On-Time Performance.....	9-172
9.2.4.	Ridership.....	9-173

9.2.5.	Summary of Observations	9-175
9.3.	Route 3: Southwood & Belmont	9-176
9.3.1.	Service Description	9-176
9.3.3.	Operating Characteristics	9-177
9.3.4.	Weekday Service Productivity	9-177
	Passengers per Hour	9-177
	On-Time Performance	9-177
9.3.5.	Ridership	9-178
9.3.6.	Summary of Observations	9-182
9.4.	Route 4: Cherry Avenue & Harris Road	9-184
9.4.1.	Service Description	9-184
9.4.2.	Operating Characteristics	9-185
9.4.3.	Weekday Service Productivity	9-185
	Passengers per Hour	9-186
	On-Time Performance	9-186
9.4.4.	Ridership	9-186
9.4.5.	Summary of Observations	9-191
9.5.	Route 5: Commonwealth Drive	9-193
9.5.1.	Service Description	9-193
9.5.2.	Operating Characteristics	9-194
9.5.3.	Weekday Service Productivity	9-194
	Passengers per Hour	9-195
	On-Time Performance	9-195
9.5.4.	Ridership	9-195
	Ridership by Stop	9-195
9.5.5.	Summary of Observations	9-200
9.6.	Route 6: Ridge Street & Prospect Avenue	9-202
9.6.1.	Service Description	9-202
9.6.2.	Operating Characteristics	9-203
9.6.3.	Weekday Service Productivity	9-203
	Passengers per Hour	9-203
	On-Time Performance	9-203
9.6.4.	Ridership	9-204
9.6.5.	Summary of Observations	9-208
9.7.	Route 7: Emmet Street & Seminole Trail	9-210
9.7.1.	Service Description	9-210
9.7.2.	Operating Characteristics	9-211

9.7.3.	Weekday Service Productivity	9-211
	Passengers per Hour.....	9-211
	On-Time Performance.....	9-211
9.7.4.	Ridership.....	9-212
9.7.5.	Summary of Observations	9-216
9.8.	Route 8: Preston Avenue & Emmet Street.....	9-218
9.8.1.	Service Description	9-218
9.8.2.	Operating Characteristics.....	9-219
9.8.3.	Weekday Service Productivity	9-219
	Passengers per Hour.....	9-219
	On-Time Performance.....	9-219
9.8.4.	Ridership.....	9-220
9.8.5.	Summary of Observations	9-224
9.9.	Route 9: The Health Department & YMCA	9-226
9.9.1.	Service Description	9-226
9.9.2.	Operating Characteristics.....	9-227
9.9.3.	Weekday Service Productivity	9-227
	Passengers per Hour.....	9-227
	On-Time Performance.....	9-227
9.9.4.	Ridership.....	9-228
	Ridership by Trip	9-231
9.9.5.	Summary of Observations	9-232
9.10.	Route 10: Pantops.....	9-234
9.10.1.	Service Description	9-234
9.10.2.	Operating Characteristics.....	9-235
9.10.3.	Weekday Service Productivity	9-235
	Passengers per Hour.....	9-235
	On-Time Performance.....	9-235
9.10.4.	Ridership.....	9-236
9.10.5.	Summary of Observations	9-240
9.11.	Route 11: Locust Avenue & Rio Road.....	9-242
9.11.1.	Service Description	9-242
9.11.2.	Operating Characteristics.....	9-243
9.11.3.	Weekday Service Productivity	9-243
9.11.4.	Ridership.....	9-244
	Ridership by Trip	9-247
9.11.5.	Summary of Observations	9-248

9.12. Free Trolley: W Main Street & UVA.....	9-249
9.12.1. Service Description.....	9-249
9.12.2. Operating Characteristics.....	9-250
9.12.3. Weekday Service Productivity.....	9-250
Passengers per Hour.....	9-251
On-Time Performance.....	9-251
9.12.4. Ridership.....	9-251
9.12.5. Summary of Observations.....	9-254
10 Appendix C: Impact Calculation Factors	10-255
10.1. Short-Term Impact Factors.....	10-255
10.2. Mid-Term Impact Factors.....	10-256

Page Intentionally Left Blank



Executive Summary



Page Intentionally Left Blank

Executive Summary

Virginia's Department of Rail and Public Transportation (DRPT) requires that any public transit operator receiving state funding prepare, adopt, and submit a Transit Development Plan (TDP) at least once every six years.

A TDP serves as a guide for transit agencies regarding the ongoing and future operations of their transit services. It provides both a broad and specific review of an agency's operational performance, and a thorough understanding of the socioeconomic and demographic situations in which transit services are offered.

This document consists of seven chapters, corresponding to the plan requirements outlined by the DRPT:

- **Chapter 1** – Overview of Transit System
- **Chapter 2** – Goals, Objectives, and Service Design Standards
- **Chapter 3** – Service and System Evaluation
- **Chapter 4** – Service and Capital Improvement Plan
- **Chapter 5** – Implementation Plan
- **Chapter 6** – Financial Plan
- **Chapter 7** – Regional Coordination

KEY FINDINGS AND RECOMMENDATIONS

Charlottesville Area Transit (CAT) operates thirteen fixed-routes, including a free trolley connecting downtown with the University of Virginia. All routes operate Monday through Saturday between approximately 6:30 a.m. and 6:30 p.m., with nine routes continuing night service until 10:00 p.m., 11:00 p.m. or 12:00 a.m. Four routes operate on Sundays, including Route 2, Route 9, Route 12, and the Free Trolley. Service characteristics for weekdays and Saturdays are very similar. However, on Saturdays,

Routes 4, 8, 9, and 11 operate less frequently and with slightly different operating hours.

CAT has made no major service changes since the implementation of recommendations from the 2013 Route Analysis Study in 2014.

CAT ridership has been trending downward in recent years. In 2017, the system carried 21.52 passengers per revenue hour – down from 23.18 in 2015. CAT's ridership losses are in line with national trends. Low unemployment, sustained lower gas prices, and, perhaps most importantly, the increasing availability, affordability, and popularity of alternative mobility options such as bicycles and app-based ride-hailing services are all combining to reduce demand for transit.

These new options create a challenge, in the form of competition, for traditional transit operators like CAT, but they also create opportunities by allowing transit providers to better align their services with market demands. Traditional fixed route service is not necessarily the best mobility solution for every environment, and the availability of new, more flexible, mobility models now let fixed route providers focus their services where they can do best.

The proposed weekday/Saturday and Sunday system maps shown in **Error! Reference source not found.** and Figure 2 reflect the recommendations presented in this document. These recommendations are based on service and market opportunities identified in Chapter 3, as well as public and stakeholder feedback received throughout the project. Overall, the recommendations are intended to simplify CAT's services in order to make them easier to use and more intuitive to understand.



Figure 1 | Proposed Weekday/Saturday System

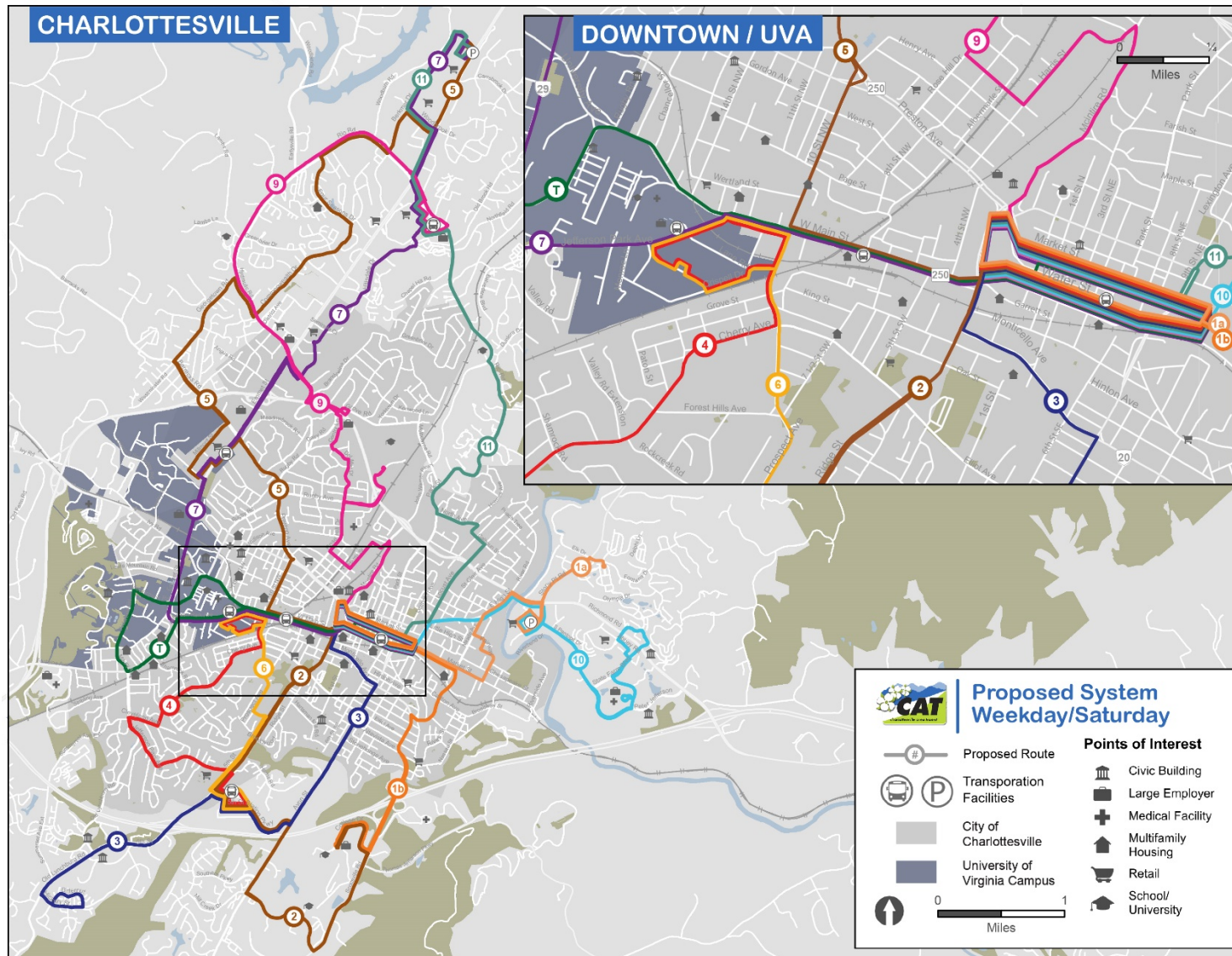
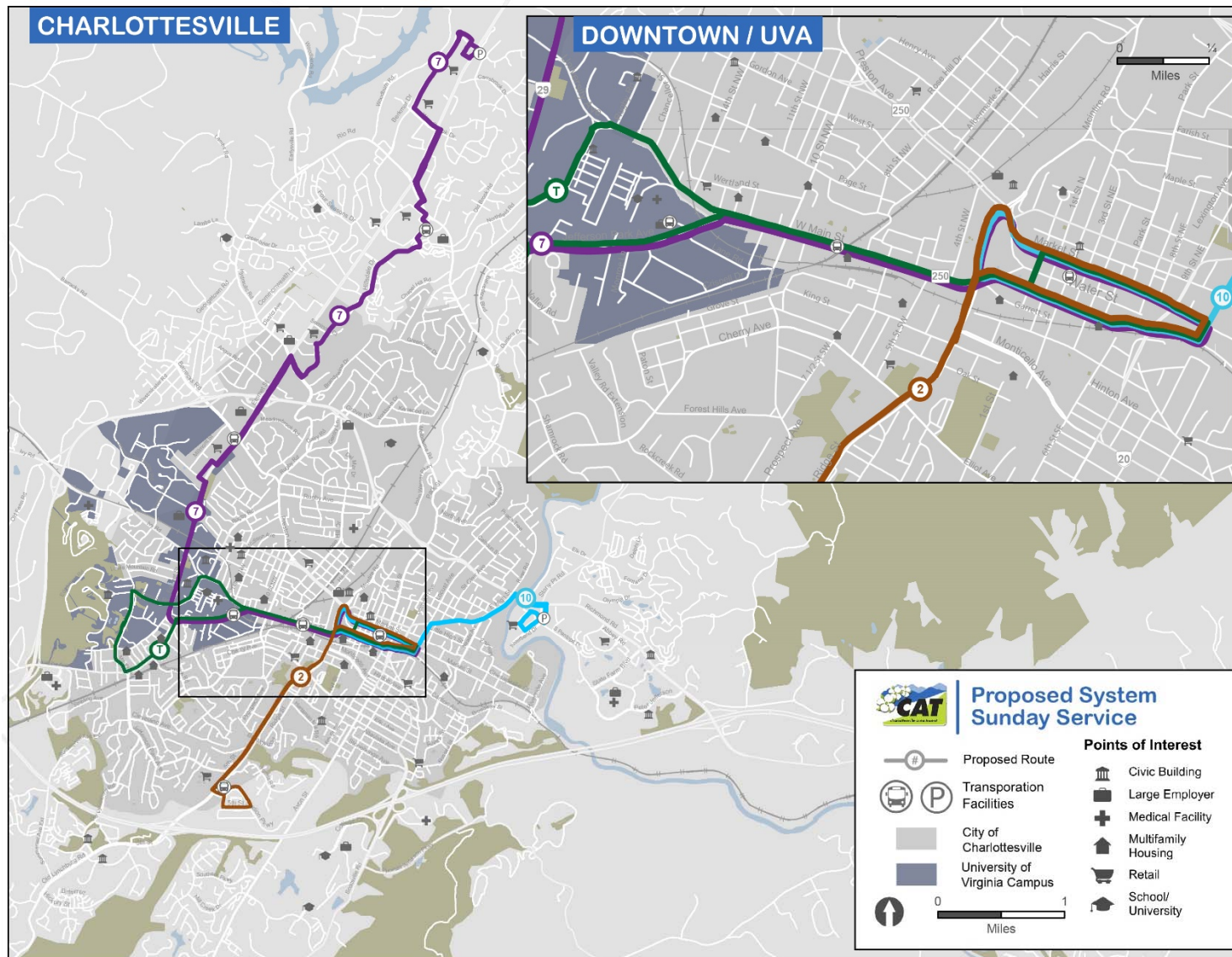


Figure 2 | Proposed Sunday System



The TDP also recommends a number of initiatives that can be implemented in the shorter term to make the region's transit services more seamless and accessible. These include the following:

- **Regional Travel Planning** – A one-stop regional transit planning tool could provide users with information, including real-time vehicle locations, for CAT, JAUNT, UTS, and Greene County Transit services.
- **Regional Mobile Ticketing** – With mobile ticketing, a regional fare category can be established and overlaid on the fare structures of CAT, JAUNT, and Greene County transit, even if all other fares remain unique to each system. Revenues can be divided among the three providers based on an agreed-upon fare allocation formula.
- **US-29 BRT Service** – Through a regional partnership between CAT, JAUNT, and UVA, JAUNT's 29 Express brand could evolve into limited-stop Bus Rapid Transit service and provide relief to CAT's heavily used Route 7 (which could continue to provide local all-stop service).
- **Subsidized TNCs and Microtransit** – Given that JAUNT is sub-recipient of Federal funding, it may be necessary for CAT to play a role in any future contracts with TNCs or app-based microtransit providers. Such an agreement may take the form of a three-party contract where CAT contracts with a TNC or other app-based provider for purchased service, and concurrently with JAUNT to manage the service through a regional partnership between CAT.

Overall, this document is intended to be both a practical, immediately implementable plan, and a strategic document guiding CAT's future development.



Chapter 1

Transit System Overview: Charlottesville Area Transit



Page Intentionally Left Blank

1 Overview of the Transit System

1.1. HISTORY

In 1975 the City of Charlottesville created the Charlottesville Transit Service (CTS) as a division of the Department of Public Works following a private transit company ceasing operations. CTS began service using six buses purchased from the private operator. The stated goal of CTS in 1975 was to provide bus service within five blocks of every City residence. Initially, all routes ran on one-hour headways.

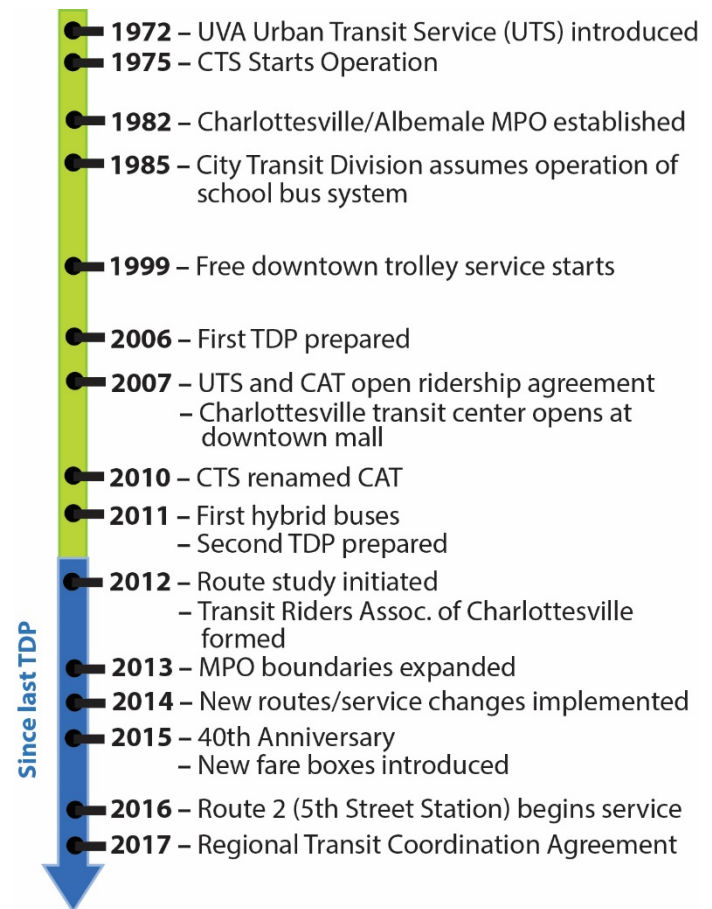
In 1978, Albemarle County contracted with the City to begin a route serving locations along Route 29 to the north of the City. This agreement represented the first major geographic expansion of CTS and the first cooperative effort between the City and the County for fixed route transit service.

In 1985, the City's Transit Division assumed responsibility for the operation of school bus transportation in addition to CTS.

In 1999, the agency initiated a free shuttle route (using green-painted trolley-style buses) connecting downtown with the University of Virginia.

In 2006, in response to the City of Charlottesville and Albemarle County having adopted resolutions expressing a commitment to establish a Regional Transit Authority (RTA) for the greater Charlottesville area, the first Transit Development Plan was prepared for CTS. The plan followed a route study conducted the previous year that analyzed ridership patterns and undertook an evaluation of existing route structures.

Figure 3 | Organizational Timeline



The TDP noted that the findings were that traffic congestion had resulted in unreliable service and duplication with bus service existed with the University of Virginia's (UVA) own student bus system often serving common locations and trip markets. The TDP recommended strategies for improving the existing routes, both day and night, and improved service expansion alternatives.

In 2007, the University Transit Service (UTS) and CTS entered into an open ridership agreement that allows UVA students, faculty, and staff to ride CTS for free by showing a valid UVA ID card. The Downtown Transit Station (DTS) also opened next to the former Chesapeake & Ohio railroad depot as part of the East End Downtown Mall Improvement Project.

In 2009, the General Assembly passed legislation to allow for the creation of a transit authority between



Albemarle and Charlottesville. The legislation, however, did not approve a requested voter referendum on a sales tax to fund it. Without a dedicated funding source the progress toward an RTA stalled.

In 2010, CTS was re-branded as Charlottesville Area Transit (CAT), with a new dogwood and mountain logo. The City also built a new Transit Operations Center for CAT on 6 acres of land purchased just south of the City.

In 2011, a second TDP was prepared for CAT, extending through FY 2017. The TDP conclusion reached from the service analysis was that conversion of the CAT transit system to a trunk and feeder system was not yet feasible. Also, should the system continue to grow into Albemarle County, it would be appropriate to create satellite transfer facilities, with the introduction of community circulators and crosstown routes that do not go to the Downtown Transit Station (DTS). Following completion of this TDP, City Council elected to conduct additional route analysis.

The results of additional route analysis and new service recommendations were completed in 2013. As a response, in 2014 CAT underwent a major realignment to make bus routes more direct and to establish a new regional hub at the UVA Hospital in addition to the existing Downtown facility. The overall intent was to increase route reliability and efficiency.

Ridership peaked in FY2013 at 2.6 million passengers, following steady increases since 1996. Recent ridership estimates (FY 2016) report 2.4 million annual passengers.

Today, CAT provides bus service to the greater Charlottesville area on 13 routes within the city, to certain areas of Albemarle County and to the grounds of UVA. CAT buses operate seven days a week. The newest expansions include a new route to a retail complex (Fifth Street Station) and route adjustments

to serve a new Piedmont Family YMCA facility. The Thomas Jefferson Planning District Commission has recently concluded a study of the operations of CAT, JAUNT and the UTS to explore how they might work better together. In September 2017, the Albemarle Board of Supervisors and the Charlottesville City Council agreed to enter into a formal partnership to help advise on improvements to bus service throughout the region.

1.1.1. Current Initiatives

Regional Transit Partnership: An agreement was established in 2017 between the Charlottesville-Albemarle Metropolitan Planning Organization (CA-MPO), the City of Charlottesville, the County of Albemarle, JAUNT, Inc, and the Thomas Jefferson Planning District Commission (TJPDC). Recurring responsibilities of this partnership are to:

- Create a formal means of exchanging information between transit providers, localities and other stakeholders.
- Facilitate transit planning through recommendations, assessments and guidance on transit-related matters to the city, county and public transit operators.
- Integrate transit into other decision-making and help ensure that transit will receive increased consideration in regional and local planning efforts.
- Test a RTA structure, allowing parties to become more familiar with the concept of a consolidated transit system.

I-81/I-64 Inter-Regional Public Transportation

Proposal: The Central Shenandoah Planning District Commission (CSPDC) led the development of a transit feasibility study and service plan in FY2016-FY2017 to explore creation of a public transportation link between Harrisonburg and Charlottesville. The service is envisioned to provide for a variety of trip needs including work, education, access to Greyhound and Amtrak, and access to medical care. CAT would

continue in a support role, providing future feeder connections, dependent upon the connections determined for Charlottesville.

1.2. GOVERNANCE

CAT is owned and operated by the City of Charlottesville and housed under the City's Transit Department, which also operates Charlottesville Pupil transportation serving Charlottesville City schools.

Decisions regarding CAT service are ultimately made by the City Council. The Charlottesville City Council consists of five members who are elected on an at-large, non-partisan basis for staggered four-year terms. The City Council elects the Mayor and Vice Mayor as well as appoints the City Manager.

The Charlottesville Area Transit (CAT) Advisory Board is also appointed by City Council. The Board is charged with recommending policies to City Council regarding the services to be provided and the appropriate procedure for implementing CAT service and operating plans. The CAT Advisory Board annually recommends a public transportation budget for the succeeding fiscal year in accordance with the City's annual budget process. Any service planning changes must be advanced by the board and brought before City Council at least sixty (60) days prior to the proposed date of implementation. The service plans provide information on anticipated costs, ridership, routing, schedules, personnel needs, and budget amendments that may be required. The CAT Advisory Board may also make recommendations on other revenue sources such as grants, fares, and advertising policies.

The day-to-day CAT operations are administered through the Transit Director who reports to the Assistant City Manager.

The policy making body of the CA-MPO is its Board, which consists of five voting members. The voting membership of the Policy Board consists of two representatives from the City of Charlottesville and

two representatives from the County of Albemarle. The fifth representative is from the Virginia Department of Transportation (VDOT). CAT is a non-voting member including the Department of Rail and Public Transportation (DRPT).

1.3. ORGANIZATIONAL STRUCTURE

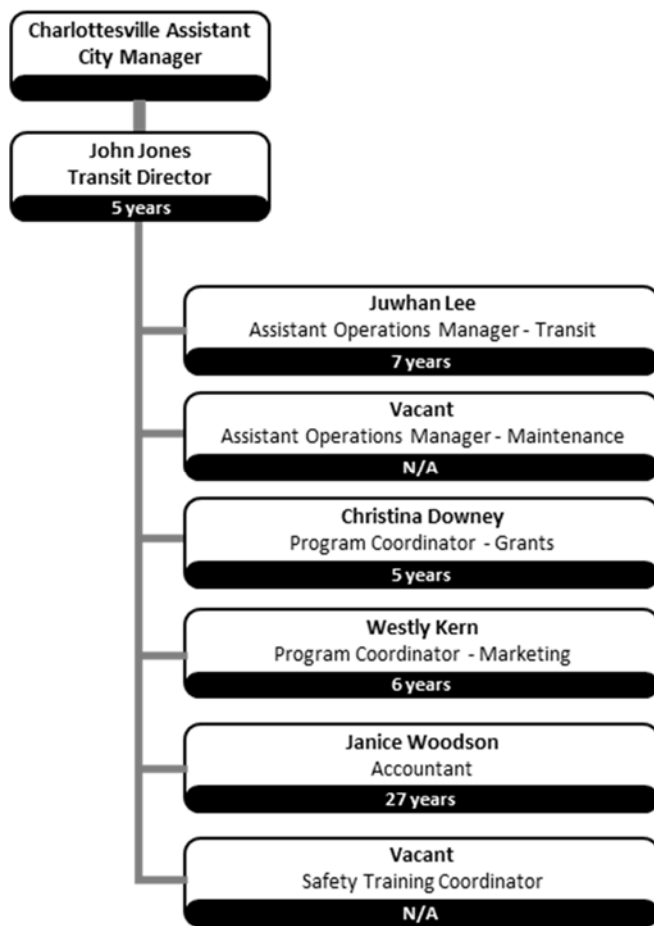
Total CAT employment consists of 106 employees, representing an almost 13 percent increase since a new transit director started in 2013. There are 11 administrative positions, with three vacancies currently existing for an Assistant Operations Manager – Maintenance, Safety/Training Coordinator, and Transit Dispatcher/Scheduler. CAT has backfilled positions to meet needs while these vacancies are being filled.

There are a total of 85 vehicle operators, 41 full-time and 44 part-time. Operators provide both CAT service and operate the Charlottesville School District buses with separate runs for school types (elementary, middle, and high school), special needs, and after-school activities. All CAT employees are City employees.

To address shortages of operators, the Growing Opportunity (GO) Driver Program was established as a five-week training program that prepares City residents for a career as a bus driver with CAT, UTS, and JAUNT. The program is entirely free for eligible participants. After successful completion of this program, graduates will initially be considered for relief transit operator positions and will be next in line as full-time openings become available with CAT.



Figure 4 | Organizational Chart



1.4. SERVICES PROVIDED, AND AREAS SERVED

1.4.1. Fixed Route Bus

CAT operates thirteen routes, including a free trolley route called the “Free T.” The routes reflect input from the most recent Route Analysis Study (2013) and the subsequent changes CAT made based upon those recommendations which were implemented in 2014.

All routes operate Monday through Saturday between approximately 6:30 a.m. and 6:30 p.m., with

nine routes continuing night service until 10:00 p.m., 11:00 p.m. or 12:00 a.m. Four routes now operate on Sundays, including Route 2, Route 9, Route 12, and the “Free T” trolley. Service characteristics for weekday and Saturday are very similar. However, on Saturday, Routes 4, 8, 9, and 11 operate at less frequent service levels in the peak periods, and with slightly different operating hours.

CAT routes are classified as one of three types: Key Routes, Local Routes, and Lifeline Routes. This classification captures service frequency, operating characteristics, and the needs being served by the route. Service guidelines have been established for each service type. Following the implementation of service recommendations in 2014, CAT has made no changes in 2015 and only minor changes (stop locations and timepoints) in 2016. CAT route descriptions based upon scheduled services include:

UVA FREE Trolley: The UVA Free Trolley or “Free T” operates between downtown Charlottesville and the UVA campus. This route operates at frequent (15-minute) service and is fare-free for all riders. The Free Trolley features the highest-frequency and highest ridership of any route in the CAT system. The route is also partially funded by the University of Virginia. The UVA Free Trolley is one of four routes that operate on Sunday and one of nine routes that have late operating hours.

Route 1 PVCC and Woolen Mills: This route operates between Piedmont Virginia Community College (PVCC) and Riverview Park via downtown Charlottesville. The route connects with the Woolen Mills area via East Market Street, and PVCC via Monticello Avenue. This route operates at 60-minute frequencies.

Figure 5 | System Map

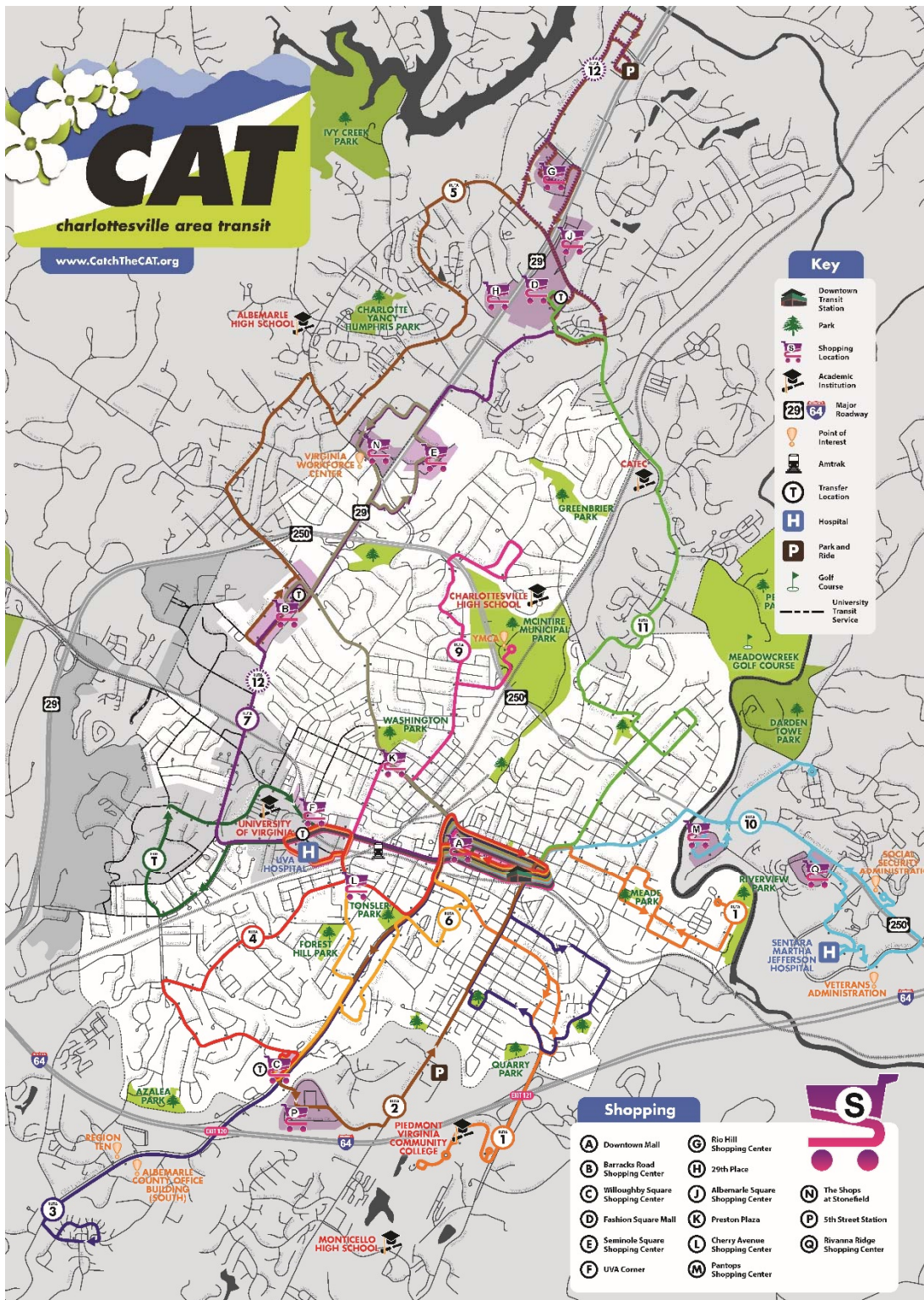


Table 1-1 | Fixed Route Service Summary

13 ROUTES									
Route	Route Type	Service Days/Times					Mon.-Fri. Span (Hrs.)	Mon.-Fri. Freq. (Mins.)	Peak Vehicles
		Mon.-Fri. Peak	Mon.-Fri. Midday	Sat.	Sun.	Late PM			
1 - PVCC & Woolen Mills	Local	●	●			●	16:00	60	1
2 - 5th Street Station	Key	●	●	●	●	●	17:07	30	1
3 - Southwood & Belmont	Local	●	●	●		●	17:45	30-60	2
4 - Cherry Avenue & Harris Road	Local	●	●	●		●	17:38	23-70	3
5 - Commonwealth Drive	Local	●	●	●		●	16:45	30	3
6 - Ridge Street & Prospect Avenue	Local	●	●	●		●	17:30	60	1
7 - Emmet Street & Seminole Trail	Key	●	●	●		●	17:07	20	5
8 - Preston Avenue & Emmet Street	Local	●	●	●			12:27	60	2
9 - The Health Department & YMCA	Local	●	●	●	●		17:00	70	1
10 - Pantops	Local	●	●	●		●	16:57	60	1
11 - Locust Avenue & Rio Road	Lifeline	●	●	●			15:27	60	1
12 - Seminole Trail	Key				●		10:00*	60*	2
Free T - West Main Street & UVA	Key	●	●	●	●	●	16:57	15	3

Route 2 5th Street Station: Route 2 operates from downtown Charlottesville in a rectangular alignment around the Belmont Park neighborhood, the 5th street Station via Avon Street, the Willoughby Square Shopping Center, and the Tonsler Park neighborhood, via 5th St SW. Free parking is provided at the Park & Ride on Avon Street Extended. Frequencies are 30-minutes Monday through Saturday, from 6:35 a.m. to 11:45 p.m. and on Sunday from 7:35 a.m. to 5:45 p.m.

Route 3 Southwood and Belmont: Route 3 operates between downtown and the Albemarle County Office Building southwest of the city via Ridge and 5th Streets, and the Belmont and Belmont Park neighborhoods south of downtown via Monticello, Hinton and Alvavista Avenues. This route operates at 30-minute frequencies Monday through Friday, and on 30 to 60 minute frequencies on Saturday, depending on the time of day. This route does not operate on Sundays.

Route 4 Cherry Ave and Harris Road: This route serves downtown Charlottesville, Tonsler Park neighborhood and Willoughby Square Shopping Center via Cherry Ave and Harris Rd. Route 4 operates at 23-minute frequencies Monday through Friday, 6:36 a.m. through 6:37 p.m. and during peak periods

on Saturday. Route 4 operates on 60 minute frequencies after 6:37 p.m. Monday through Friday and during off-peak hours. This route does not operate on Sundays.

Route 5 Commonwealth Drive: Route 5 is the only route that does not interact with the Downtown Transit Station. This route operates Monday through Saturday at 30-minute frequencies between Barracks Road Shopping Center and Walmart and Sam's Club to the north. The Greenbrier Drive and Four Seasons areas, Fashion Square Mall, and the Rio Hill and Albemarle Square Shopping Centers are all served by Route 5. Route 5 is fully funded by Albemarle County and is one of ten routes that have late operating hours. Although this route does not operate on Sundays, Route 12 provides service to most areas serviced by Route 5.

Route 6 Ridge Street and Prospect Avenue: Route 6 operates between downtown Charlottesville and the Ridge Street/Jordan Hills Park area, 5th Street Station, Willoughby Square Shopping Center, and UVA Hospital. The route operates from 6:30 a.m. to 12:00 a.m. Monday through Saturday. Frequencies are every 60 minutes.

Route 7 Emmet Street and Seminole Trail: Route 7 operates between the Downtown Transit Station and Fashion Square Mall via West Main Street and US 29 (Emmet Street North/Seminole Trail). UVA, Barracks Road Shopping Center and Seminole Square Shopping Center are all served by Route 7. This route operates at frequent (20-minute) service until the evening period when frequency is reduced to 30 minutes, Monday through Saturday. Route 7 does not operate on Sundays; however, Route 12 provides service to these areas instead. Route 7 is one of nine routes that have late operating hours.

Route 8 Preston Avenue and Emmet Street: This route operates between downtown Charlottesville, and Barracks Road and Seminole Square Shopping Centers via Preston Avenue, Barracks Road and US 29 (Emmet Street North/Seminole Trail). Frequencies are every 30 minutes during peak periods and 60 minutes otherwise, Monday through Friday. Frequencies are every 60 minutes on Saturdays and there is no service on Sundays.

Route 9 The Health Department and YMCA: Route 9 serves downtown Charlottesville, UVA Hospital, Washington Park neighborhood, the Health Department, the YMCA and McIntire Park, and Charlottesville High School. Service is offered at hourly frequencies Monday through Saturday from 6:00 a.m. to 11:00 p.m., and at hourly frequencies from 11:20 a.m. to 5:40 p.m. on Sundays.

Route 10 Pantops: This route operates between downtown and the Richmond Road corridor area via High Street. The Pantops Shopping Center is served by this route as is Santara Martha Jefferson Hospital. Frequencies are hourly Monday through Saturday from 6:30 a.m. to 11:27 p.m. This route does not operate on Sundays. Albemarle County contributes funding to this route.

Route 11 Locust Avenue and Rio Road: This route operates from downtown Charlottesville north on Locust Avenue and Rio Road, near McIntire and Pen Parks, CATEC, and Fashion Square Mall. This route is serviced every 60 minutes from 6:00 a.m. to 9:27 p.m. Monday through Friday, and 6:00 a.m. to 6:27 p.m. on Saturday. This route does not operate on Sundays.

Route 12 Seminole Trail: This route provides dedicated Sunday service to areas typically serviced by Routes 5 and 7. The route operates from downtown Charlottesville, to UVA Hospital via W Main Street, to UVA Campus, and north on US 29 (Emmet Street North/Seminole Trail) to Barracks Road Shopping Center, Seminole Square Shopping Center, Fashion Square Mall, Albermarle Shopping Center, and Rio Hill Shopping Center. Service is provided every 60 minutes from 7:45 a.m. to 5:45 p.m. on Sundays.



Table 1-2 | Summary of Service Changes Since Last TDP

Year	Route	Service Change Summary
2014	Route 1	Returned service to Monticello Road. The route now serves Monticello Road on its return trip from PVCC. The service day was extended from 9:30 PM to 10:00 PM, Monday through Friday.
	Route 4	The route now ends at Willoughby Square Shopping Center instead of the UVA Hospital. The service day was extended from 11:45 PM to 12:00 AM Monday through Saturday.
	Route 7	Increased frequency from every 20 minutes to every 15 minutes Monday through Saturday between the times of 6:25 AM and 7:40 PM.
	Route 10	Extended service day from 6:30 PM to 11:30 PM. The increase in service hours allows evening access to Martha Jefferson Hospital.
	Free T	On Sunday afternoons, the Free Trolley now operate every 25 minutes instead of every 45 minutes.
2015	Route 7	Discontinued the 11:10 PM departure from the Downtown Transit Station. The change was made to streamline the schedule.
	Route 10	Shifted routing alignment to serve the Food Lion in the Pantops Shopping Center first.
2016	Route 2	New Route - Travels from the Downtown Transit Station (DTS) to a new shopping center connecting 5th Street to Avon Street Extended (5th Street Station).
	Route 5	No longer directly serves the Barracks Road Shopping Center bus stop in front of Kroger.
	Route 6	No longer serves Willoughby Square Shopping Center twice an hour. Instead the shopping center is only served on the inbound trip from Jordan Hall (UVA Hospital) to the Downtown. Transit Station.
	Route 7	No longer directly serves the Barracks Road Shopping Center bus stop in front of Kroger. Sunday service was rebranded as Route 12 and added service to Sam's Club and Walmart. Sunday service now operates on a 60-minute service frequency rather than a 30-minute frequency.
2017	Route 4	Increase in service frequency during the morning and evening commutes while midday and late night service has a reduction in frequency.
	Route 9	Added service to the new YMCA, West Main Street, and the Downtown Mall. Areas north of Kenwood Lane no longer receive service. The route now operates seven days a week, an increase from the previous six days a week.

1.4.2. Other Transportation Services

Two other public transit agencies, University Transit Service for the University of Virginia and JAUNT Paratransit Service, have major presences in the Charlottesville area.

University of Virginia University Transit Service (UTS): Covering the main arteries of the UVA Grounds with as many as 27 buses in service at any given time, UTS is a free shuttle bus service for UVA students,

faculty, and staff. The UTS service area includes the UVA Grounds, north to the Barracks Road Shopping Center area, south along Jefferson Park Avenue and east to UVA's Hospital. UTS is funded through student activity fees, thus there is no fare collected on-board the buses. The public is also permitted to ride "fare-free" through a reciprocal agreement with CAT.

UTS operates under different schedules throughout the year. During academic semesters, UTS runs Full

Service. On most holidays, including Reading Days, Winter Break, and Summer Vacation, UTS operates Holiday Service. In addition, during exams and finals, UTS runs exam service and on Friday and Saturday nights, UTS runs extended late-night service. UTS operates six routes while classes are in session, with weekday frequencies ranging from 8 – 15 minutes. Service is generally provided between approximately 6:00 a.m. and 8:00 p.m. except for the Northline and U-Loop, which run on a reduced frequency schedule (15 minutes) until 12:30am. The Northline and U-Loop also provide limited weekend service.

Figure 6 | UTS Bus



JAUNT: JAUNT is a regional transportation system providing service to Charlottesville, Albemarle, Louisa, Nelson, Fluvanna and Buckingham counties. JAUNT, initially owned by the local governments that it serves, became a public corporation in 1982. CAT partners with JAUNT to provide their required ADA Paratransit Services, with pass-through FTA funding. This agreement is mutually beneficial by allowing CAT to avoid investments in smaller buses and take advantage of JAUNT's existing paratransit services. JAUNT likewise benefits by receiving additional funding to serve one of its core functions. JAUNT provides a 50% match with local and state funds and receives 24% of CAT's annual Section 5307 operating allocation from FTA. JAUNT submits requests for reimbursement to the City, with CAT conducting audits twice a year.



In addition to ADA paratransit service, JAUNT provides human service agency transportation, rural demand response service, and commuter route service. Most of JAUNT's commuter routes, as well as midday rural demand response service, provide public transportation between the outlying rural areas and Charlottesville. Most recently in 2016, JAUNT started the 29 Express running from the Forest Lakes/Hollymead area to UVA and the Downtown Library.

Figure 7 | JAUNT Van



1.4.3. Transit Hubs/Downtown Station

In 2007, CAT began operating out of the Downtown Transit Station (DTS) located at 615 East Water Street. All but one route serves the DTS. This facility is Leadership in Energy and Environmental Design (LEED) designated at the Gold level, reflecting a variety of sustainable approaches during planning and design, site preparation, and construction. The DTS, located at the easternmost end of the Charlottesville pedestrian mall, lies approximately ½ mile east of the Greyhound Bus Terminal and 1 mile east of the Charlottesville Amtrak station.

The indoor facilities of the DTS are open Monday through Saturday from 7:00 a.m. to 8:00 p.m. and Sundays from 9:00 a.m. to 5:00 p.m. There are times when CAT service is still operating and the indoor DTS facility is closed to the public. When open, bathrooms are located in the DTS as well as a small customer service office to provide route information, reduced

fare applications, CAT paratransit cards, and daily and monthly passes.

Figure 8 | CAT Downtown Transit Station



The DTS features a linear configuration with a single elongated pull-out bay capable of holding as many as six buses at any given time. Since the pull-out bay is on the westbound side of Water Street, all buses must approach the DTS in the westbound direction. As such, all buses operating to or from the DTS must circulate around the perimeter of downtown via a loop bounded by 10th Street NE to the east and Ridge Street-McIntyre Road to the west.

Since the 2013 Route Study, CAT has been investigating efforts that would minimize the circuitousness of existing CAT service in the downtown area, created by the limited crossings of the downtown pedestrian mall. An envisioned project from this study was the creation of a transit-accessible northbound passage between Water Street and Market Street that would minimize time delays associated with navigating the current downtown loop.

1.4.4. Bus Stops and Shelters

CAT has 325 bus stops encoded in their bus stop arrival application. This app works off a unique five-digit number that is assigned and displayed on each CAT bus stop sign and included in the printed CAT schedules. In 2014, CAT partnered with the City of Charlottesville's IT department to release a free mobile app. based upon this bus stop data, providing estimated arrival information from CAT's Automatic Vehicle Location (AVL) system. A display screen at the DTS also reports next bus arrival times.

Many of CAT's bus stops are common to two or more routes, especially on West Main Street, Water Street, and Market Street. The 2013 Route Study found that many of CAT's bus stops are placed very close together, and in some cases, only a block or less apart. CAT has since been eliminating and consolidating stops, with an approximately 15 percent reduction in overall bus stops from what was reported in the 2011 TDP.

The 2013 Route Study further recommended that CAT develop three transfer hubs at key locations where passenger transfer activity would be increased and where substantially more passengers would likely be waiting for service. These enhancements represent a more substantial level of investment at individual locations than basic bus stop signage and amenities. The proposed hub locations included the UVA Hospital, Market Street at 5th Street and the Willoughby Square Shopping Center.

Placement of shelters and other amenities are generally within the City's right-of-way and usually dictated by higher ridership or activity level or customer requests. Some bus stops are placed via agreement with private entities, such as at the Fashion Square Mall.

CAT has approximately 40 shelters system-wide. As part of the annual Tom Tom Founders Festival, sixteen bus shelters throughout Charlottesville are selected to be turned into unexpected art galleries.

1.4.5. Park and Ride Facilities

Charlottesville has six park and ride lots in the urbanized area, however most are modest in size and only one lot is served by CAT. Park and Ride information, along with additional commuter assistance, is provided by the Rideshare Program jointly administered by TJPDC and CSPDC. The most recent Park and Ride addition is located on City property at 1505 Avon Street Extended and served by the new Route 2.

Table 1-3 | Park and Ride Locations

Park and Ride Lot	Location	Spaces	CAT Routes
Avon Street Extended	Avon Street and Mill Creek	12	2
Azalea Park	5 th Street Extended and Old Lynchburg Road	5	None
Darden Towe Park	Route 20 North and Route 250 East	11	None
Forest Lakes North	Route 29 North and Route 649	7	None
Route 29 and I-64	Route 29 South and Teel Lane	20	None
Walmart South Lot	Route 29 North and Hilton Heights Road	10	5

1.5. FARE STRUCTURE

CAT buses currently accept cash fares and smart card passes. Multi-day passes are programmed on smart cards and are available for purchase at the DTS. Base fare for a one-way trip is 75 cents; reduced base fares are 35 cents. Day passes are available for \$1.50 while monthly passes cost \$20.00. Reduced rates for these passes are 75 cents and \$10.00, respectively. Those aged 65 and older, youth under 12, persons with disabilities and holders of Medicare cards are eligible for reduced fares.

Free rides are available for:

- Youth 12 and under (no ID required)
- Youth 13 to 17 upon presenting a valid Youth Smart Card
- City employees upon presenting a valid City ID
- American Disability Act (ADA) certified individuals upon presenting a valid CAT ID
- University of Virginia students, faculty and staff upon presenting a valid University ID card

CAT's Fare structure last changed in 2015, with the introduction of new EZ fareboxes from Trapeze. Passengers previously could only purchase monthly, three-month or yearly passes. The passes were made of paper and lacked flexibility with a finite life span. With the new fareboxes, CAT now offers new pass options (3-day and 7-day). The new system allows passes to be activated upon first use rather than from when they are purchased. With a total farebox revenue reported as \$718,703 in FY 2016, the average fare for all CAT riders was \$0.30. This reflects a nine percent decrease from 2015.

Fares for JAUNT trips varies by residency and distance. The fare for a JAUNT ADA trip is \$1.50 for qualifying passengers within the city and within the Charlottesville Urbanized area. The base fare for the public within the urbanized area is \$15.00. Fares for rural Albemarle destinations can vary by due to total trip distance depending upon ultimate destinations.

1.6. FLEET

CAT owns and operates an active revenue fleet of 37 buses. The oldest vehicles (9) were purchased in 2008 with the most recent vehicle (1) purchased in 2016. The average fleet age is 5.88 years. The average fleet mileage is just over 191,000 as of this report. No vehicle exceeds 35-feet in length.



Table 1-4 | CAT Fixed Route Fleet

Make/Model	Year	Type	Fuel	Seats	Quantity	Average Miles
Gillig	2008	Low Floor 35-ft.	Clean Diesel	32	7	294,830
Gillig	2008	Low Floor 29-ft.	Clean Diesel	27	1	293,426
Optima Opus	2008	30-ft. Trolley Replica	Diesel	21	1	172,558
Gillig	2010	Low Floor 35-ft.	Clean Diesel	32	4	291,598
Gillig	2010	Low Floor 29-ft.	Hybrid Electric	27	2	211,039
Gillig	2011	Low Floor 29-ft.	Hybrid Electric	27	4	231,611
GM-Goshen	2011	Body-on-Chassis 26-ft.	Diesel	16	1	100,506
Gillig	2012	Low Floor 29-ft.	Hybrid Electric	27	3	202,076
GM-Goshen	2012	Body-on-Chassis 26-ft.	Diesel	16	1	66,259
GM-Goshen	2013	Body-on-Chassis 26-ft.	Diesel	16	1	58,926
Gillig	2014	Low Floor 35-ft.	Clean Diesel	32	2	123,649
Gillig	2014	Low Floor 29-ft.	Hybrid Electric	27	1	125,999
Gillig	2014	Low Floor 35-ft. Trolley Replica	Clean Diesel	32	3	114,128
Gillig	2015	Low Floor 35-ft.	Clean Diesel	32	4	77,638
Gillig-Arboc	2016	Body-on-Chassis 26-ft.	Gasoline	16	1	16,635
Gillig-Arboc	2017	Body-on-Chassis 26-ft.	Gasoline	16	1	799

Only a few vehicles are due for replacement (5 total) before 2019. In the years 2020-2022 approximately 58 percent of the fleet will be due for replacement. In 2020, the largest annual total of nine vehicles will reach the end of their useful life.

Ten Gillig hybrid-electric buses have been purchased from 2010 to 2014. CAT has expressed a desire to discontinue the acquisition diesel-electric hybrid vehicles due to maintenance cost concerns and in 2015 resumed the purchase of clean diesel fueled vehicles. All buses on every CAT route are fully accessible. Each bus also has a two-bicycle rack installed on the front. Table 1-4 summarizes the existing CAT fixed-route revenue fleet. As previously noted, the City does not directly operate paratransit service, and thus owns no paratransit vehicles.

1.7. EXISTING FACILITIES

CAT's new Administration, Maintenance and Operations Base is located at 1545 Avon Street Extended near Interstate 64. The facility includes a vehicle maintenance facility, bus storage and parking, a washing station, a fueling station, and houses the administration and dispatcher's offices. This facility

opened in 2010. As with the DTS, the facility is LEED Gold certified.

The 27,000 square foot Charlottesville Area Transit Service Operations Center includes four buildings—one each for administration, vehicle maintenance, vehicle washing, and vehicle servicing. Together with a parking area for 60 buses, these buildings occupy six acres along one of the city's major entrance corridors.

1.8. TRANSIT SECURITY PROGRAM

CAT has a Safety Hazard and Security Plan in place that establishes policies, organization, roles and responsibilities for incidents, countermeasures and strategies. The plan also includes a section that addresses periodic assessments and review of the Safety Hazard and Security Plan.

CAT indicated in its last FTA Triennial Review (2015) that it does not expend one percent or more of its Section 5307 Urbanized Area Formula Grant funds for transit security per FTA guidance. CAT indicated that

the Charlottesville Police Department monitors CAT's safety and Security Protocol and compliance.

CAT's Facilities Maintenance Program, updated in 2012, provides for assurance of proper operation of facility security equipment. CAT's operational facility is secured with cameras, key cards, secure perimeter fencing and automatic gate openers.

Data from the National Transit Database indicated that CAT had two reportable incidents related to safety and security in 2015.

1.9. INTELLIGENT TRANSPORTATION SYSTEM (ITS) PROGRAM

In 2016, City Council approved CAT's effort to secure a transit planning platform, called Remix. The software offers interactive maps that will allow CAT to identify routes, service hours and stops that best serve the public. Remix provides cost estimates for various inputs, providing instant analysis on proposed transit services. Modifications and assessment of route adjustments and service hours are readily displayed and can more easily be quantified and compared against other operating scenarios. The City secured this powerful software in coordination with JAUNT, who contributed to acquiring the license. In addition to sophisticated route planning software, CAT also is employing farebox and real-time arrival systems that not only enhance the customer experience but also improve in the assessment and reporting on the existing service.

1.9.1. Fareboxes

CAT installed new fareboxes in 2015. In addition to more pass options and smartcard capabilities, the enhanced fareboxes also enable CAT to determine where people are boarding, at what time, and with what kind of pass. CAT intends to use this capability to report better data to the FTA. The new fareboxes also include a feature to allow the driver to keep track

of passengers who board with a bicycle, and passengers in wheelchairs. This capability is used to enable CAT to monitor demand and determine if they need to install shelters or other amenities at bus stops.

CAT is currently coordinating its Smart Media/AVL capabilities with JUANT, to help with seamless transfers between the two systems and allow for digital payments.

1.9.2. Real Time Arrival Information

CAT has also developed a real time web map and free mobile application to search for nearby bus stops and real-time arrival predictions. The CAT mobile application was developed in-house by the City of Charlottesville's IT Department and won a 2015 Governor's Technology Award. The application allows riders to locate where their bus is, bookmark favorite bus stops, and discover alternative route options. In addition, notifications for detours and service changes are regularly pushed out. As of 2017, UTS routes have been added to the application for UVA students, faculty, and staff to be able to use one app. for both transit systems.

1.10. DATA COLLECTION, RIDERSHIP AND REPORTING METHODOLOGY

Report data for Ridership is collected through CAT's Trapeze farebox system. In addition to fare information, the system also captures stop level data to determine bus stop utilization and inform service planning. Verification of ridership counts are done by Operations Supervisors by conducting spot checks, which include riding a route and taking a ridership count, which can then be compared against the report data from Trapeze.

The EZFare system from Trapeze transitioned CAT to a new automated fare collection system the reduced fraud as well as decreased the cost of fare collection.



Reported improvements included the ability to process 64,000 monthly University of Virginia ID transactions with a 0.006 percent failure rate.

CAT prepares a monthly ridership reports of transit operations, including ridership, revenue hours, passenger trips per revenue hour, and cost per passenger trip. The reporting further classifies routes as local, key, or lifeline services. Information is presented to the University, City Council and the Board of Supervisors.

1.11. COORDINATION WITH OTHER TRANSPORTATION SERVICE PROVIDERS

The City of Charlottesville and Albermarle County have collaborated on several route projects that have enabled the expansion of public transportation services to the residential and commercial growth areas in the urban ring surrounding the City. Expanding transit services to these areas has greatly enhanced the mobility of County residents and has afforded City residents mobility into these areas for employment, shopping, and recreational activities.

The Albermarle County Board of Supervisors and Charlottesville's City Council have agreed to create a partnership between the area's bus systems; one step toward a possible regional transit authority. The CA-MPO was charged by the Planning and Coordination Council (PACC) of the City, County, and University to prepare a Regional Transit Organizational study. The goal of the study is to review organizational, decision-making and formal communication options for the transit service organizations in the region and to explore partnership opportunities between CAT, JAUNT and UTS.

1.12. PUBLIC OUTREACH

The City of Charlottesville engages the public prior to the implementation of any CAT fare change or major service change in accordance with specific public

outreach procedures that comply with 49 USC Chapter 53, Section 5307 (d)(1)(I), and with FTA guidelines for small urban grant recipients. This process of identifying the magnitude of the service change, notifying the public, holding a City Council Meeting(s) and incorporating public comment into the service decisions was most recently and effectively engaged during the implementation of numerous service changes in 2014.

In 2009, CAT conducted a Transit Marketing Study to ascertain the effectiveness of its marketing, branding and communications programs. The study developed a profile of CAT's key ridership markets and a Marketing Plan that outlined a set of strategies to improve CAT's marketing. Stakeholder interviews revealed that CAT needed improvement in the areas of customer awareness, customer knowledge, and overall customer image of public transit in Charlottesville. CAT since has developed outreach materials and filmed/edited videos to help supplement increased awareness.

CAT conducted a transit customer service survey from March 26 – April 17, 2017. The survey gathered information both on rider profiles, trip purpose, general opinions on customer experience items and specific trip behavior questions related to recent service changes. Respondents indicated that the Free Trolley and Route 7 were the most heavily utilized. Most respondents did not have access to an automobile and a little over a third of respondents had a UVA ID card. Thus, the survey showed a mix of responses that reveal how transit provides a much-needed service to the local community while also providing transportation alternatives to UVA students and faculty. Additional cross-tabulation could further reveal correlations, such as if UVA affiliated riders where the predominant users of the mobile app. and if the route directness affects one group versus another.

CAT is also an active participant in the Tom Tom Founders Festival's 'City as Canvas' initiative. This annual event transforms public spaces through murals, public performance, art installations, and innovative collaborations with local organizations. An inaugural Art Bus, completed in 2015 by prolific Richmond muralist Mickael Broth, had 28,000 riders and reached an estimated 300,000 viewers. CAT has participated every year since and observed a lot of positive public engagement from each event.

Figure 9 | CAT Tom Tom Festival Art Bus



Page Intentionally Left Blank



Chapter 2

Transit System Overview: Charlottesville Area Transit



Page Intentionally Left Blank

2 Goals, Objectives and Service Design Standards

To facilitate review and assure sufficient coverage, the goals and objectives in this section have been categorized into six areas of activity for the public transit operator. These categories summarize the wide variety of goal/objective statements present in the relevant agency, municipal, and regional planning documents. Areas with limited coverage were targeted for enhanced goal/objective development during the TDP process. These categories are:



GROWTH / NEW OPPORTUNITIES (GO):

Objectives related to the expansion of service geographically or in terms of frequency, including development of new ridership markets, new connections with other service providers, or expanded facilities and fleet.



OPERATIONAL EXCELLENCE (OE):

Objectives that enhance the training and effectiveness of the workforce, address the monitoring and continual improvement of service delivery, and utilize studies or resources to support streamlined operations or project implementation.



COMMUNITY INTEGRATION (CI):

Objectives that further coordinate transit with economic development and local land use preferences and represent participation in studies or locally-based planning initiatives.

FINANCIAL ACCOUNTABILITY (FA):

Objectives that address efficiency of operations and cost recovery, as well as the pursuit of expanded or new revenue sources.



REGULATORY COMPLIANCE (RC):

Objectives that support meeting the agency's regulatory requirements. These should align with guidance and reporting requirements while establishing or exceeding any applicable performance metrics.



ENVIRONMENTAL STEWARDSHIP (ES):

Objectives that seek to reduce emissions via technology, promote travel alternatives other than driving alone, and reduce energy consumption at facilities.

The results of a review of relevant and recent planning documents that addressed transit goals, objectives, and service standards for the region are presented in the following sections.

2.1. PREVIOUS GOALS AND OBJECTIVES

The previous TDP for Charlottesville Area Transit (CAT) outlined regional and local goals and objectives that related to the provision of public transit. However, the plan did not specifically assign goals and objectives for CAT. As guidance, the previous TDP referenced the 2008 City Budget and P3 (Plan, Perform, Perfect) process, which identified four established goals pertinent to all departments of the City of Charlottesville government. These goals included:

1. Reliable and Safe Operations and Infrastructure
2. Planned Sustainable and Environmentally Sensitive Community
3. Great Place to Work
4. Efficient and Effective Service Delivery



Transit Development Plan

FY 2019 – FY 2028

The previous TDP noted that the initiative was still relatively new (2008) and that the various city departments were still working with the city on establishing performance measures or to further refine goals. At the time of publication, CAT was working with the City on goals one, three and four. The second goal, "Planned, Sustainable, and Environmentally Sensitive Community," had two performance measures relatable to CAT, namely:

Table 2-1 | City and County CAT-related Goals/Objectives

Goal/Objectives	Category	Status
GOAL #1 – Increase regional access to transit for regional travel and limit the use of non-renewable fuel for vehicles, specifically gasoline. (City of Charlottesville)		
Increase alternative fuel access, develop a plan to replace City vehicles with vehicles that are more environmentally friendly.	ES	One-time
Actively participate in the establishment of a Regional Transit Partnership and encourage bicycle, pedestrian and transit connections (including attention paid to Sunday and night service) between the County and City.	CI, GO	Ongoing
Cooperate with the County in exploring express bus lanes and other transit	GO	One-time

Passenger Trips (or passengers) per Gallon of Fuel (PPG) and Overall Passenger Trips.

At publication time of the previous TDP, the City of Charlottesville and Albemarle County had preexisting transit-related goals and objectives in their respective comprehensive plans. CAT-specific, measurable goals and objectives, summarized at the conclusion of the previous TDP, are listed in Table 2-1 alongside activity area categories and the status of each initiative.

improvements north of the City.		
Continue to expand transit service and increase ridership.	GO	Ongoing
GOAL #2 - Implement County related recommendations of the Charlottesville Transit Development Plan and participate in its update which occurs every five years. (Albemarle County)		
Identify methods of funding transit services and develop a funding structure/program to support transit in the County.	FA	Ongoing
Expand transit service in the Urban Area, and to the Hollymead, Cedar Hill Mobile Estates and Piney Mountain Communities.	GO	Ongoing
Utilize the Transit Development Plan and other studies to assist in determining the location and timing for the	OE	Ongoing

provision of transit services.

Consider expansion of service hours to include nights and weekends on appropriate routes to improve ridership and service.	GO	Ongoing
--	----	---------

2.2. ALIGNMENT WITH REGIONAL GOALS/REGULATIONS (STATE, FEDERAL)

This section reviews the alignment of the previous goals and objectives developed for CAT with relevant transit/transportation goals for the region, including those developed by localities within the service area. This TDP update will afford the opportunity to further incorporate and/or strengthen CAT goals, objectives,

Table 2-2 | LRTP 2045 - Public Transit Goals / Objectives

Goal/Objectives	Category	Status
Improve access to transit for all users. Ensure the diverse needs of a changing population are met (elderly, disabled, limited English proficiency, and persons lacking access to private vehicles).	GO, CI	Ongoing
Continue to support efforts to enhance access to intra-regional transit services, to include bus, rail, and air services.	GO, CI	Ongoing

and service standards to align with the strategic planning elements of these adopted plans, especially those adopted since the last major TDP update. The new Regional Transit Partnership (RTP), established in 2017, will also assist CAT with its stated purpose: to “allow local officials and transit staff to work together with other stakeholders to craft regional transit goals.”

Charlottesville/Albemarle MPO DRAFT 2045 Long Range Transportation Plan (LRTP) (2017): The 2045 LRTP outlines the region’s long-range transportation vision and lists all future projects anticipated in the region over the next 20 to 30 years to attain that vision. The existing LRTP 2040 Plan was adopted in 2009. In May 2017, the CA-MPO kicked off the update process for this plan. Draft goals and objectives were developed in July 2017. The draft goals and objectives that relate to public transit – alongside activity area categories and statuses – are listed below:

Goal/Objectives	Category	Status
Incorporate environmentally/context-sensitive design into roadway, bicycle/ pedestrian facilities and transit improvements.	ES	Ongoing

City of Charlottesville Strategic Plan (FY 2018-20): This city-wide planning effort has identified two goals, three strategic plan objectives, and seven performance measures for CAT, which include:



Table 2-3 | City of Charlottesville Strategic Plan - CAT Goals / Objectives

Objectives	Category	Performance Metrics
GOAL #3: A Beautiful and Sustainable Natural and Built Environment		
Provide a variety of transportation and mobility options	OE, GO	<ul style="list-style-type: none"> CAT passenger satisfaction; Ridership trends: total CAT unlinked passenger trips; Total revenue service hours; and Total revenue service miles.
Be responsible stewards of natural resources	ES	<ul style="list-style-type: none"> Unlinked passenger trips per revenue service hour; and Unlinked passenger trips per revenue service mile.
GOAL #5: A Well-Managed and Responsive Organization		
Provide responsive customer service	OE	<ul style="list-style-type: none"> CAT driver courtesy

Federal Transit Administration Rulemaking (2016): In August, 2016, FTA published a final rule for the Public Transportation Safety Program, which provides the overall framework for FTA to monitor,

oversee, and enforce safety in the public transportation industry. This builds upon implementing a Safety Program that is both scalable and flexible through the application of Safety Management System (SMS) principles. SMS builds on existing transit safety practices by using data to proactively identify, avoid, and mitigate risks to safety.

Just prior to this rulemaking, in July 2016, the FTA published a Final Rule for Transit Asset Management (TAM). The rule requires FTA grantees to develop asset management plans for their public transportation assets, including vehicles, facilities, equipment, and other infrastructure. FTA's national Transit Asset Management System Rule:

- Defines "state of good repair";
- Requires grantees to develop a TAM plan;
- Establishes performance measures;
- Establishes annual reporting requirements to the National Transit Database; and
- Requires FTA to provide technical assistance.

These federal rules also inform DRPT updates of TDP guidance and performance-based monitoring of transit grantees throughout the Commonwealth.

Albemarle County Comprehensive Plan (2015): This plan emphasizes the priorities and importance of key areas to the County and provides guidance on how stated strategies can work to achieve objectives and goals. The plan's Transportation Goal states that: "Albemarle's transportation network will be increasingly multimodal, environmentally sound, well maintained, safe and reliable." Specific transit objectives are listed below alongside activity area categories and statuses.

Table 2-4 | Albemarle County Comprehensive Plan - Public Transit Goals / Objectives

Objective	Category	Status
Continue to use planning studies to determine the location and timing for the provision of transit services.	OE	Ongoing
Continue to provide public transit service hours at night and on weekends on appropriate routes to improve ridership and service. Continue to provide service to the Rio Road area.	OE	Ongoing
Expand transit service to the Hollymead Development Area, airport, Cedar Hill Mobile Home Park, south of I-64 on Avon Street Extended, and Route 250 West.	GO	Ongoing
Continue to recognize JAUNT as the primary public transportation provider for rural Albemarle County.	CI	Ongoing
Participate in the formation of a Regional Transit Partnership.	CI	Ongoing
Increase and expand transit network efficiency and use throughout the region.	OE, GO	Ongoing

Objective	Category	Status
Continue to provide and enhance rural transit opportunities for elderly and disabled residents.	GO, CI	Ongoing

City of Charlottesville Comprehensive Plan (2013):

This plan provides a vision for the City of Charlottesville's transportation network, noting that it provides the fundamental framework for creating a safe, livable community while reinforcing more sustainable land use patterns. It further notes that the transportation system should be designed for everyone, whether young or old, motorist or bicyclist, walker or wheelchair user, bus rider or shopkeeper. The plan sees a multimodal transportation network as an effective, flexible framework for building community and creating places in the City. The transit section goal is to: "Create a transit system that increases local and regional mobility and provides a reliable and efficient alternative for Charlottesville's citizens." A total of 10 objectives to support this goal are listed below alongside activity area categories and statuses.

Table 2-5 | City of Charlottesville Comprehensive Plan - Public Transit Goals / Objectives

Objective	Category	Status
Continue to expand transit service and increase ridership.	GO	Ongoing
Evaluate transit services: including Sunday and after-dark bus service and route restructuring.	GO	Ongoing



Objective	Category	Status
Continue to work with Albemarle County and the TJPDC to develop a transit system that adequately serves residents. This includes the continued study of light rail and Bus Rapid Transit (BRT).	GO, CI	Ongoing
Work closely with state government, regional organizations and adjacent jurisdictions to support transit-oriented and transit-accessible employment.	CI	Ongoing
Accommodate the travel needs of all residents and employees, including low-income populations, the elderly and those with disabilities.	CI	Ongoing
Encourage the development of transit-oriented/ supportive developments.	CI	Ongoing
Explore the development of a dedicated funding source for future transit needs.	FA	Ongoing
Work closely with new developments to provide an accessible path from nearby transit stops to the building.	CI	Ongoing

Objective	Category	Status
Evaluate the use of Intelligent Transportation System (ITS)/transit signal priority to promote transit efficiency.	OE	Ongoing
Explore innovative approaches to increasing ridership of public transit, especially for first time riders.	OE	Ongoing

An update for this plan will occur in 2018.

Charlottesville Transit Study (2013): The primary goal of this study was to determine how CAT services should be organized to be most effective for Charlottesville residents and visitors. The study followed the completion of the last TDP to address community discussions regarding whether more significant changes should be made. The City Council ultimately desired an evaluation of more significant alterations, commissioning the study to examine far-reaching system changes. Additionally, as part of this effort, a stand-alone set of Service Guidelines was created. CAT noted in annual update letters to DRPT that this study replaced the goals and objectives for the FY2012 – FY 2017 TDP period.

The broad study goals were listed as:

- Make the service easier to use;
- Make the service faster and more direct;
- Make the service easier to understand;
- Make the service more convenient; and
- Better match service to demand.

The study's seven objectives, are listed below alongside activity area categories and initiative statuses.

Table 2-6 | Charlottesville Transit Study (2013) Goals / Objectives

Objective	Category	Status
Operate service consistently throughout the day.	OE	Ongoing
Improve reliability and directness.	OE	Ongoing
Consolidate duplicative services.	OE	Ongoing
Expand service to new areas.	GO	Ongoing
Adjust service frequencies and spans to match demand.	OE	Ongoing
Develop a new transfer hub at UVA Hospital.	OE, CI	One-time COMPLETED

2.3. RATIONALE FOR CHANGE

Upon review of additional plans and studies, it was determined that CAT may benefit from additional diversity in its goals and objectives. As a result of the 2013 Transit Study, CAT has primarily reported its progress in terms of operational excellence goals and objectives. Areas such as Financial Accountability, Regulatory Compliance, and Environmental Stewardship, currently receive less attention. In addition, in CAT-established materials or other plan documents, CAT lacks specific Organizational Excellence goals or objectives related to system safety and security.

Changes in the Federal and State regulations can also be incorporated in CAT goals and objectives through this TDP update. While the City has established some performance objectives for CAT since the last TDP, there is now an opportunity to further modify or add CAT performance objectives to include the newest State and Federal regulations. For example, the CAT goals, objectives, and standards could explicitly

address the principles of maintaining their Transit Asset Management (TAM) standards to demonstrate compliance.

This TDP update effort seeks to consolidate and repackage goals and objectives to allow for targeted measures, strategies, and timelines, and to show continued success or progress toward desired results. In this reorganization, service standards are now directly associated with an objective to provide the measurable target that is proposed. These goals and objectives were developed with input from CAT and in consideration of the results of the agency-led stakeholder outreach as part of the TDP update process.

Certain elements are outside CAT's ability to control or influence. While CAT can accomplish most of goals and objectives in this TDP update without dependence on outside actors, any goals or objectives that may require assistance, approval, or coordination are indicated as such.

2.4. NEW GOALS AND OBJECTIVES

While goals generally define a longer-term purpose toward which an endeavor is directed, objectives provide additional details, or targets for how the goal will be achieved and in what intermediate timeframe. The goals and objectives presented in this chapter represent an iterative process with CAT staff in balancing operations objectives representing near-term, relatively low-cost strategies that provide immediate improvements to the transportation system and longer-term improvement objectives that may require time to fully achieve. Goals and objectives are revisited on an annual basis, and historically have a strong emphasis on the implementation and status of projects to advance outcomes.

New goals and objectives that incorporate agency, regional, and state priorities were developed. This



section provides examples of potential measures, desired targets, and strategies for reaching and maintaining targets in a timely fashion. Additional detail is provided on potential sources of data or technology necessary to facilitate the measurements. Measures have been selected that best reflect CAT's unique operating environment. For example, the new goals and objectives preserve an emphasis on organizational excellence that CAT wishes to

maintain. In one case, an operational need to contain costs and maintain efficient maintenance outweighs a regional emphasis on the environmental policies such as alternatively-fueled vehicles. Additionally, many measures presented relate directly to the service design standards found in the next section. Goals and objectives, coupled with specific measures, targets, and strategies, are listed below.

GOAL #1 – Monitor and adjust service to improve efficiency, customer convenience, and system reliability/safety.			
Measure	Target	Strategy	Data Sources
Objective 1.1: Continue to employ service evaluation guidelines in the regular assessment of the performance of all routes. (FA, OE)			
System metrics compiled for passengers per hour, passengers per mile, fare revenue to operating expense ratio, and passenger miles divided by platform miles.	Conduct service adjustments for the system should metrics drop below 95% of rolling historic average to include the last three years.	Collect for each category of route (Local, Key, Lifeline) and incorporate as part of monthly reporting, with no less than annual implementation of coordinated service adjustments.	Operations logs, financial data
Objective 1.2: Monitor and improve safety on transit service and with facilities. (OE)			
Preventable bus accident rate per 100,000 vehicle miles.	Less than 1 per 100,000 miles.	Establish/maintain driver safety recognition program, conduct refresher training for routes/operators as needed.	Operations logs
Total safety incidents per 100,000 boardings.	Less than 0.7 per 100,000 boardings.	Identify locations or practices disproportionately contributing to incidents and target awareness campaigns or physical improvements.	
Objective 1.3: Provide appropriate amenities in response to service demand. (GO)			

Percent of stops with shelters that exceed service standards for such amenities.	50 percent of stops with over 50 boardings (within City of Charlottesville) have a shelter; 50 percent of stops with over 35 boardings (outside the City) have a shelter.	Monitor and identify locations where additional investment is needed. Proactively engage partners as needed to accommodate upgrades.	Manual counting/field inspections, bus stop/facility database
Objective 1.4: Seek continual improvements to overall network design to promote schedule consistency, improve directness of routes, reduce necessity for transfers, and minimize duplicative services. (OE)			
Percent of city population within one-quarter mile of higher frequency (30 minutes or less) service at least four hours during weekday span.	70 percent of the city's population.	Conduct GIS analysis and network redesign as needed to balance access with higher quality (speed/directness).	Census/City demographic data, route mapping, operations logs
Routes per street segment.	No more than one route on the same street when serving common destinations, except for approaches to the Downtown Transit Station, other urban/transit centers, or park and ride facilities.	Consider route consolidation/frequency adjustments where applicable.	

GOAL #2 – Strengthen/pursue regional partnerships to improve access to existing services and plan future enhancements.

Measure	Target	Strategy	Data Sources
Objective 2.1: Collaborate on efforts that advance regional transit planning and regional initiatives. (CI)			
Participation in coordination studies.	Identify one coordination pilot project per year.	Develop new/more efficient service delivery options collaboratively.	RTP reporting, in-house data
Objective 2.2: Preserve accessibility and service coverage to population areas/ridership markets with heightened need for essential transit service. (OE)			
Percent of service hours/miles by route category.	Provide a minimum of 30 percent of service (hours/miles) as Lifeline designated routes.	Pursue in conjunction with Objective 1.4 to assure a balance between productivity enhancements and preserving system coverage.	GIS analysis, route mapping, operations logs/summary reporting

GOAL #3 – Be a good steward of financial resources and demonstrate accountability.			
Measure	Target	Strategy	Data Sources
Objective 3.1: Contain operating costs by monitoring and adjusting system performance while exploring cost savings measures. (FA)			
Operating expense growth (non-fuel).	Overall costs not to exceed four percent growth per year.	Monitor cost trends, adjust service accordingly to maintain budgetary constraints.	Financial data, CAD/AVL system, operations logs
Operating expense per revenue hour/revenue mile.	Below VA average for all NTD reporting agencies.	Compare with statewide NTD reporting.	
Objective 3.2: Maximize and preserve the existing transit system. (OE)			
State of Good Repair backlog as a percentage of overall budget.	No more than 10 percent of annual budget.	Track items needing attention as indicated in TAM database/reporting.	Maintenance logs, TAM reporting, fleet inventory
Miles between service road calls.	6,500 miles.	Maintain preventative maintenance schedules.	
Percent of fleet exceeding lifespan (years/miles).	No more than 20 percent of fleet.	CAT conducts vehicle condition assessments per TAM plan. Adherence to FTA Useful Life Benchmarks (ULB) for vehicle classifications.	
Missed trips due to operational failures.	98 percent or more of all scheduled trips operated. 98 percent of all pull outs dispatched.	Reconcile schedule data with operating data/dispatch logs monthly.	

GOAL #4 – Continue the use of innovation and technology to enhance the customer experience and encourage a favorable perception of transit.			
Measure	Target	Strategy	Data Sources
Objective 4.1: Provide more comfortable, more efficient, and safer operation to include a focus on security, cleanliness, and efficient customer service. (OE)			
Number of customer complaints per 100,000 boardings by mode.	Less than 20 verified customer complaints.	Continued quality control for vehicle cleanliness, monitoring and correction of any recurring scheduling issues (see Objective 1.4).	In-house documentation/survey, CAD/AVL system, NTD reporting

On-time performance.	Greater than 90 percent.	Monitor and adjust schedules as needed.	
Average number of monthly systemwide NTD Reportable Crimes.	Less than one.	Adherence to a consolidated System Security Program.	
Objective 4.2: Improve communication with customers via technology applications, website enhancements, social media presence and call center information dissemination. (OE)			
Uptime of website, smartphone applications. Call center wait time.	99.9 percent website uptime. Call wait time of 30 seconds.	Monitor applications, refresh content of website daily, push out service alerts. Monitor call logs for JAUNT provided ADA service.	Telephony logs, in-house documentation
Objective 4.3: Demonstrate energy efficiency and positive environmental impacts. (ES)			
Ratio of vehicle miles / total fuel consumption (gallons).	No net decrease from previous year.	Monitor annually, investigate fuel conservation practices to achieve overall fleet fuel efficiency.	Manual counting, financial data, maintenance logs, fleet data

2.5. SERVICE DESIGN STANDARDS

Service design standards are critical planning tools to evaluate the effectiveness of existing service and to assure impartiality in service modification decisions. Service standards are typically developed in several categories of service, such as service coverage, passenger convenience, fiscal condition, and passenger comfort. The most effective service standards are straightforward and relatively easy to calculate and understand. Service standards reinforce the performance measurement necessary to meet many of CAT's objectives.

Guidance for setting service/performance standards was provided in the previous CAT TDP. The service design philosophy reflected the Regional Transit Authority (RTA) Plan conducted in 2008. The RTA Plan suggested performance standards that focused on the following categories:

- **Service Coverage** – includes measures that address service availability, service frequency and span of service;
- **Patronage Convenience** – includes measures that address bus operating speeds, bus load factors, bus stop spacing, service dependability (on-time performance, missed trips), and accident ratio;
- **Fiscal Condition** – includes measures that address farebox recovery ratios, service productivity measures (passenger trips per bus-hour), and average fleet age; and
- **Passenger Comfort** – includes measures that address number of passenger shelters, bus stop signage, revenue equipment features and condition, and public information features.

CAT's service design standards have also been informed by the 2013 Transit Study, the City of Charlottesville's P3 Strategic Initiatives, historical



Transit Development Plan

FY 2019 – FY 2028

agency guidelines, published industry best practices, and application of professional knowledge and judgment.

The initial CAT service design guidelines in place at the beginning of this TDP update have been listed in **Table 2-7**. The status column of this table indicates if

these initial standards are to be maintained or modified. Modifications are underlined to identify any proposed changes. Any newly proposed standards developed during this TDP update have been included in this table and identified as “new” in the status column. Each measurable service standard is also associated with the most relevant objective.

Table 2-7 | Proposed Service Standards

SERVICE STANDARD	Status	Objective
Span of Service		
<ul style="list-style-type: none"> Core Service: 6:00 AM – 6:00 PM (Core service) Select Routes: 6:00 PM-11:00 PM (no less than 60 min. headway) 	Maintain	1.1
Frequency of Service		
<ul style="list-style-type: none"> Local Routes – 30 min. peak, 60 min. off-peak Key Routes – 20 min. peak, 30 min. off peak Lifeline Routes – Not to exceed 60 min. 	New	1.1
Bus Stop Spacing		
<ul style="list-style-type: none"> Local Routes – 800-1,000 feet Key Routes – 1,000-1,300 feet Lifeline Routes – 1,000-1,300 feet 	Maintain	1.3
Route Directness		
<u>Deviations from a direct path from end-to-end of the route shall account for no more than one-quarter of the end-to-end travel time of the route.</u>	Modified	1.4
Total Route Travel Time		
Maximum of 60 min. one-way	Maintain	1.4
Bus Stop Amenities		
Bus stops with more than 50 passengers boarding daily should have a bus shelter within the City of Charlottesville.	Maintain	1.3
Bus stops with more than 35 passengers boarding outside the City of Charlottesville should <u>be explored for inclusion of</u> a bus shelter.	Modified	1.3
Load Factor		
The loading standard should be a maximum average load factor of <u>1.2</u> (ratio of total passengers to seated passengers) <u>during the weekday peak periods, and 1.0 at all other time periods.</u>	Modified	1.1
Dependability		
<u>90%</u> on-time service (0 to 5 minutes late) -- No trips leaving early.	Modified	1.1
Maintain fewer than 6,500 miles between service road calls.	New	3.2
Less than five percent missed trips due to operational failures.	New	3.2
No more than 10 percent of fleet exceeding the FTA ULB for its vehicle classification.	New	3.2

SERVICE STANDARD	Status	Objective
Farebox Recovery		
<ul style="list-style-type: none"> Review and modify, if possible, services that exhibit less than 60 percent of average. Review and modify, if warranted, services between 60 percent and 80 percent of average. 	New	1.1
Productivity (Passengers per Revenue Hour/Mile)		
<ul style="list-style-type: none"> Review and modify, if possible, services that exhibit less than 60 percent of average of route type. Review and modify, if warranted, services between 60 percent and 80 percent of average of route type. 	New	1.1
Cost Effectiveness (Cost per Revenue Hour/Mile)		
Review and modify, if possible, services that exhibit less than 60 percent of route type average.	New	1.1
Safety		
0.10 or fewer "reportable incidents" per 100,000 miles, as defined by the National Transit Database.	New	1.2
Customer Service		
Less than 20 customer complaints per 100,000 trips.	New	4.1
Maximum reservation wait time less than 30 seconds (ADA).	New	4.1
Fleet Age (Fixed Route)		
No more than 20 percent of fleet in excess of the FTA Useful Life Benchmarks (ULB) for the vehicle classification.	New	3.2

2.6. MEASURING PERFORMANCE

This section provides additional details on the definition and measurement approaches for some of the service standards presented in Table 2-2. These approaches should be monitored on a recurring basis with adjustments made to avoid any excessively cumbersome data collection and/or measurement practices. Where possible, the agency will leverage technology (operations, maintenance, or financial systems) to streamline measurements. The measurement methodology should be documented in agency policies and procedures and the results should be reported at least quarterly, unless otherwise noted.

Dependability

The system should be resilient to impacts caused by accidents, breakdowns, traffic delays, driver/vehicle availability, and other factors that could cause a scheduled trip to be missed. Service should also not be curtailed due to the unavailability of either a driver or a vehicle upon initial pull out from the garage or home location for a scheduled pick up. A final component to system reliability is the average distance in service miles between when all vehicles in revenue service incur component failures that prevent starting or finishing a run.

Measurement Approach

- Logs shall be maintained and updated daily to accurately reflect vehicle status at the start of the trip. Vehicles unable to begin their



assigned trip or that require an additional vehicle to be dispatched due to operability shall be reported as a missed trip.

- An operations/maintenance log shall be maintained to record all service failures of a vehicle in revenue service. This measurement can be calculated each month by dividing the number of revenue miles operated by the number of road calls.

Passengers Per Revenue Hour

The minimum level of ridership a category of service should attract is expressed as the average number of passengers for each hour of revenue service provided. This measure is an industrywide standard used to assess overall performance and route efficiency. While current CAT guidelines base route-level performance on established percentages of the system average, the use of specific passengers per hour targets for each route category is advised.

Measurement Approach

- Look at historic CAT system trends by route category in conjunction with financial data to establish appropriate benchmarks of productivity considering expected financial outcomes of operating that route (ridership vs. coverage). A conservative target starting point can be 80 percent of the historic average to identify the need for potential service adjustments.

Safety

The National Transit Database (NTD) defines a reportable incident as one in which one or more of the following conditions applies: 1) A fatality; 2) Injuries requiring medical attention away from the scene for one or more persons; or 3) Property damage equal to or exceeding \$25,000.

Measurement Approach

- CAT should maintain and review quarterly safety logs of all incidents and report this

information to NTD. As necessary, CAT should use additional incident forms to record whether incidents were preventable, caused by other drivers, or caused by outside influences. For preventable incidents, the measurement should also identify operators who may need additional training following one or more occurrences.

Route Directness

Circuitous transit routings can lengthen travel times and decrease the attractiveness of transit as compared to automobile travel. Transit travel times should be no more than 20-25 percent longer than comparable trips by automobile. Generally, bus routes should not serve off-route stops where a substantial number of through riders would be delayed. Service should be provided in both directions on the same street wherever possible to maximize customer convenience and service effectiveness. One-way routes, loops, and "snakes" should be avoided when designing bus routes except where required by street configurations or route terminals, since they increase travel times for through riders.

Measurement Approach

- Use either straight distance vs. route distance between two destinations (using Goggle mapping and one-way route miles) or use automobile travel times (via Google Maps) in comparison with scheduled transit times.
- More complicated calculations are possible to determine if the stop boardings at circuitous deviations are worth the inconvenience to through passengers. For CAT, this approach applies primarily to the key routes. Industry practice states that the total additional travel time for all through passengers should not exceed three minutes for each rider boarding or alighting along the deviation. The calculation is:

*Through Passengers. * Additional One-way
Travel Time Boarding Passengers*

Load Factor

Load standards are thresholds of the ratio of passengers on board to seats available. A fully seated passenger load would have a load factor of 1.0. Other considerations include the timing of maximum load and allowing for higher loads at peak periods. Also, CAT and other properties have historically considered the overall length of time the bus operates above a

1.0 load factor, with a desire to limit the maximum time a passenger may be left standing.

Measurement Approach

On-board surveys can be conducted in conjunction with NTD sampling. Passenger counters can help target the most crowd-prone times/routes, but observation is also required to determine length of individual standees and other issues that come from excessive loads (such as increased dwell times or pass bys,).



Page Intentionally Left Blank



Chapter 3

Service and System Evaluation



Page Intentionally Left Blank

3 Service and System Evaluation

3.1. SERVICE OVERVIEW

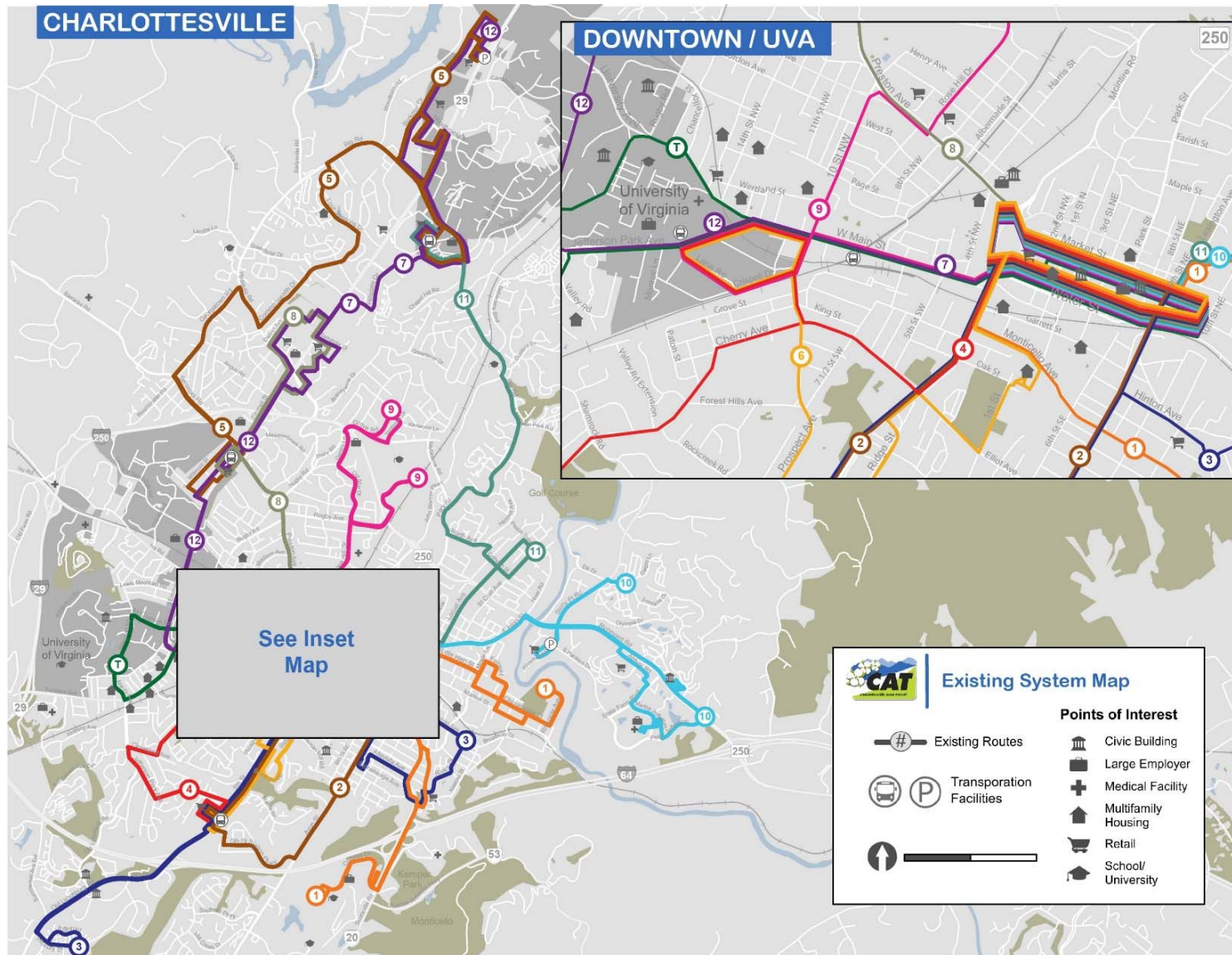
As described in Chapter 1, CAT provides fixed-route transit service in Charlottesville and parts of the urban ring of Albemarle County. According to the 2015 National Transit Database (the most recent year for which data is available), the CAT serves a service area is 38 square miles, with a population of 87,755 residents. The population density of the service area is 2,673 residents per square mile.

3.1.1. Fixed Route Service

Figure 10 Error! Reference source not found. shows the current CAT system map. The current network consists of 13 fixed-routes, including 12 routes requiring a fare and one free trolley connecting the Downtown area and UVA campus.



Figure 10 | CAT System Map



Half of the 12 weekday routes operate past 11:00 PM.

Headways across the service day range from 15 to 70 minutes. During peak periods, Route 7, Route 4, and the free Trolley provided 23, 20, and 15-minute service frequency, respectively. Four routes provide 30-minute peak-period frequency and four others operate hourly. At 70-minutes, Route 9 is the only route to provide less-than-hourly service frequency during peak periods.

During off-peak periods, Route 9 and Route 4 both operate every 70 minutes. Six routes operate hourly in the off-peak, and two provide 30-minute service. Routes 7 and the Trolley continue to provide 20 and 15-minute service frequency (respectively) during the off-peak.

Table 3-1 summarizes the weekday level of service provided on each CAT route. All weekday service

begins in the 6:00 AM hour, with a variety of end times ranging from just before 7:00 PM to just after midnight. Half of the 12 weekday routes operate past 11:00 PM.

Headways across the service day range from 15 to 70 minutes. During peak periods, Route 7, Route 4, and the free Trolley provided 23, 20, and 15-minute service frequency, respectively. Four routes provide 30-minute peak-period frequency and four others operate hourly. At 70-minutes, Route 9 is the only route to provide less-than-hourly service frequency during peak periods.

During off-peak periods, Route 9 and Route 4 both operate every 70 minutes. Six routes operate hourly in the off-peak, and two provide 30-minute service. Routes 7 and the Trolley continue to provide 20 and 15-minute service frequency (respectively) during the off-peak.

Table 3-1 | Weekday Level of Service

Route	Trips	Span	Headway (Minutes)					
			Early	AM Peak	Midday	PM Peak	Evening	Late Night
1	17	6:15 AM-10:05 PM	--	60	60	60	60	--
2	35	6:35 AM-11:42 PM	--	30	30	30	30	30
3	25	6:00 AM-11:45 PM	--	30	60	30	60	60
4	31	6:25 AM-12:03 AM	--	23	70	23	70	70
5	51	6:15 AM-11:00 PM	--	30	30	30	30	--
6	18	6:30 AM-12:00 AM	--	60	60	60	60	60
7	55	6:30 AM-11:15 PM	--	20	20	20	30	--
8	19	6:30 AM-6:57 PM	--	30	60	30	--	--
9	12	6:00 AM-11:00 PM	--	70	70	70	70	--
10	17	6:30 AM-11:27 PM	--	60	60	60	60	60
11	16	6:00 AM-9:27 PM	--	60	60	60	60	--
12	Sunday Service Only							
Trolley	36	6:35 AM-11:30 PM	--	15	15	15	15	15



Error! Reference source not found. summarizes Saturday and Sunday service levels for CAT routes. With the exception of Route 1, all weekday routes operate on Saturdays as well. Only Routes 2, 9, 12, and the Trolley provide Sunday service.

Saturday service is generally similar in span and frequency to weekday service, beginning as early as

6:00 AM and ending as late as just after midnight. Saturday service frequency ranges from 15 minutes to 70 minutes. Sunday service begins as early as 7:35 AM and ends as late as 5:47 PM. Frequencies on Sunday range from every 25 to every 70 minutes

Table 3-2 | Weekend Level of Service

Route	Trips	Span		Base Headway (minutes)	
		Saturday	Sunday	Saturday	Sunday
1	Weekday Service Only				
2	55	6:35 AM-11:42 PM	7:35 AM-5:42 PM	30	30
3	18	6:00 AM-11:45 PM	--	60	--
4	17	6:25 AM-12:03 AM	--	70	--
5	51	6:15 AM-11:00 PM	--	30	--
6	18	6:30 AM-12:00 AM	--	60	--
7	55	6:30 AM-11:15 PM	--	20	--
8	12	6:30 AM-6:57 PM	--	60	--
9 ¹	12	6:00 AM-11:00 PM	10:40 AM-5:40 PM	70	70
10	17	6:30 AM-11:27 PM	--	60	--
11	11	6:00 AM-9:27 PM	--	60	--
12	10	--	7:45 AM-5:45 PM	--	60
Trolley	53	6:35 AM-11:30 PM	8:00 AM-5:47 PM	15	25

Operating Statistics

Vehicle Fleet

As discussed in **Chapter 1**, CAT's fleet of transit vehicles consists of 36 vehicles, including 17 35-foot coaches, 11 30-foot coaches, four 26-foot coaches, three 35-foot replica trolleys, and one 30-foot replica trolley.

Six CAT routes require just one vehicle during peak-period service; three require two vehicles. Route 5 requires three vehicles to provide 30-minute service

and Route 7 requires five vehicles for 20-minute service. Overall, CAT requires 23 vehicles during peak-period operations. **Table 3-3** lists the number of peak vehicles required on weekdays for each CAT route.

Table 3-3 | Weekday Peak Vehicle Requirement

Route	Peak Vehicle Requirement
1	1
2	1
3	2

¹ Route 9 began providing revenue service on Sundays as of August 5, 2017. At the time of publication, Sunday operating statistics were not available for this route.

Route	Peak Vehicle Requirement
4	2
5	3
6	1
7	5
8	2
9	1
10	1
11	1
12	N/A
Trolley	3
System Total	23

Operating Costs

In FY2017, CAT expended \$7.5 million to operate fixed-route service. On weekdays and Saturdays, Route 7 and the Trolley (CAT's most frequent routes) are the most expensive services to operate. CAT reports that Routes 2 and 9, which each require just one vehicle are the least expensive services to operate. On Sundays, Routes 12 and 2 are respectively the most and least expensive services to operate. **Table 3-4** summarizes annual operating expenses by route and day type.

Table 3-4 | Annual Operating Cost

Route	Annual Operating Cost		
	Weekday	Saturday	Sunday
1	\$283,026	N/A	N/A
2	\$231,407	\$45,562	\$28,126
3	\$424,152	\$64,116	N/A
4	\$530,190	\$64,116	N/A
5	\$866,364	\$174,564	N/A
6	\$318,114	\$64,116	N/A
7	\$1,414,098	\$303,732	N/A

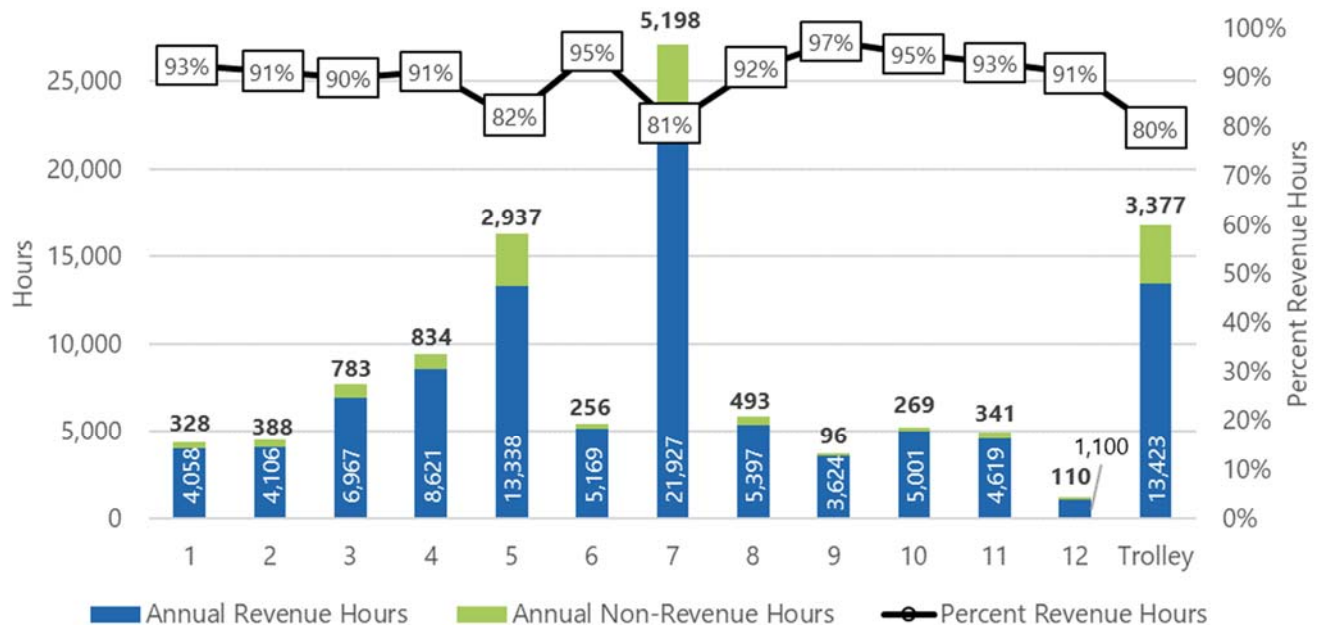
Route	Annual Operating Cost		
	Weekday	Saturday	Sunday
8	\$335,916	\$42,744	N/A
9	\$212,076	\$42,744	Not Available
10	\$300,570	\$60,580	N/A
11	\$273,996	\$40,976	N/A
12	N/A	N/A	\$79,145
Trolley	\$1,069,410	\$215,540	\$52,745
System Total	\$6,259,319	\$1,118,790	\$160,016

Revenue and Non-Revenue Hours

A vehicle is considered in revenue service when operating on a route and available to passenger. Non-revenue service generally refers to buses traveling to or from a garage without passengers. To save valuable funds and provide efficient service, agencies try to maximize time and miles spent in revenue service.

In FY2017, CAT logged over 92,000 total vehicle hours, approximately 86 percent of which were attributed to revenue service. **Figure 11** shows annual total vehicle revenue and non-revenue hours, as well as the percentage of vehicle hours operated in revenue service. Route 7 operates the greatest number of revenue hours per year, but also has the greatest number on non-revenue hours. This is most directly a function of the number of vehicles operating on the route, as each vehicle brings with it a number of non-revenue hours associated with daily travel to and from the CAT garage before and after revenue service.

Figure 11 | Annual Revenue and Non-Revenue Hours

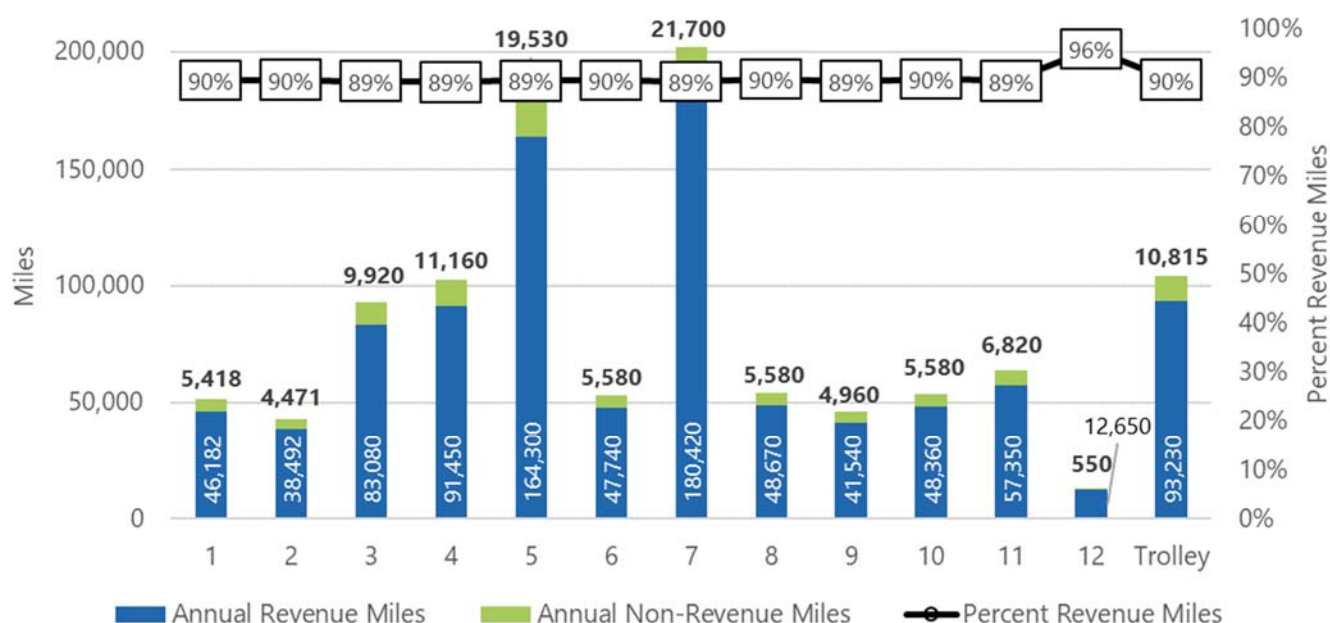


Revenue and Non-Revenue Miles

In FY2017, CAT logged over 878,000 total vehicle miles, approximately 89 percent of which were attributed to revenue service. Error! Reference source not found. **Figure 12** shows total annual revenue and non-revenue miles along with the percentage of annual miles operated in revenue service. For all CAT routes, the percentage of miles spent in revenue service hovers around 89 to 90 percent, reaching a

high of 96 percent on Route 12, which also operates the fewest total number of revenue miles. As with revenue hours, Route 7 ranks highest in terms of total revenue miles. Route 5 and the Trolley respectively rank second and third in total revenue miles.

Figure 12 | Annual Revenue and Non-Revenue Miles



3.1.2. Paratransit Service

CAT's ADA-mandated complementary paratransit service is provided by Jefferson Area United Transportation (JAUNT) through a pass-through funding arrangement. The paratransit service is available to qualified individuals who are unable to access fixed CAT fixed-route service due to physical or cognitive disabilities. Paratransit service is available within a ¾-mile buffer of each fixed-route, and fares are \$1.50 for each one-way trip.

JAUNT ADA paratransit service is available from 6:30 AM to 12:00 AM Mondays through Saturdays and from 9:00 AM to 5:00 PM on Sundays (with Sunday service restricted to areas served by the Trolley and Route 7). During Fiscal Year 2017, JAUNT provided 143,061 total ADA paratransit trips, accounting for 52,410 revenue hours.

3.2. SYSTEM ANALYSIS

In the following system analysis, weekday ridership and service productivity data is derived from data collected during the week of September 11, 2017.

3.2.1. Ridership

Annual Ridership

In FY2017, CAT provided 2,189,612 total unlinked passenger trips. **Figure 13** summarizes annual ridership by route and by service day type. Overall, the free Trolley carried the most passengers, with 737,714 unlinked trips for the year. Route 7 was second with 582,307 total riders in FY2017. The lowest annual ridership was recorded on Route 12, which recorded 16,073 unlinked trips for the year.

Average Daily Ridership

On average, CAT carried over 8,100 riders on a typical weekday in FY2017. Typical Saturdays saw over 4,600 trips, and nearly 1,300 passengers rode CAT routes on a typical Sunday.

The free Trolley transports the greatest number of passengers (2,838) on an average weekday; Route 7 ranks second with 2,187 passenger trips. With just 126 weekday passenger trips, Route 9 carries the fewest average weekday riders. **Figure 14** shows that Saturday ridership rankings are similar to weekdays, but with lower total volumes. Of the routes that

operate on Sundays, the Trolley has the highest daily ridership (707 passenger trips), and Route 9 has the lowest (18 passenger trips).

Ridership by Trip

On average, CAT carries over 11.5 riders per trip on weekdays, 7.8 riders per Saturdays, and 14.9 riders per trip on Sundays, during which only four routes operate. On weekdays and Saturdays, the free Trolley attracts the highest number of riders per trip (78.8 and 36.0, respectively). The most productive route on Sundays is Route 12, with 46.7 passengers per trip. Route 2 carries the fewest passengers per trip on Saturdays (4.5); Route 9 carries the fewest on Sundays

(1.5). **Figure 15** summarizes the average ridership per trip for all routes on weekdays and weekends.

Ridership by Stop

Figure 16 shows a heatmap of ridership activity throughout the CAT network. Ridership activity is highest in downtown Charlottesville and in the vicinity of UVA. In addition, the US 29 corridor features several high-ridership destinations including the Barracks Road Shopping Center, Seminole Square, The Shops at Stonefield, Fashion Square Mall, and Walmart. The highest ridership location outside of downtown/UVA and the Route 29 corridor is at 5th Street SW, near Willoughby Square and 5th Street Station.

Figure 13 | Annual Ridership

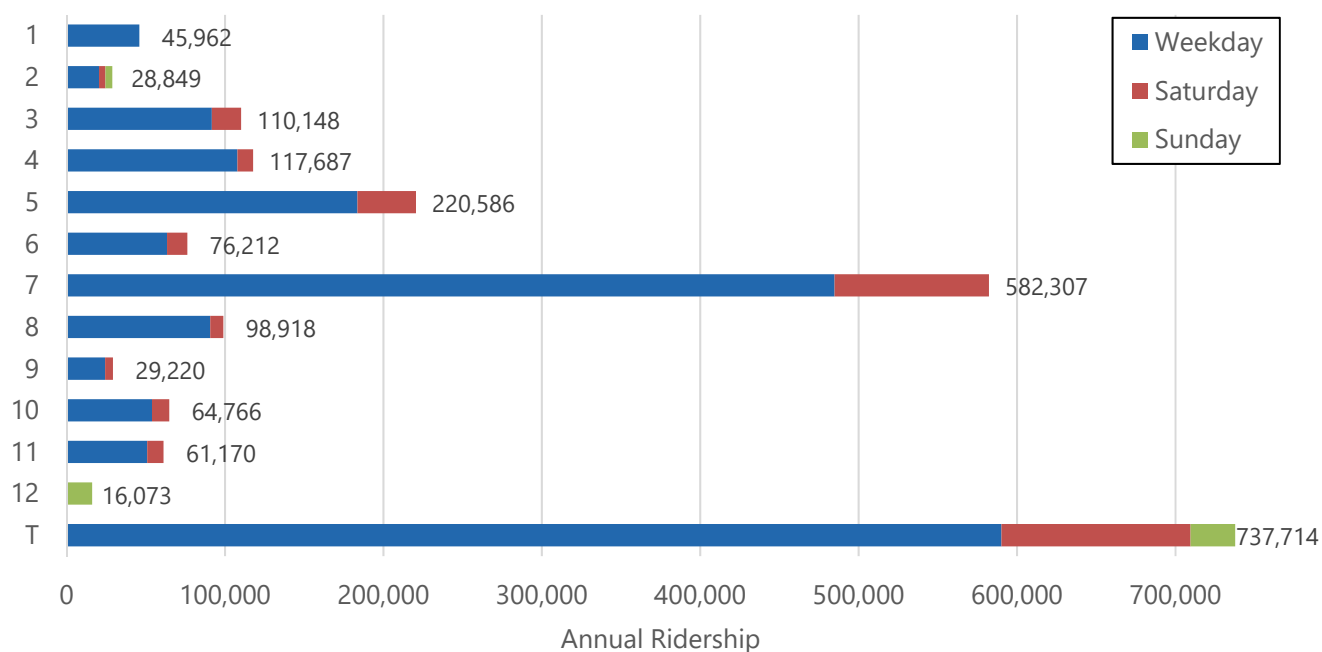


Figure 14 | Average Daily Ridership

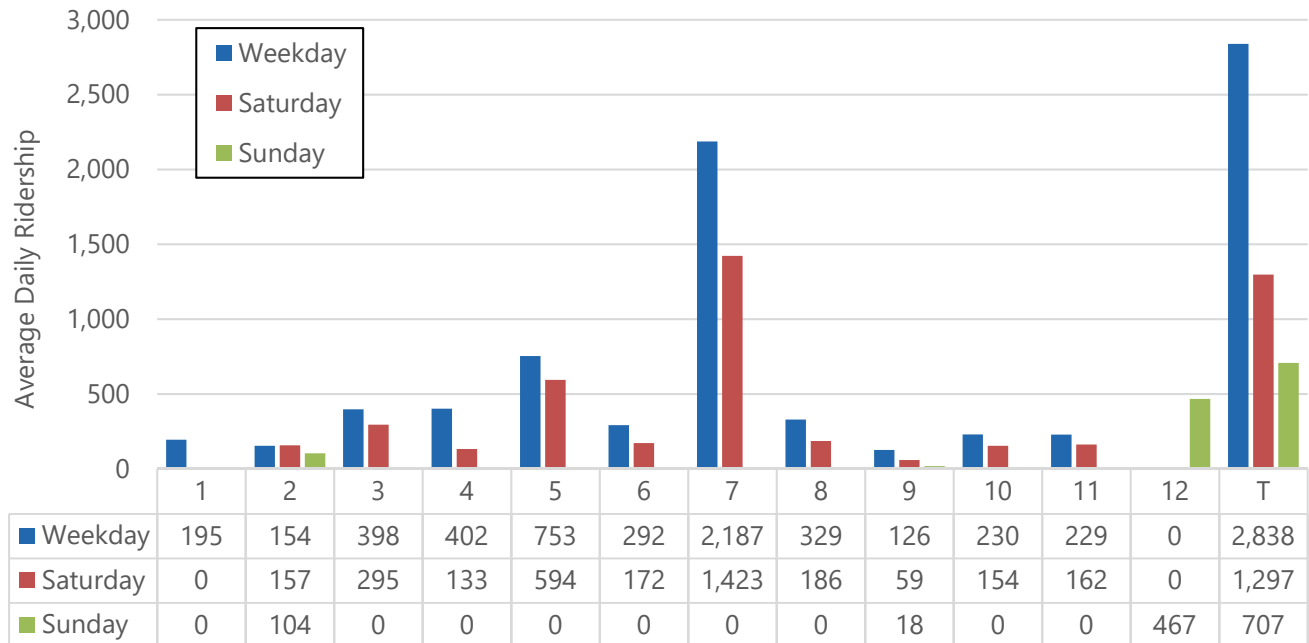


Figure 15 | Average Ridership by Trip

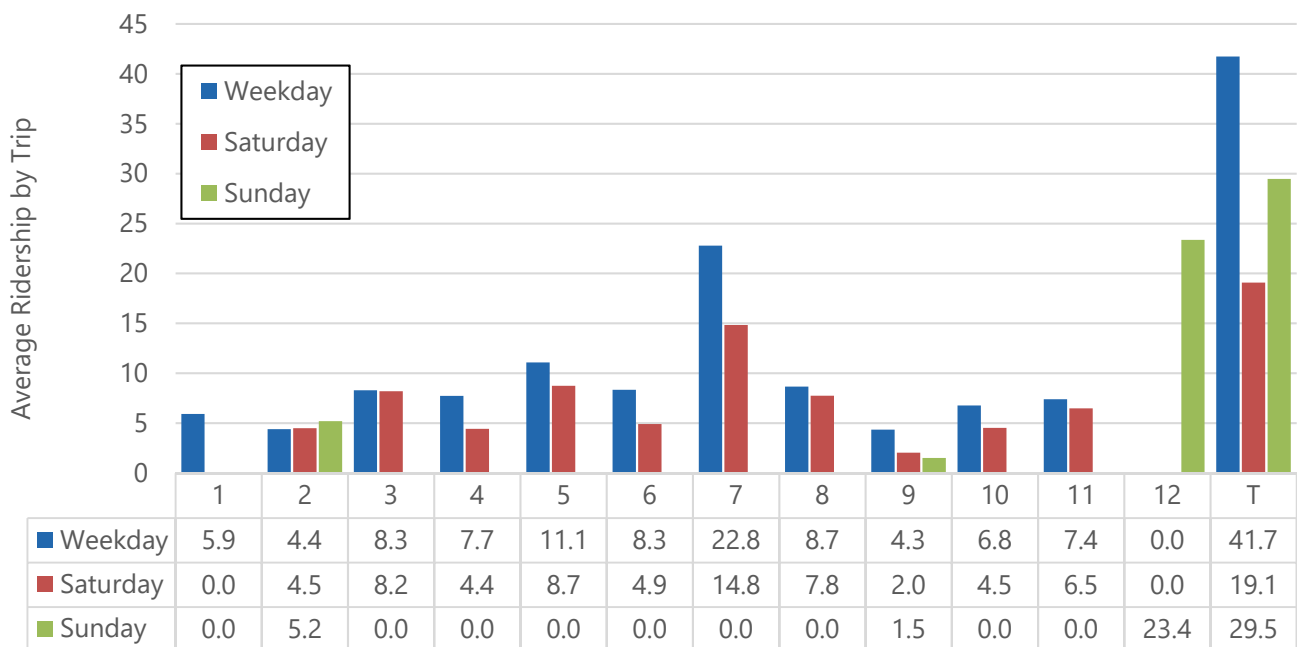
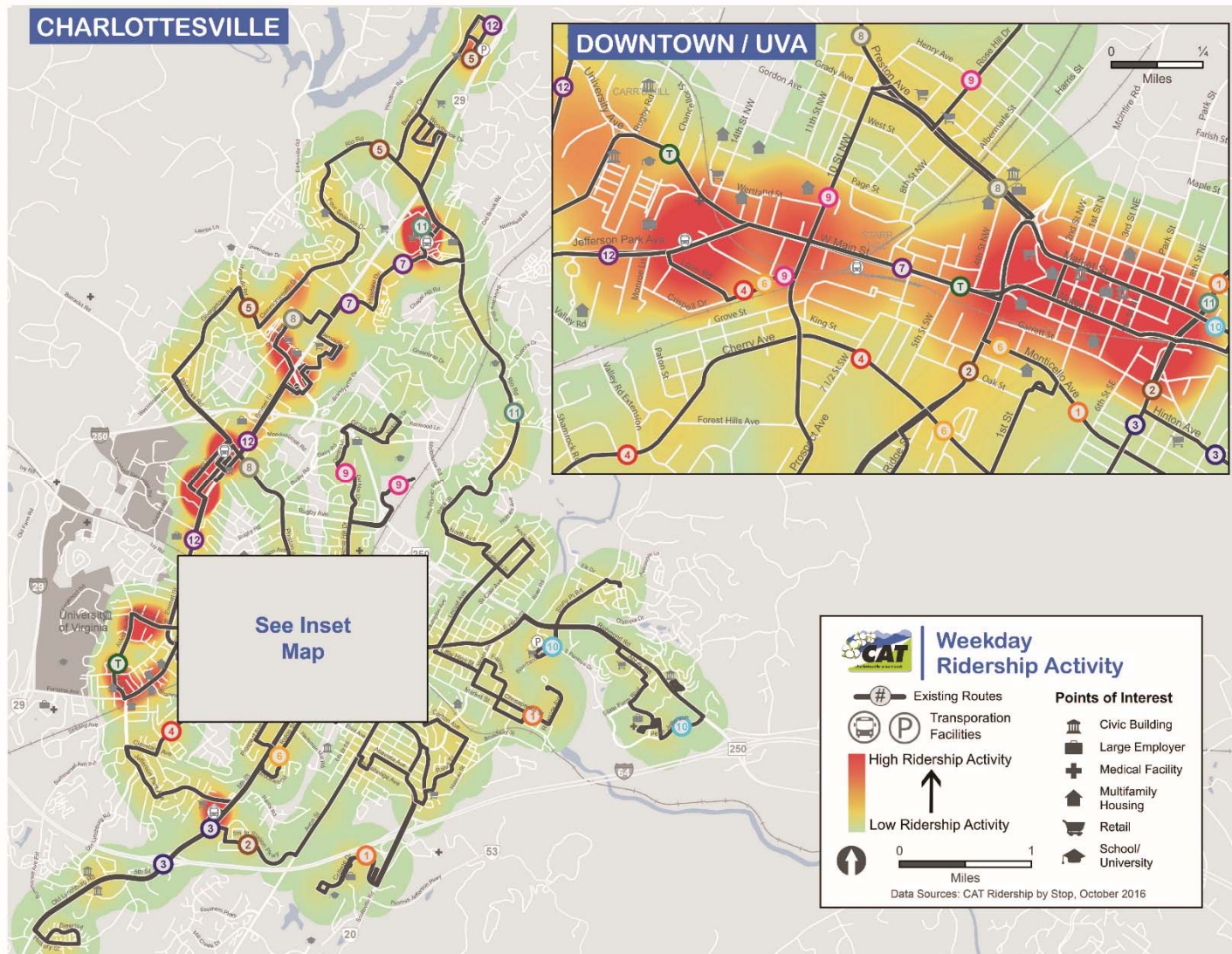


Figure 16 | Average Weekday Ridership Activity



3.2.2. Service Effectiveness

Service effectiveness, expressed in terms of passengers per revenue hour and passengers per revenue mile, is essentially a measure of CAT's return on investment. Each CAT route requires an investment of resources (quantified by revenue hours and revenue miles). The relative success of each investment is measured by the ridership that each route generates.

Passengers per Revenue Hour

On average, CAT carries 20.8 passengers per revenue hour on weekdays, 12.8 passengers per revenue hour on Saturdays, and 25.1 passengers per revenue hour on Sundays. **Figure 17** shows the ridership per revenue hour of each CAT route by service day type. As with other ridership metrics, the free Trolley performs best in terms of weekday, Saturday, and Sunday passengers per revenue hour (70.5, 32.2, and 41.6, respectively). On weekdays, Route 2 carries the fewest number of passengers per revenue hour (9.6). On Saturdays, this distinction belongs to Route 4 (4.8), and on Sundays, Route 2 carries a system-low 10.4 passengers per hour. No data is shown for Route 9 on Sunday because it only began providing revenue service on August 5, 2017, and service effectiveness data was not yet available as this document was being prepared.

A new service standard proposed in **Chapter 2** recommends that CAT:

- review and modify, if possible, services that exhibit less than 60 percent of the average passengers per revenue hour/per revenue mile values; and
- review and modify, if warranted, services that exhibit between 60 percent and 80 percent of the average values for these metrics.

Chapter 2 also recommends assessing ridership per revenue hour and other service effectiveness metrics by service category, so that routes are compared

against peers with similar service characteristics, rather than against routes with very different levels of service. While CAT does designate three service types – local, key, and lifeline – routes in each category do not share similar service characteristics, other than days of service. For example, Route 9 and Route 7 are both considered key routes, but the former operates every 70 minutes all day, while the latter operates every 20 minutes. Thus, in this chapter, the performance of all routes is analyzed as one group. If CAT revises its service categories in the future to group routes with similar service characteristics, similar analyses should be done by service category, rather than system-wide.

On weekdays, Routes 4, 10, and 11 fall between 60 and 80 percent of the system-wide average for passengers per hour (between 12.5 and 16.7); Routes 1, 2, and 9 fall below 60 percent of the average (below 12.5). On Saturdays, Routes 2 and 10 fall between 60 and 80 percent of the average (between 7.7 and 10.2); Routes 4 and 9 fall below 60 percent (below 7.7). Notably, the average value for this metric is driven substantially upward by the free Trolley, CAT's highest ridership service.

Passengers per Revenue Mile

The free Trolley carries the greatest number of passengers per revenue mile on weekdays (10.0), Saturdays (4.6), and Sundays (7.1). On weekdays and Saturdays, Route 9 reports the lowest number of passengers per mile (0.9 and 0.4, respectively); on Sundays, Route 12 carries a system-low 2.0 passengers per mile. **Figure 18** shows passengers per revenue mile by day type.

If assessing the current CAT network by the proposed service standards discussed in Chapter 2, Routes 3, 5, and 10 fall between 60 and 80 percent of the system-wide average for weekday passengers per revenue mile (between 1.4 and 1.9); Routes 1, 2, 4, 9, and 11 fall below 60 percent of the weekday average (below 1.4). On Saturdays, Routes 2, 3, 10, and 11 fall between



Transit Development Plan

FY 2019 – FY 2028

60 and 80 percent of the average (between 0.8 and 1.1) for that service day; Routes 4 and 9 fall below 60 percent of the Saturday average (below 0.8). On Sundays, Route 12 carries a system-low of two

passengers per revenue mile. As is the case with passengers per revenue hour, the average value for this metric is raised significantly by the free Trolley, CAT's highest ridership service.

Figure 17 | Passengers per Revenue Hour

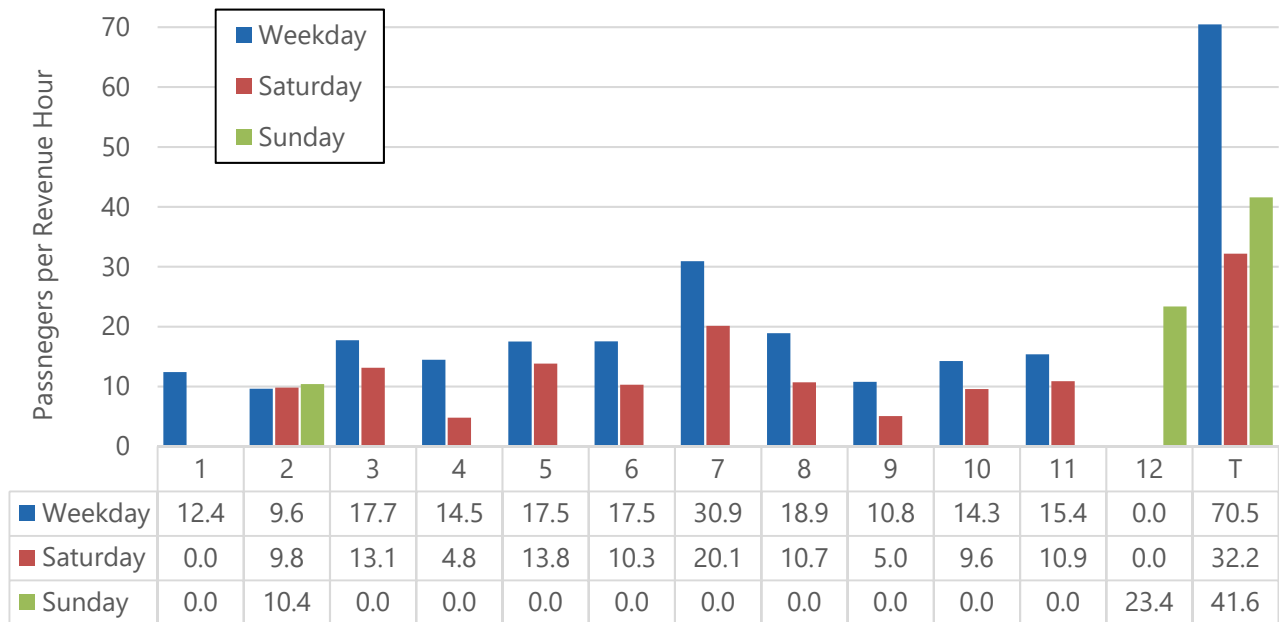
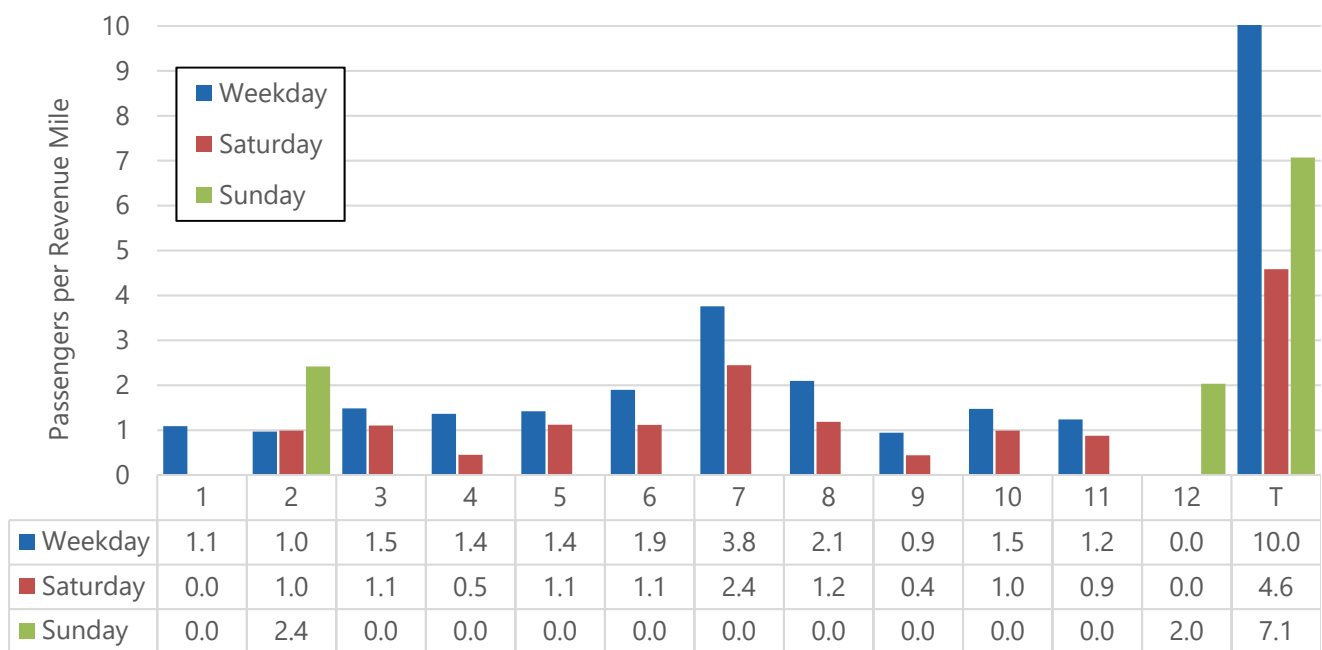


Figure 18 | Passengers per Revenue Mile



3.2.3. Cost Efficiency

Farebox Recovery

During FY2017, the CAT system generated \$457,391 in farebox revenue. \$152,367 of this revenue came from pass sales, while \$305,024 came from on-board fare purchases. **Figure 19** summarizes farebox revenue on CAT services during FY2017. On weekdays and Saturdays, Routes 7, 5, and 3 generate the highest fare revenue among CAT routes. On Sundays, Route 12 is the top fare generator.

The cost recovery ratio statistic measures the percentage of operating expenses recovered by fare revenue, determining a service's cost effectiveness. In FY2017, the overall fixed-route cost recovery ratio for CAT was 6.16 percent.

Newly-proposed service standards in **Chapter 2** call for CAT to review and modify, if possible, services that exhibit less than 60 percent of the average farebox recovery level, and to review and modify, if warranted, services that exhibit between 60 and 80 percent of the average for this metric. On weekdays, the average farebox recovery ratio is 4.0 percent. Excluding the Trolley, for which a fare is not charged, on weekdays, Routes 2, 4, and 9 fall between 60 and 80 percent of the average farebox recovery (between 2.4 and 3.2

percent); no routes that charge a fare fall below 60 percent of the average (below 2.4 percent). On Saturdays, Routes 2 and 4 fall between 60 and 80 percent of the average (between 2.0 and 2.7 percent); Route 9 falls below 60 percent of the average (below 2.0 percent).

Net Cost per Passenger

Net cost per passenger is calculated by subtracting annual fare revenue from annual operating costs, and subsequently dividing that total by the number of unlinked passenger trips. The average subsidy per passenger can offer further insight into the cost effectiveness of a service. shows net cost per passenger over FY2017. Over this fiscal year, CAT averaged a \$5.20 net cost per passenger on weekdays, \$5.23 on Saturdays, and \$4.26 on Sundays.

On weekdays and Saturdays, Routes 2 and 9 require the greatest subsidy per passenger. Route 2 is the least cost-effective service on Sundays as well. The Trolley and Route 7 require the lowest subsidy per passenger trip. Although the Trolley is a free service, CAT passengers have the ability to purchase passes on-board Trolley vehicles. This purchase appears as farebox revenue for the service.



Figure 19 | Annual Farebox Revenue (in Thousands of Dollars)

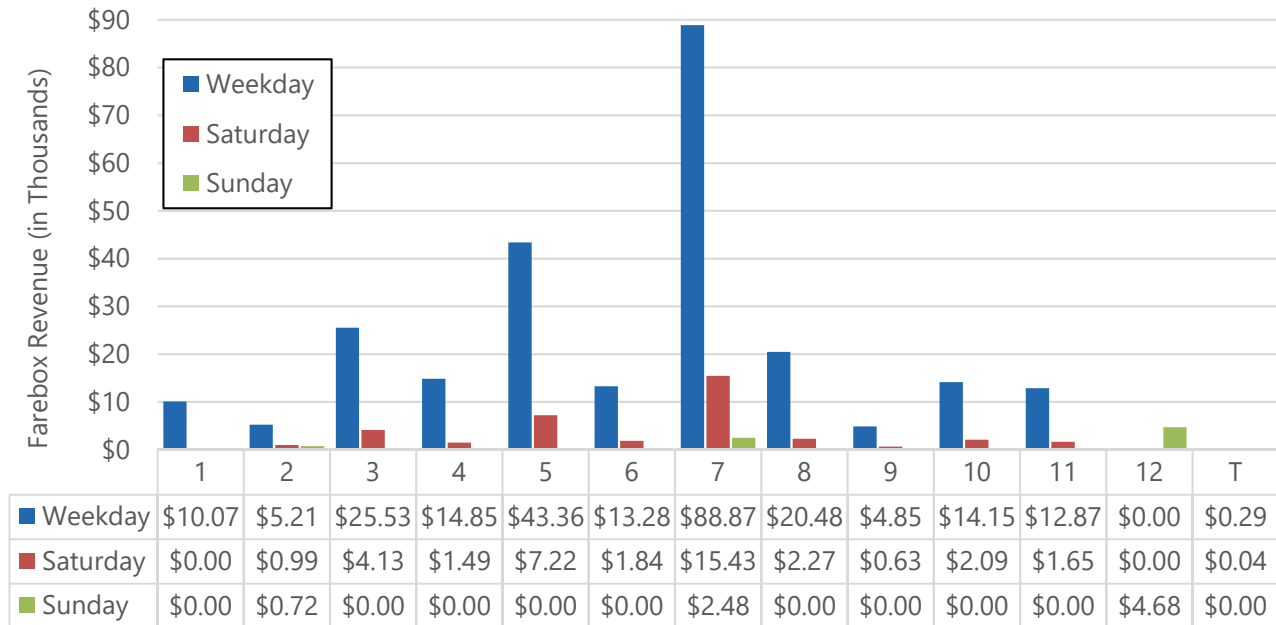
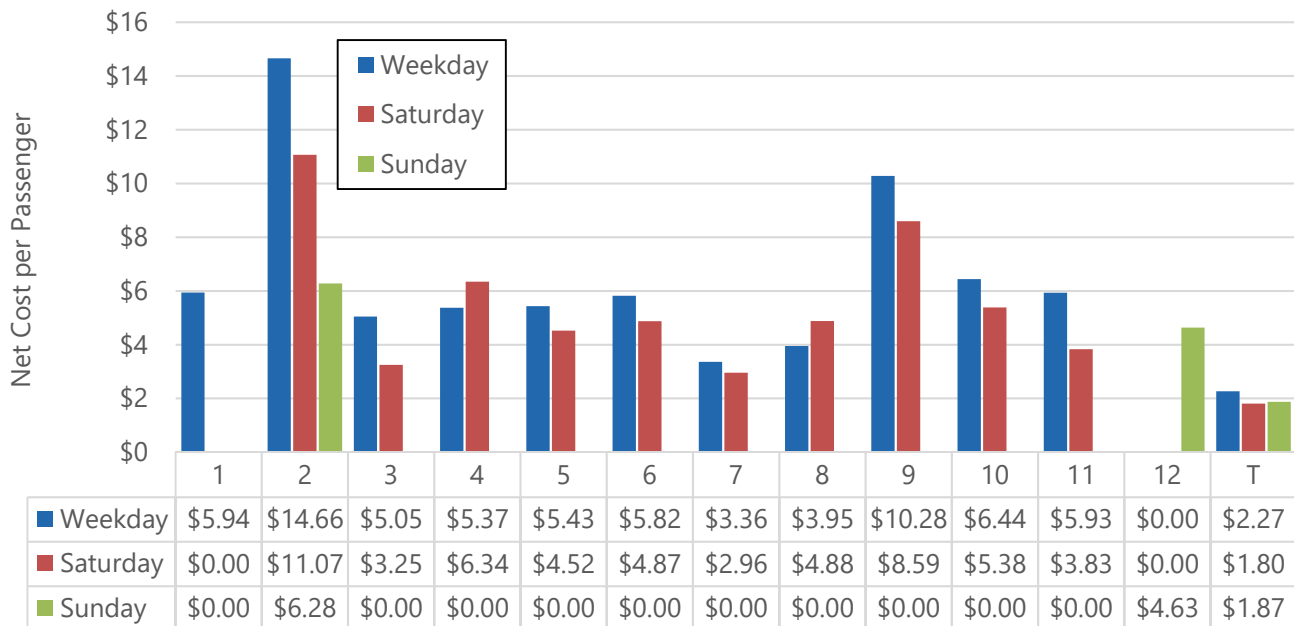


Figure 20 | Net Cost per Passenger



3.2.4. Service Quality

On-Time Performance

CAT defines a bus to be “on-time” if it serves a timepoint within a six-minute window of the

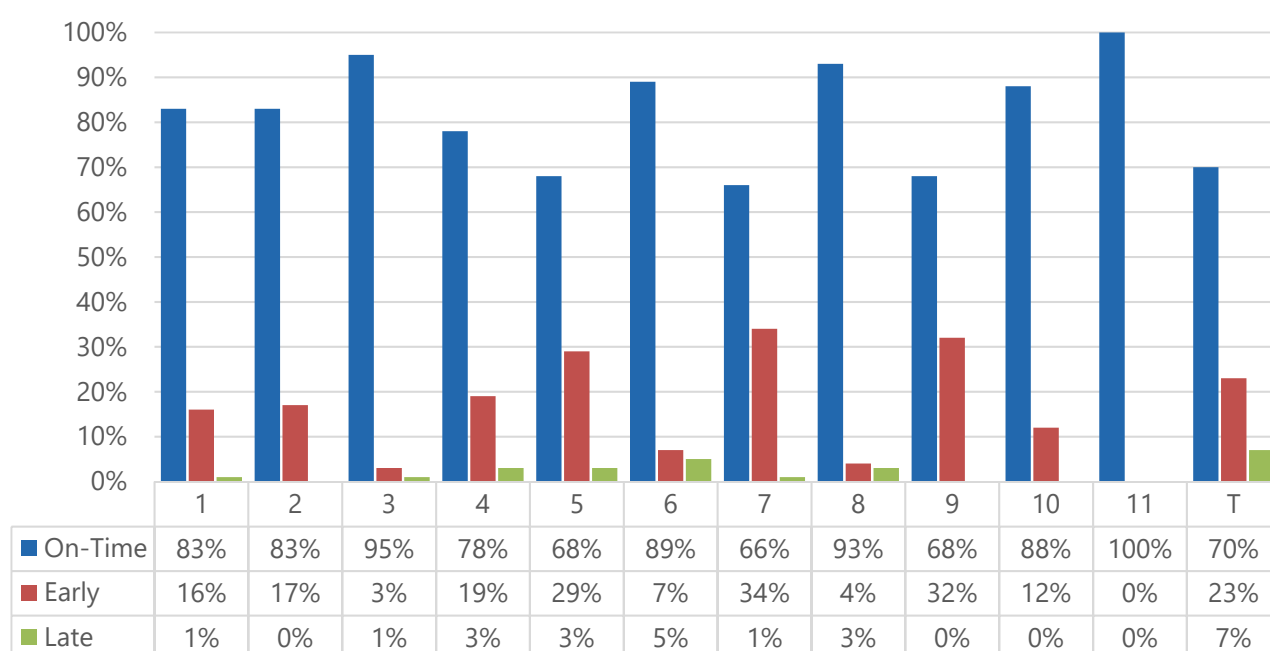
scheduled service time. Buses can arrive up to one minute early and up to five minutes late and still be considered on-time. While the agency has historically strived to achieve an on-time performance rate of 85

percent, in **Chapter 2**, a modified service standard of 90 percent on-time service is proposed. System-wide, in FY2017, CAT routes averaged on-time performance rates of 82 percent on weekdays, 92 percent on Saturdays, and 97 percent on Sundays.

Figure 21 summarizes weekday on-time performance by route based on the September 2017 ride check.

Route 11 is the only route to report a 100 percent on-time rate; Routes 3 (95 percent) and 8 (93 percent) rank just below. With 66 percent of trips arriving on-time and 34 percent arriving early, Route 7, one of CAT's busiest routes, has the lowest on-time performance rate. Three routes – Route 3, Route 8, and Route 11 – meet the 90 percent on-time performance service standard proposed in **Chapter 2**.

Figure 21 | Weekday On-Time Performance



Overloaded Trips

The seating capacity of the 35-foot buses assigned to most CAT routes is 32 passengers.

Table 3-5 summarizes trips on which the maximum passenger load exceeded this capacity during the September 2017 ride check period. Overloaded trips occurred on two routes and 14 total trips: Route 7 in the northbound direction (three trips); and the Trolley (11 trips). As noted in **Chapter 2**, the CAT modified load factor service standard suggests a load factor of 1.2 during weekday peak periods and a load factor of

1.0 during all other periods. Trips with maximum loads exceeding 38 passengers (approximately 32 multiplied by a factor of 1.2) are marked in **bold** in the table below.



Table 3-5 | Overloaded Trips

Route	Trip Time	Max Load
7 (NB)	4:15 PM	46
	4:35 PM	33
	4:55 PM	36
Trolley	8:20 AM	40
	8:35 AM	50
	9:20 AM	54
	10:05 AM	50
	10:20 AM	45
	4:50 PM	35
	5:35 PM	35
	6:35 PM	53
	7:20 PM	36
	10:35 PM	44
	11:20 PM	51

3.3. TREND ANALYSIS

This section provides a three-year (Fiscal Year 2015 through Fiscal Year 2017) retrospective analysis of system-wide CAT fixed-route service based on the following metrics:

- Annual ridership;
- Passengers per revenue hour;
- Passengers per revenue mile;
- Annual Operating Cost;
- Passenger Revenue; and
- Net Cost per Passenger.

From an efficiency and productivity standpoint, this assessment sheds light on how CAT services have performed over time.

3.3.1. Service Productivity

Annual Ridership

Annual ridership figures provide a baseline on which to track the overall usage of a system. **Table 3-6** shows annual CAT ridership from FY2015 to FY2017. Over the three-year period, ridership slowly, but steadily, decreased, dropping overall by 10 percent.

Table 3-6 | Annual Ridership, FY15-FY17

Fiscal Year	Annual Ridership
2015	2,423,740
2016	2,356,730
2017	2,189,612
% Change	-10%

Passengers per Revenue Hour



Table 3-7 summarizes passengers per revenue hour on CAT fixed-route service from FY2015 to FY2017. Calculated by dividing annual unlinked passenger trips by annual vehicle revenue hours, this metric measures how productively CAT vehicles spend their time in service. Passengers per revenue hour dropped seven percent over the analysis period, from 23.18 to 21.52. This decline can be attributed to decreases in both total unlinked passenger trips (by 10 percent) and vehicle revenue hours (by three percent) from FY2015 to FY2017.

Table 3-7 | Passengers per Revenue Hour, FY15-FY17

Fiscal Year	Passengers per Revenue Hour
2015	23.18
2016	22.84
2017	21.52
% Change	-7%

Passengers per Revenue Mile

Table 3-8 summarizes passengers per revenue mile on CAT fixed route service from FY2015 to FY2017. This metric, calculated by dividing annual unlinked passenger trips by annual vehicle revenue miles, measures how productively CAT vehicles spend their distance (rather than their time) in service. Passengers per revenue mile decreased by five percent – from 2.32 to 2.20 – over the analysis period, or by slightly less than the percentage decrease associated with passengers per revenue hour. Coupled with an overall decrease in ridership, CAT's passengers per revenue mile decreased by five percent over the three-year timeframe.

Table 3-8 | Passengers per Revenue Mile, FY15-FY17

Fiscal Year	Passengers per Revenue Mile
2015	2.32
2016	2.25
2017	2.20
% Change	-5%

3.3.2. Cost Efficiency

Annual Operating Cost

From FY2015 to FY2016, costs to operate CAT services decreased slightly. However, over the succeeding fiscal year, costs increased, resulting in a three percent rise in annual operating costs over the entire three-year period. **Table 3-9** reports on CAT's operating costs from FY2015 through FY 2017.

Table 3-9 | Annual Operating Costs, FY15-FY17

Fiscal Year	Annual Operating Costs
2015	\$7,188,651
2016	\$6,998,445
2017	\$7,421,700
% Change	3%

Passenger Revenue

Table 3-10 summarizes revenue received from CAT passengers – from both pass sales and on-board fare purchases – over the three-year analysis period. During this timeframe, pass sales decreased by 16 percent, while farebox revenue decreased by 17 percent.

Table 3-10 | Passenger Revenue, FY15-FY17

Fiscal Year	Pass Sales	Farebox
2015	\$182,126	\$369,437
2016	\$163,900	\$340,311
2017	\$152,367	\$305,024
% Change	-16%	-17%

Net Cost per Passenger

Net cost per passenger, also known as subsidy per passenger and reported as a dollar value, is calculated by subtracting annual fare revenue from annual operating costs, and subsequently dividing that total by the number of unlinked passenger trips. Assessing the average subsidy per passenger trip provides an indication of the cost effectiveness of a service in relation to the local, state, federal, or dedicated operating funding devoted per passenger.

Table 3-11 reports on CAT's system-wide net cost per passenger from FY2015 through FY2017. CAT's net cost per passenger rose from \$2.74 to \$3.18, or by 16 percent, during the analysis period. This metric increased most significantly during the latter two fiscal years, a period over which total ridership dropped by seven percent. Along with this decrease in unlinked trips, the system saw a nine percent drop



in fare revenue coupled with a six percent rise in operating costs. Together, these factors accounted for a significant overall increase in cost per passenger. In addition, from FY2015 to FY2017, operating costs rose by three percent overall, and fare revenue dropped by 17 percent overall.

Table 3-11 | Net Cost per Passenger, FY15-FY17

Fiscal Year	Net Cost per Passenger
2015	\$2.74
2016	\$2.76
2017	\$3.18
% Change	16%

3.3.3. Trend Analysis Conclusion

As CAT ridership decreased from FY2015 to FY2017, so did total fare revenue, revenue hours, and revenue miles. Over this same time frame, operating costs increased, causing CAT's cost-effectiveness to decrease.

While the exact sources of these trends are not discernable, a contextual look at CAT service changes sheds some light on possible explanations. In 2013, prior to the analysis period, CAT completed the Charlottesville Transit Study to improve the effectiveness and quality of its services. Recommended actions sought to make service more consistent, improve reliability and directness, consolidate duplicative service, expand the reach of service, adjust service frequencies to match demand, and develop a new transfer hub at UVA Hospital, from August 2014 to January 2015, CAT implemented a series of changes that included route realignments, discontinuances, and service hour extensions.

From FY2014 to FY2015, overall ridership increased by 6.5 percent, indicating a positive response to the changes. In FY2016, CAT implemented Route 2 to serve the 5th Street Station shopping center. The agency also realigned and extended Route 7, designating Sunday service on the route as Route 12.

It is possible that changes to Routes 2 and 7 may not have attracted originally projected ridership. In addition, the extension of Route 7 may have contributed to its relatively poor on-time performance, which may have alienated some passengers. Additionally, the three-year analysis period was one of declining transit ridership nationwide. This national trend has been attributed to a prolonged period of low gas prices coupled with the growing popularity of alternative mobility options such as ride-hailing apps (Uber, Lyft, etc.) and cycling.

3.4. TRANSIT POTENTIAL ANALYSIS

Fixed-route transit service is generally most effective in areas with high concentrations of residents and/or businesses. Combining both residential and employment densities shows the locations with the highest potential to support fixed-route transit service and generate strong transit ridership

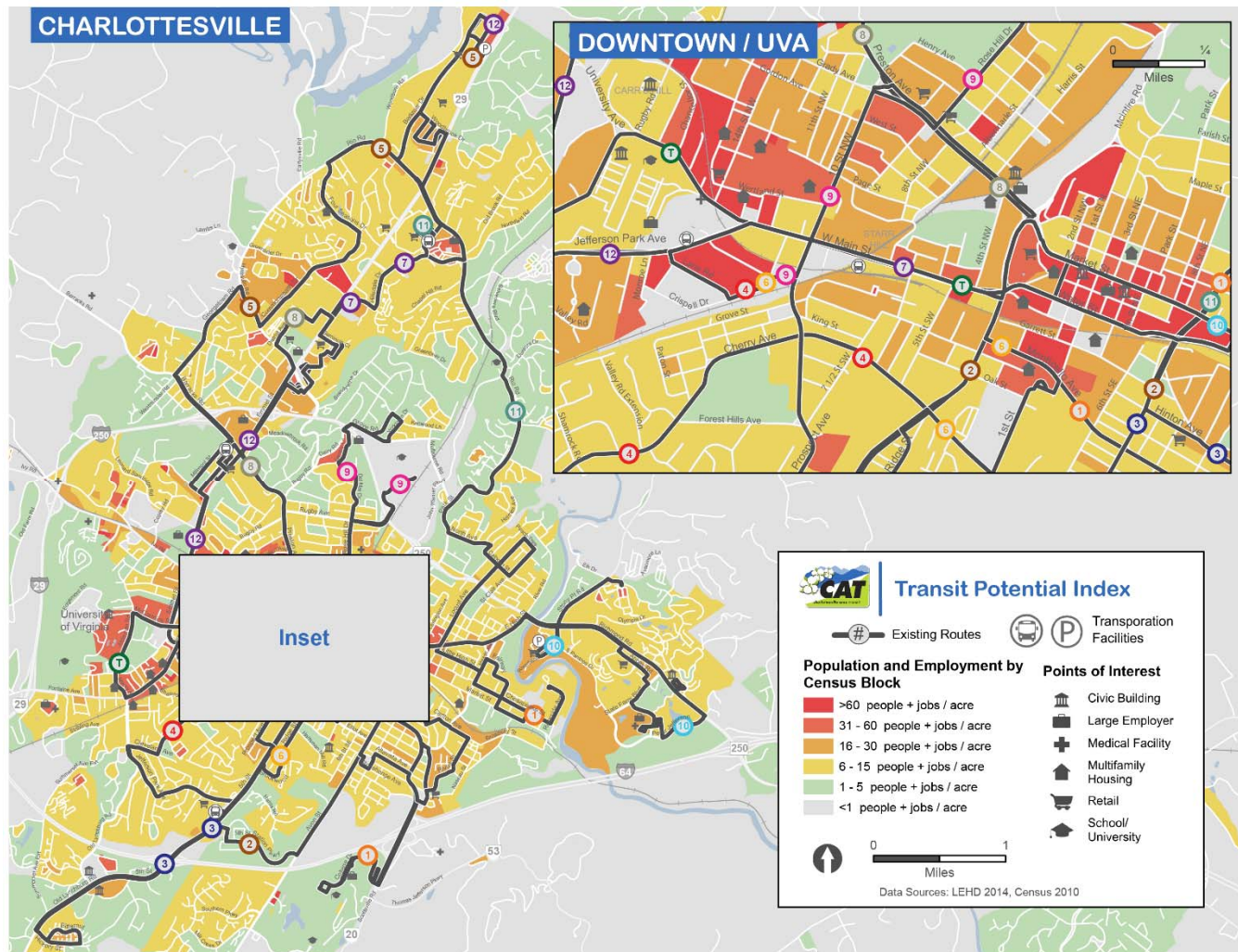
Figure 22 shows the transit potential, by Census block, of the CAT service area. As a general rule, a density of more than five people and/or jobs per acre is needed to support a base level (service every 60 minutes) of fixed-route transit service. Areas with higher density can support more robust service, and areas with lower densities may be more suitable for other service types such as demand response service.

Overall, CAT service appears to operate in corridors that are well-suited for transit service based on population and employment density. Route 11 serves a stretch of Rio Road that appears to be very low-density. However, this corridor has seen new residential development in recent years that is not yet reflected in the Census-based population data. In addition, there are plans for a large new Senior Center to be built in the Belvedere neighborhood near East Rio Road. On the southern end of the service area, Route 1 appears to serve a low-density area south of I-64, but this is a large Census block that includes Piedmont Virginia Community College. The size of the

block and the greenspace surrounding the college dilutes the employment density of the area, but

community colleges are key destinations for transit riders.

Figure 22 | Charlottesville Transit Potential



3.5. TRANSIT PROPENSITY ANALYSIS

Above all else, public transportation is a mobility tool. Certain population subgroups have a higher likelihood or propensity to use transit as their primary means of local and regional transportation than the population in general. In addition, certain environmental factors such as congestion and parking cost/availability cause commuters to seek out alternatives to driving alone. The Transit Propensity analysis considers the following factors to determine

where transit trips are relatively more and less likely to occur:

- Where transit-oriented population trips originate (Transit-Oriented Populations Index);
- Where commuter trips originate (Commuter Populations Index);
- Where workplace destinations are located (Work Destinations Index); and
- Where non-work destinations are located (Non-Work Destinations Index).

3.5.1. Transit-Oriented Populations

Index

The transit-oriented population index considers six categories: population, age, households, income, vehicle ownership, and disability status. Areas with higher populations or household densities, as well as higher concentrations of seniors, youth, persons living in poverty, households with reduced vehicle access, and disabled persons, will have a greater propensity toward transit ridership. This index utilizes the following equally weighted inputs:

- Population (where all residents live and where minority residents live);
- Age (where youth and senior populations live);
- Number of households;
- Income (number of residents living in poverty);
- Vehicle ownership (number of zero- or one-car households); and
- Number of disabled residents.

Figure 23 shows the transit-oriented population across the CAT service area. High transit-oriented population areas include:

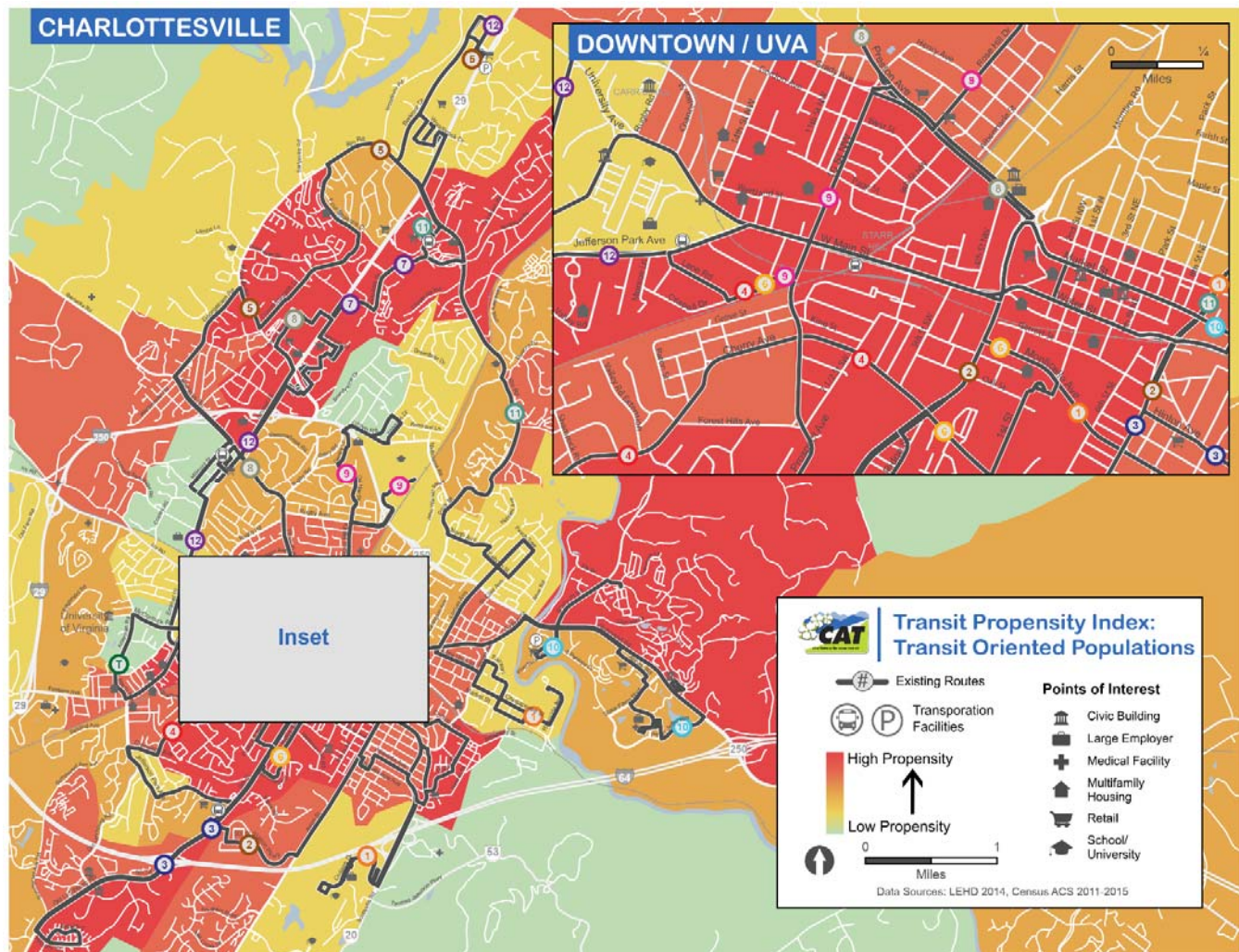
- Downtown (served by Routes 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, and the Trolley);
- The Stony Point Road corridor and north of Richmond Road (served by Route 10);
- The 5th Street Corridor, just south of Downtown (served by Routes 2, 3, 4, and 6);
- Southeast of Old Lynchburg Road (served by Route 3); and
- The Seminole Trail (Route 29) corridor, north of Route 250 (served by Routes 7, 8, 11, and 12).

Areas with a lower transit-oriented population index include:

- North of Grove Road and Dairy Route (served by Route 9);
- West of Emmet Street (Route 29), south of Route 250 (served by Routes 7 and 12); and

East of Scottsville Road, south of I-64 (served by Route 1)

Figure 23 | Transit Oriented Populations Index



3.5.2. Commuter Populations Index

The commuter population index consists of two categories: labor force and non-single occupant vehicle (SOV) commute mode. Employed persons, commuters, and transit commuters all contribute to this index, which is indicative of where traditional peak hour commuters live, and where those that currently use non-automobile modes to commute live.

Figure 24 shows the commuter populations index across the CAT service area. Areas with a high commuter index within the service area tend to have both a higher employed population and a higher percentage of residents commuting by transit. These include:

- Downtown, surrounding the intersection of Main Street and 10th Street (served by Routes 4, 6, 7, 9, 12, and the Trolley);
- The Jefferson Park Avenue corridor (served by the Trolley);
- South of Cherry Avenue and Ridge Street (served by Routes 4 and 6);
- The Seminole Trail (Route 29) corridor, north of Route 250 (served by Routes 7, 8, 11, and 12); and
- Surrounding the I-64 and Old Lynchburg Road corridors (served by Route 3).

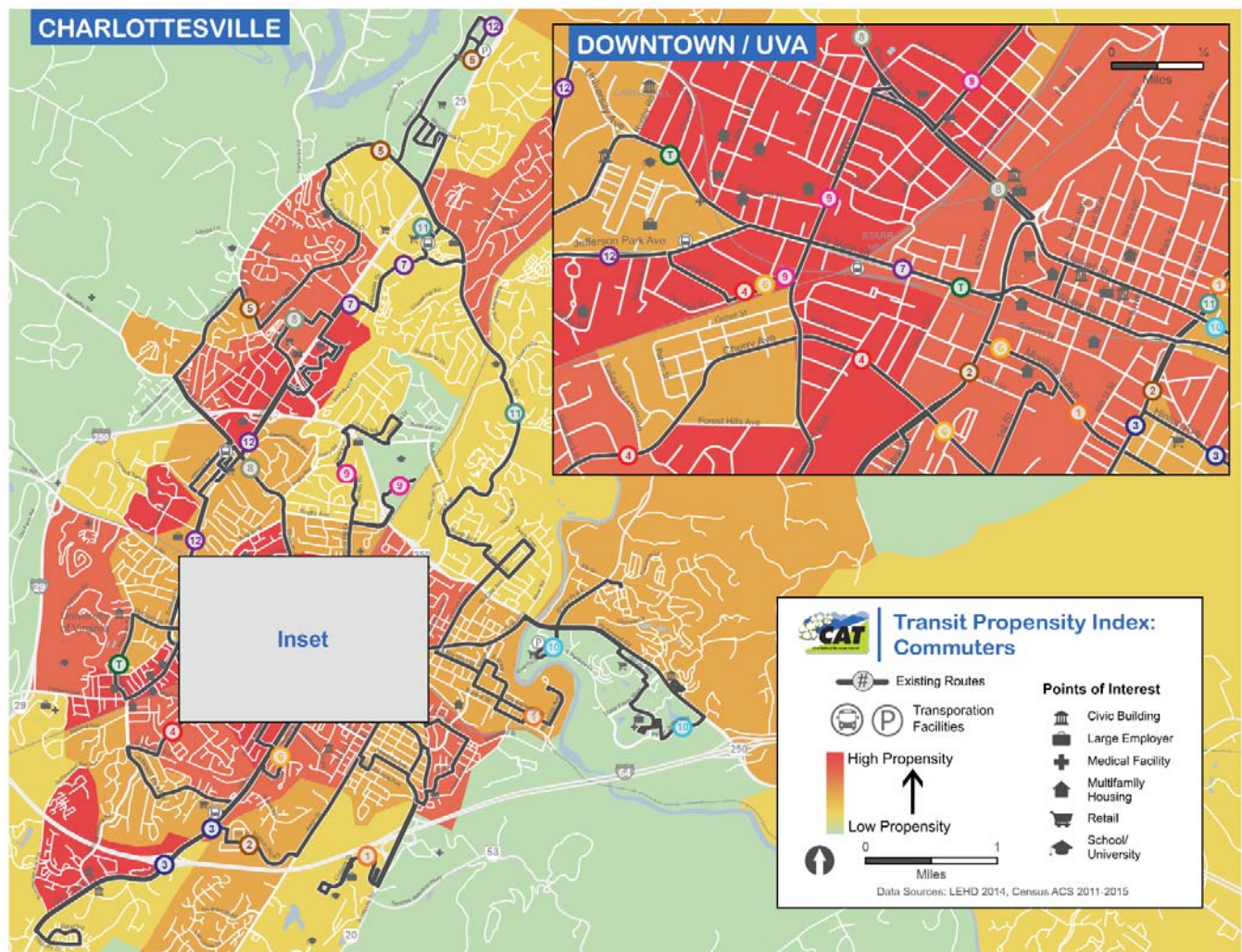
Transit Development Plan

FY 2019 – FY 2028

Areas with a lower commuter population index include:

- East of Grove Road and Route 250 (served by Route 9);
- North of Rio Road and Route 29 (served by Routes 5 and 12); and
- South of Richmond Road and Cherry Point Road (served by Route 10).

Figure 24 | Commuter Populations Index



3.5.3. Work Destinations Index

The work destinations index identifies areas with high levels of employment activity and thus high propensities for attracting transit work trips. As this index is used as an indicator of the density of job locations, its only input is employment.

Figure 25 depicts the results of this index. Regions with a higher work destinations index value generally have a high employment density. These areas include:

- East of Jefferson Park Avenue (served by Routes 4, 6, 7, 12, and the Trolley);
- Between Main Street/Water Street and Route 250, east of Rose Hill Drive (served by Routes 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, and the Trolley); and

- South of Richmond Road and Cherry Point Road (served by Route 10).

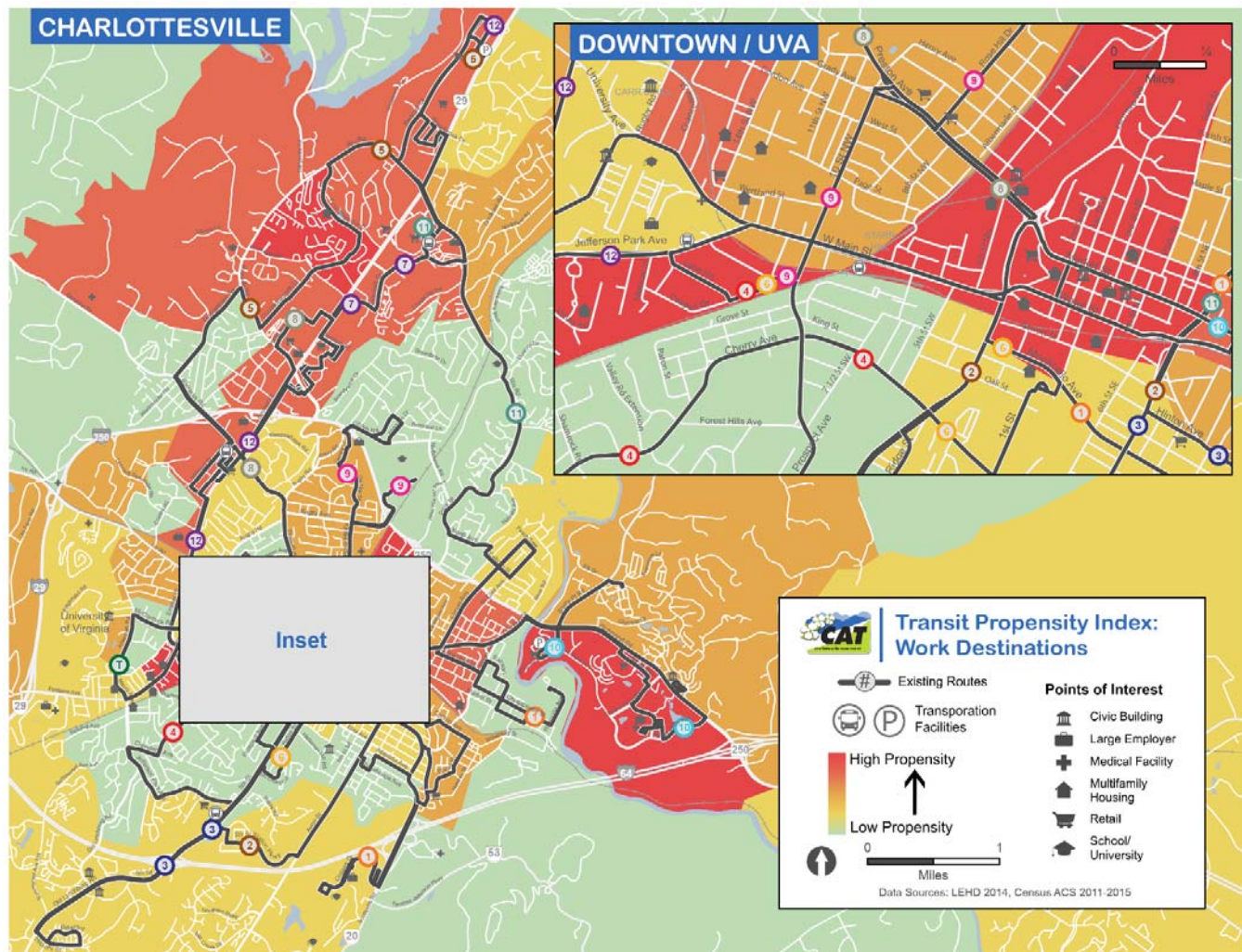
Areas with a lower work destinations index include:

- North of Grove Road and east of Rio Road (served by Routes 9 and 11);

- East of Meade Avenue, south of Richmond Road (served by Route 1); and

The Cherry Avenue, 5th Street, and Avon Street corridors, south of Elliott Avenue (served by Route 2, 3, 4, and 6).

Figure 25 | Work Destinations Index



3.5.4. Non-Work Destinations Index

The non-work destinations index evaluates five destination types that indicate where residents might travel if going somewhere other than work. The index is based on the number of retail/restaurant, recreation, healthcare/social assistance, education, and government jobs in each block group.

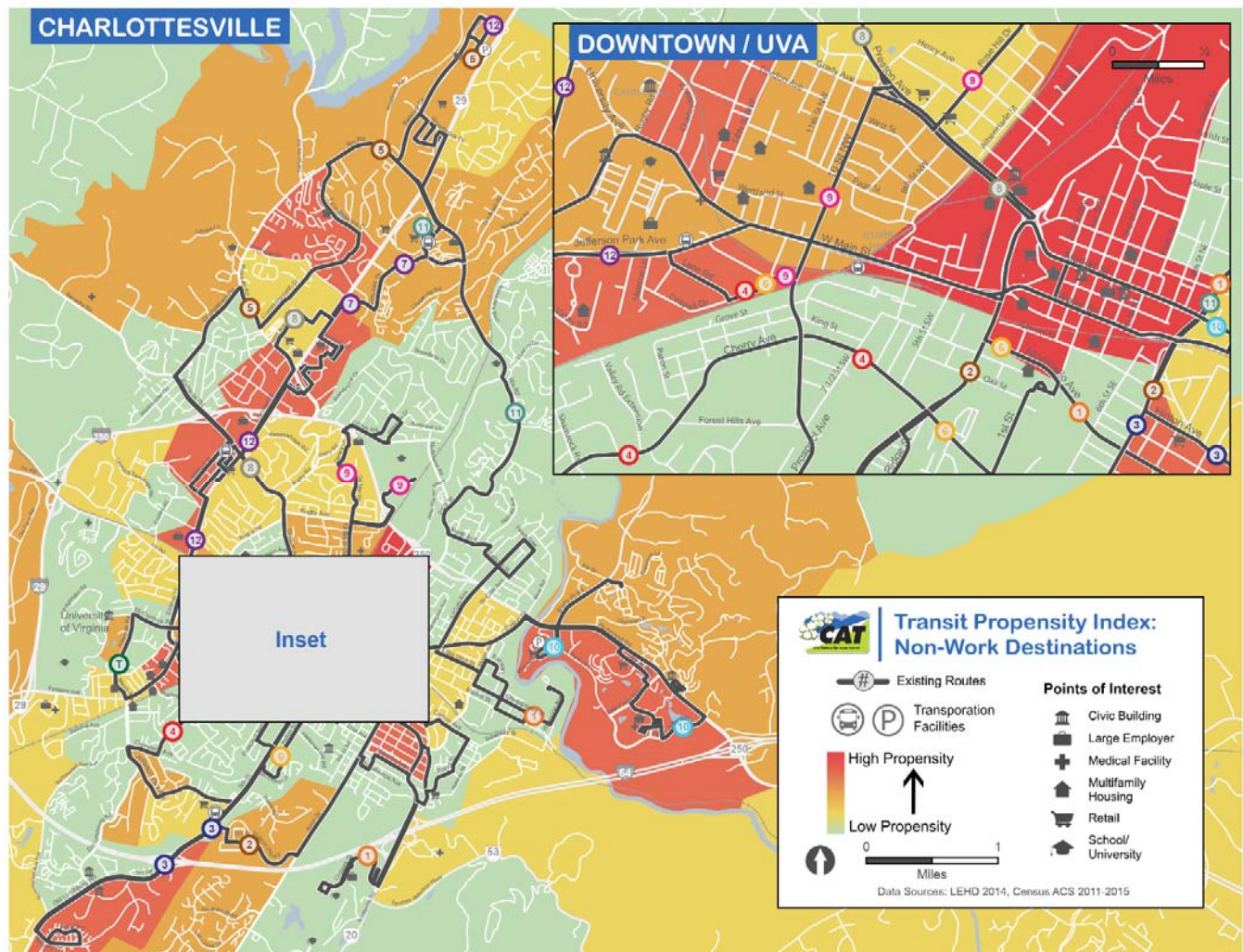
Figure 26 depicts the results of this index. The highest work destinations index value can be found between Main Street/Water Street and Route 250, west of Park Street and east of 7th Street. This area is served by Routes 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, and the Trolley. Other areas with relatively high concentrations of non-work destinations include the Seminole Trail

(Route 29) corridor and south of Richmond Road, but many block groups within the CAT service area have moderate to low concentrations of non-work destinations.

It should be noted that block-group size can impact the various transit propensity analyses by effectively diluting the reported concentrations of key demographics or destinations, especially in outlying

areas where block-groups tend to be larger. For this reason, key points of interest are also included on the maps in this chapter. These icons represent land-uses that tend to generate a high rate of transit trips. For example, while the area south of I-64 near Scottsville Road is shown as having a low propensity for transit trips, it is the site of Piedmont Virginia Community College, and represented by icons for “School/University” and “Major Employer.”

Figure 26 | Non-Work Destinations Index



3.6. RIDER SURVEYS

3.6.1. On-Board Survey

An on-board survey was conducted on all CAT routes in September 2017 to assess who is using the system,

how it is being used, and what the preferences and perceptions are of current riders. A summary of the survey results is presented below. The full survey results can be found in **Appendix A**.

370 surveys were returned in all, with the largest number of surveys collected on Route 7 (116 surveys), the Trolley (43 surveys), and Route 10 (38 surveys). 67 percent of respondents indicated that they use CAT services almost every day, and 63 percent reported beginning their journey at a place of residence. A lack of car ownership was the most commonly cited reason for using CAT services.

Customer satisfaction with CAT services varied depending on the metric. Approximately 75 percent of respondents agreed that service is dependable. However, just 65 percent indicated that schedules generally met travel needs. Regarding future service, customers indicated preferences for more frequent service, rather than longer service hours; more weekend service, over more weekday service; more bus stops for a shorter walk between stop and destination, rather than fewer bus stops for faster bus travel times; more frequent bus service on fewer streets, instead of less frequent bus service on more streets; and the improvement of existing service, over service to new areas.

A large majority of respondents (93 percent) identified as English speakers. While the age of rider respondents varied, 71 percent identified as being at least 26 years old. In contrast, although CAT serves a large university community, just 20 percent of respondents identified as being between the ages of 18 and 25. Similarly, 65 percent of respondents identified as being employed full- or part-time, while only 16 percent identified as students.

3.6.2. Online Regional Transit Survey

In September 2017, a regional transit survey was launched online, aimed at CAT and JAUNT riders, as well as non-riders. The survey will remain active throughout this study, but the following summary reflects responses through January 2018.

The online survey was similar in design to the on-board survey conducted on CAT buses, but included additional questions aimed at non-riders. The survey

yielded 246 total responses. 35 percent of respondents identified as current CAT riders, 4 percent identified as JAUNT riders, and over 60 percent identified as non-riders. Common reasons given for using CAT service included a lack of parking at a destination, gas costs and car maintenance, a lack of car ownership, a sense of doing one's part for the environment, and a preference to spend time on activities other than driving. Reasons provided for not using transit included a lack of service near home, a general lack of interest in transit, a need for more information on transit, and a bad previous experience with transit service.

Of current riders, most reported using CAT to travel to or from home and work, with social/recreational trips ranking high among destinations as well. Nearly a third indicated using transit a few times per month, less than a quarter reported using transit several times per week, and one fifth reported using it nearly every day. Commonly used CAT routes among online respondents included the free Trolley as well as Routes 4, 5, 11, and 7.

To assess customer satisfaction, respondents were asked to rate a series of CAT service metrics on a scale of "Strongly Disagree" to "Strongly Agree." Over three quarters of respondents agreed that service was dependable. A slightly smaller percentage agreed that routes got passengers where they needed to go. Less than half of respondents agreed that schedules met travel needs.

Respondents were also prompted with a series of trade-off questions that requested an indication of preference given various scenarios. Overall, online respondents preferred the following:

- More frequent bus service, over longer service hours;
- More weekend service, over more weekday service;



- Fewer bus stops for faster bus service, over more bus stops for a shorter walk to or from stops; and
- Service to new areas, over the improvement of existing service.

In addition, respondents were fairly evenly split on whether buses should run more frequently but on fewer streets or whether buses should run on more streets but less frequently.

3.7. GAPS ANALYSIS

The gaps analysis is aimed at identifying disconnects between the availability of CAT service, and the geographic and temporal distribution of transit need and transit potential in the service area. This analysis combines inputs from the regional travel demand model; the transit potential and transit propensity analyses; and surveys responses from rider and non-riders. While coverage gaps include missing connections between geographic areas, service level gaps include inadequate headways or spans based on operating characteristics. By outlining where new service is needed, the gap analysis will assist in determining the overall vision for CAT's service and capital improvement plans.

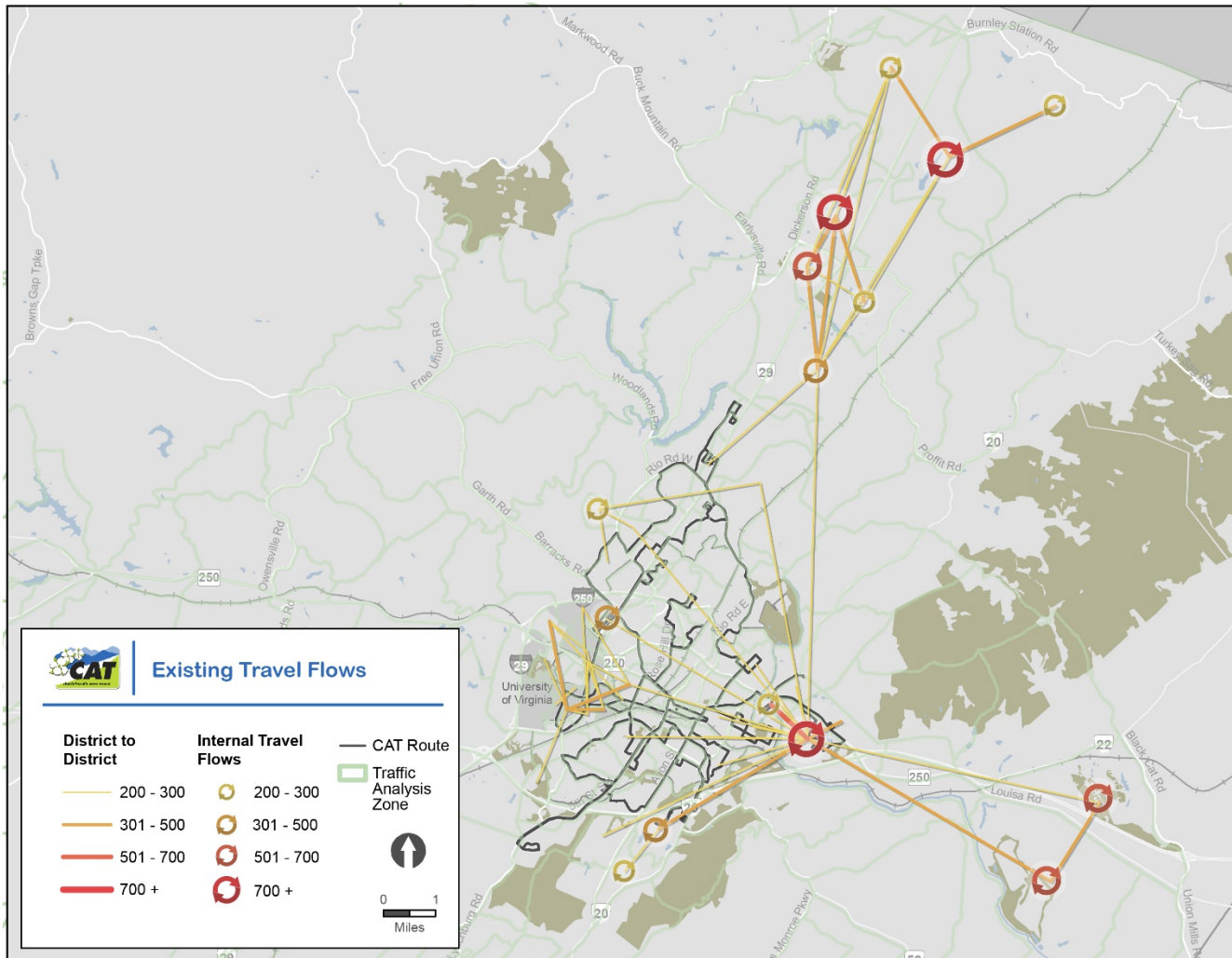
3.7.1. Coverage Gaps

As a first step in the gap analysis, a review of the Charlottesville/Albemarle Metropolitan Planning

Organization (CA-MPO) regional travel demand model was conducted to assess how well the CAT network meets the needs of travelers in the region. All trips, regardless of mode or direction of travel were depicted using centroid-to-centroid transportation analysis zone (TAZ) connections (**Figure 27**). The most prevalent travel flows were then compared to the existing CAT network to assess whether any major connections between geographic areas remained unserved by transit.

Major travel flows include internal circulation in the area bound by I-64, US 250, and the Rivanna River (this area includes Martha Jefferson Hospital and is served by Route 10); internal circulation in the area near PVCC (served by Route 1; and internal circulation in the vicinity of Barracks Road Shopping Center (served by Routes 5, 7, 8, and 12). Most of the top zone-to-zone travel flows begin or end near Martha Jefferson Hospital or UVA. It should be noted that TAZ zones are generally smaller in more urban areas. For example, downtown Charlottesville is divided into 10 zones. So, the lack of an apparent major travel flow lines emanating from downtown Charlottesville is a function of the fact that trips are divided among many small zones. In aggregate, these trips would have resulted in downtown showing up as a major anchor.

Figure 27 | Regional Travel Flows in the CAT Service Area



3.7.2. Service Level Gaps

Service level gaps include potential deficiencies in the frequency or span of a service. Key factors when identifying service level gaps include the market for transit service, existing service performance, and service preferences expressed through rider and non-rider surveys.

Frequency/Span Analysis

To assess how well existing CAT service frequencies align with transit potential and transit need, weekday peak-period frequencies were overlaid onto the results of the transit potential index (**Figure 28**) and the transit-oriented populations index (**Figure 29**).

The highest service frequency in network is provided by the free Trolley (service every 15-minutes), which together with Route 7's 20-minute peak frequency results in service every five to ten minutes between downtown and UVA. This corridor also includes the region's highest transit potential based on population and employment density. Much of the CAT service area has moderate transit potential, and appears well-matched to the moderate service frequency provided on most routes.

When comparing service frequency with service need, as expressed by the transit-oriented propensity index, it appears that service on Route 10 is somewhat insufficient relative to the high concentration of

transit-oriented populations north of Richmond Road.

Beyond the system-level gap analysis, each route can be analyzed to identify its strengths and weaknesses in terms of serving its intended markets. **Appendix B**

includes a set of detailed diagnostic route profiles that examine each route by stop and by trip. The profiles not only identify service gaps, but also present potential service improvement opportunities that formed the foundation for the recommendations in **Chapter 4**.

Figure 28 | CAT Route Weekday Peak Frequencies and Transit Potential Index

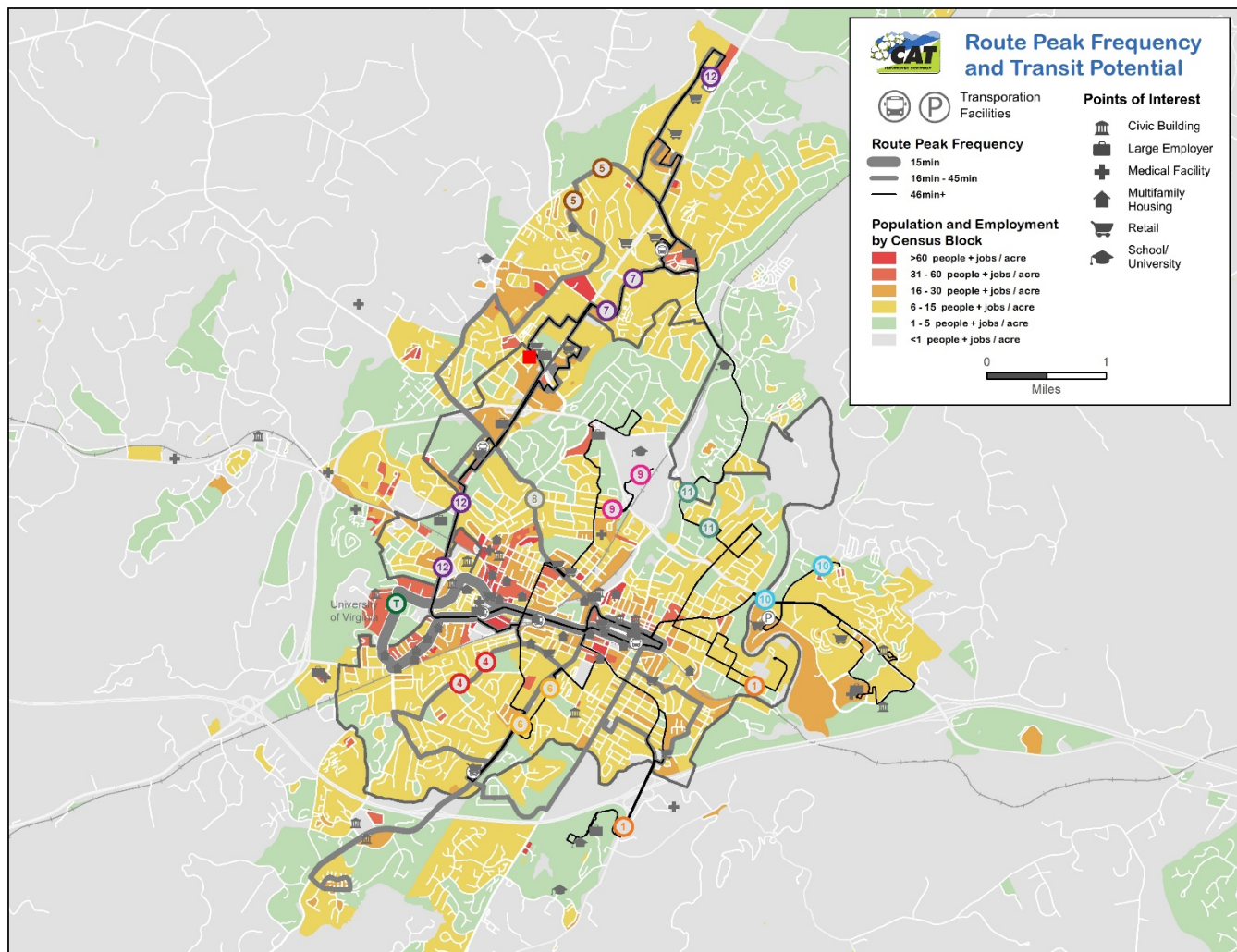
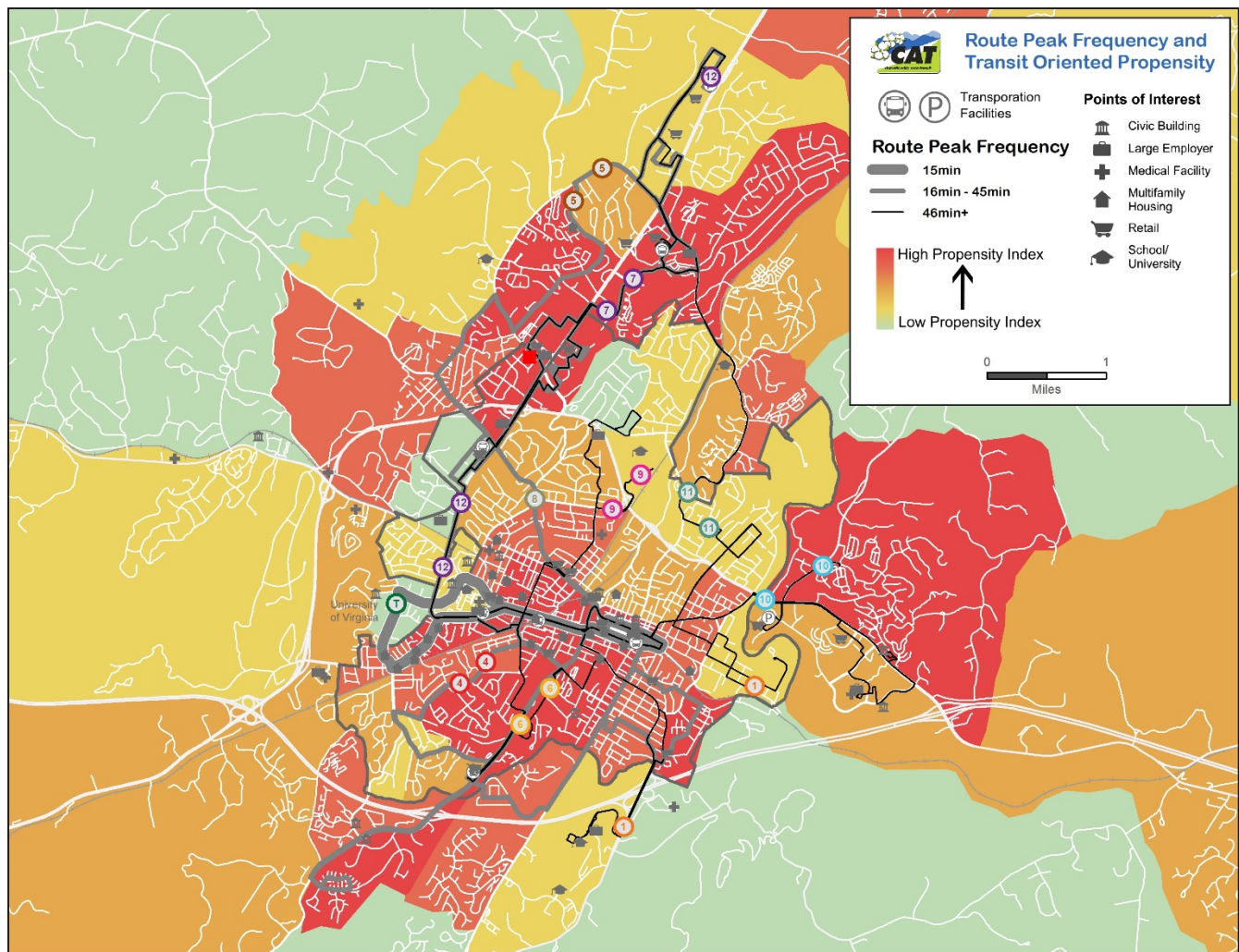


Figure 29 | CAT Route Weekday Peak Frequencies and Transit Oriented Propensity (TOP) Index



Survey Analysis

Combined responses to several questions on the CAT on-board and online surveys indicated a perceived need for service level modifications to improve rider access and increase route frequencies. 65 percent of on-board survey takers agreed that schedules meet their travel needs. However, respondents also indicated a preference for more frequent service over longer service hours, and for buses running more frequently on fewer streets rather than less frequently on more streets. Current riders also indicated a preference for improving existing service over serving new areas (although non-riders had the opposite preference in the online survey).

Online survey respondents, which included both riders and non-riders, were much less supportive of current schedules. Less than six percent of online respondents strongly agreed that current schedules meet travel needs; 38 percent merely agreed with this statement.

In response to these survey results, CAT should consider increased frequency on key corridors, even if it means a “thinner” network with fewer deviations from major arterials.



Chapter 4

Service and Capital Improvement Plan



Page Intentionally Left Blank

4 Service & Capital Improvement Plan

As described in Chapter 3, CAT ridership has been trending downward in recent years. Between 2015 and 2017 total ridership declined by seven percent. In part, this can be attributed to a reduction in service as revenue hours and revenue miles were reduced by three and five percent, respectively, during this period. However, even when normalized for service availability, CAT's productivity has fallen. In 2017, the system carried 21.52 passengers per revenue hour – down from 23.18 in 2015.

CAT's ridership losses are in line with national trends, which saw total transit ridership decline by five percent and bus-only ridership decline by eight percent between 2015 and 2017. Factors driving these national trends include growing rates of employment, sustained lower gas prices, and, perhaps most importantly, the increasing availability, affordability, and popularity of alternative mobility options such as bicycles and app-based ride-hailing services.

These new options create a challenge, in the form of competition, for traditional transit operators like CAT, but they also create opportunities by allowing transit providers to better align their services with market demands. Traditional fixed route service is not necessarily the best mobility solution for every environment, and the availability of new, more flexible, mobility models now let fixed route providers focus their services where they can do best.

The recommendations in this chapter are based on the service and market opportunities identified in Chapter 3. The recommendations are also informed by the public and stakeholder feedback received throughout the project, including on-board survey responses documented in Chapter 3. Overall, the

recommendations are intended to simplify CAT's services in order to make them easier to use and more intuitive to understand.

The recommendations are also aimed at ensuring that each route has strong anchors and a good mix of origins and destinations. As Charlottesville's population continues to grow (**Table 4-1**), CAT's ridership can grow as well, as long as service is well-aligned with the market for fixed route transit.

Table 4-1 | Projected Population Growth (Source: University of Virginia)

Jurisdiction	Projection		
	2020	2030	2040
City of Charlottesville	52,839	54,563	55,501
Albemarle County	110,669	126,988	141,221

4.1 SHORT-TERM (1-3 YEARS) SERVICE IMPROVEMENTS AND NEEDS IDENTIFICATION

Chapter 3 includes a set of detailed diagnostic route profiles that examine each route by stop and by trip. The profiles not only identify service gaps for each route, but also present potential service improvement opportunities that formed the foundation for the recommendations in this chapter.

The service improvements in this section can be implemented in the short-term, as they are cost-neutral in terms of operating cost, and require no additional peak vehicles. **Figure 30** and **Figure 31** respectively show the proposed weekday/Saturday and Sunday system maps. These are followed by detailed descriptions of the changes recommended for each route.



Figure 30 | Proposed Weekday/Saturday System

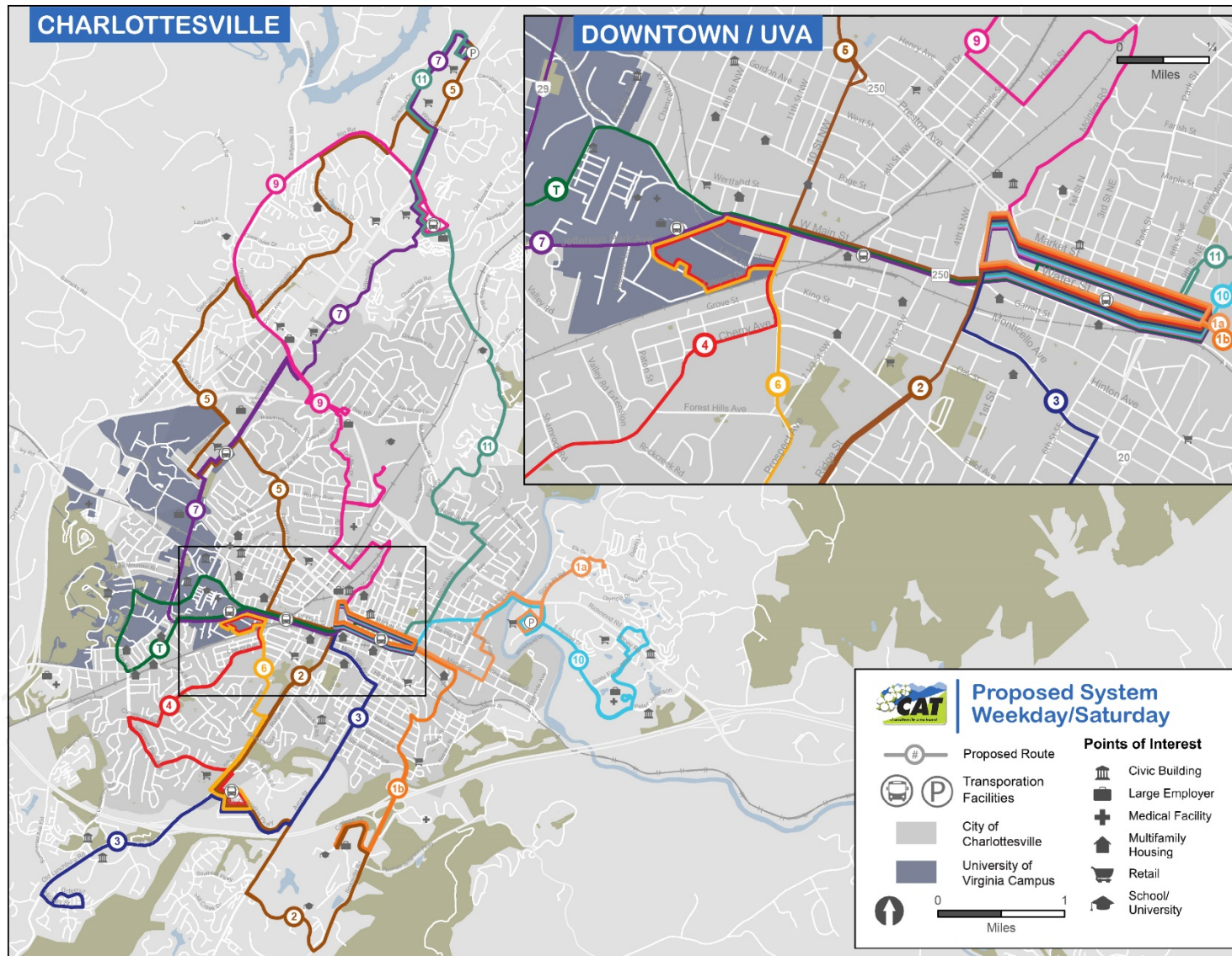
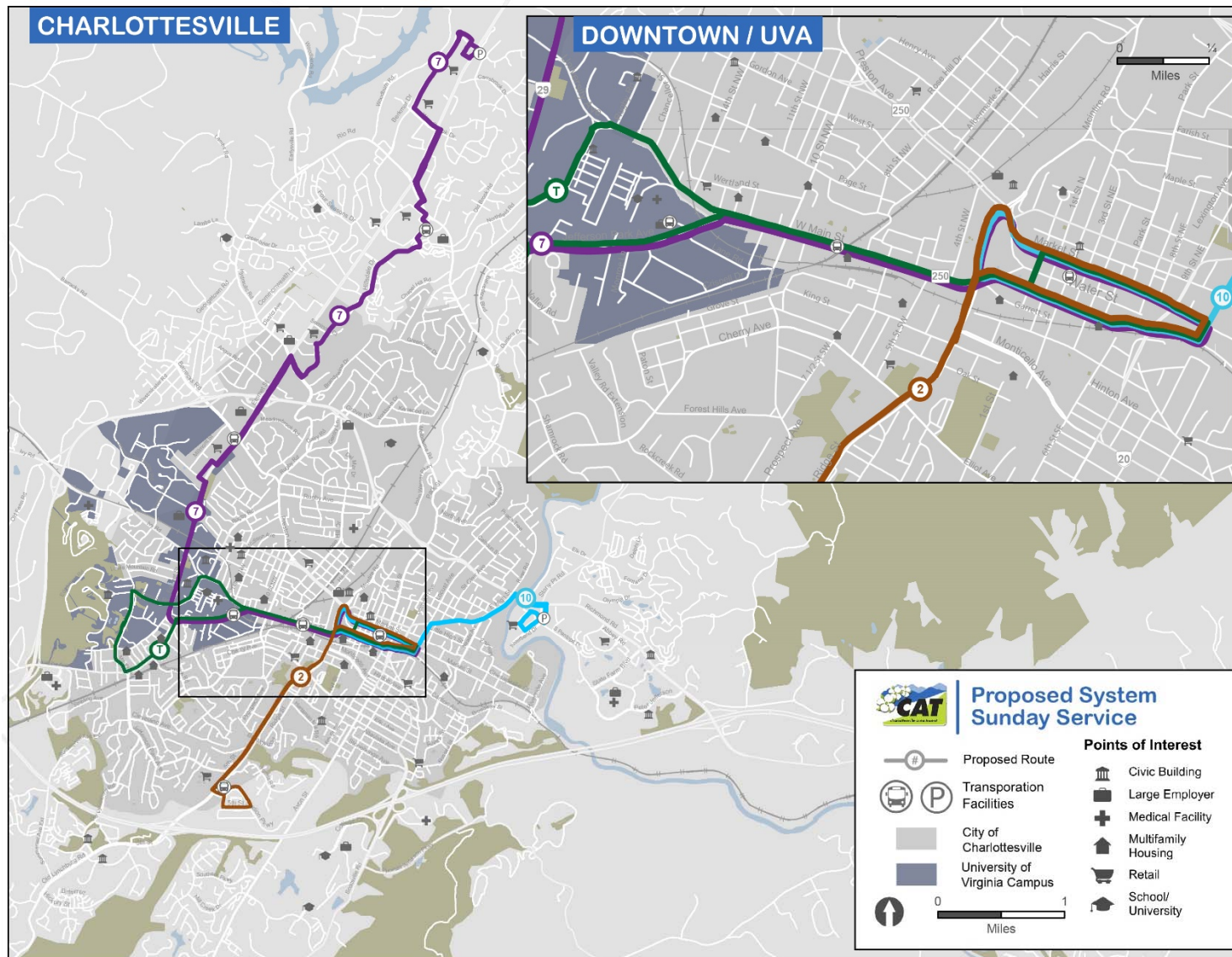


Figure 31 | Proposed Sunday System



4.1.1. Recommendation: Split Route 1 Into Two Routes; Streamline Alignments; Serve Pantops Area

Route 1 would be split into two routes (referred to as 1A and 1B in this document, with actual names to be determined by CAT staff). The proposed Route 1A (Figure 32) would operate between Charlottesville's Downtown Transit Station and the Avemore Apartments on Fontana Drive and Stoney Point Road, via the Woolen Mills neighborhood. This is a substantially new alignment, combining portions of the Woolen Mills service of the current Route 1 and the Stoney Point service of the current Route 10. The proposed route would link the Woolen Mills neighborhood and the Avemore Apartments directly to grocery and retail destinations at Pantops

Shopping Center. Route 1A would operate hourly throughout the service day on weekdays and Saturdays (**Table 4-2**). Key destinations along the proposed alignment include:

- Downtown Transit Station
- East Market Street
- Meade Park
- Onesty Family Aquatic Center
- Pantops Shopping Center
- Goodwill
- Avemore Apartments

Figure 32 | Route 1A Proposed Alignment

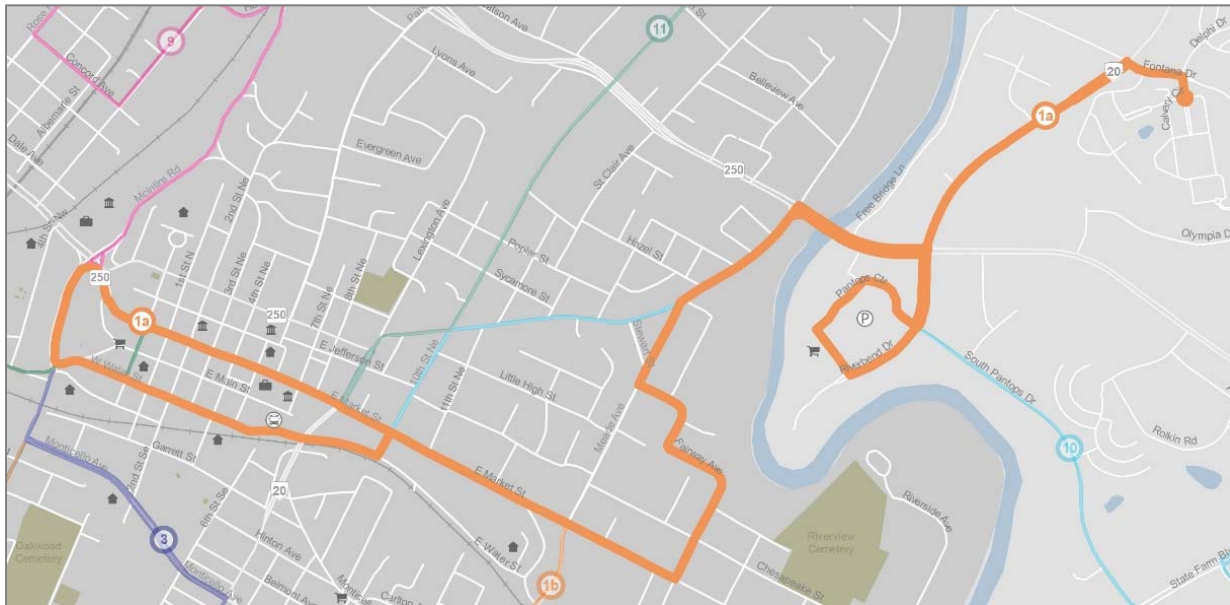


Table 4-2 | Route 1A Proposed Service Levels

Service Day	Approximate Span of Service	Frequency (minutes)
Weekday		
<i>AM Peak</i>	6:00 am – 9:00 am	60
<i>Midday</i>	9:00 am – 3:00 pm	60
<i>PM Peak</i>	3:00 pm – 7:00 pm	60
<i>Evening</i>	7:00 pm – 10:00 pm	60
Saturday	7:00 am – 10:00 pm	60
Sunday	--	--

The proposed Route 1B (**Figure 33**) would operate between Charlottesville's Downtown Transit Station and Piedmont Virginia Community College, via the Belmont Neighborhood. This alignment is similar to the southern branch of the current Route 1, but shifts service from Monticello Avenue, north of Carlton Road, to Carlton Road and Market Street. In addition, the route consolidates service between Carlton Road and Druid Avenue onto Monticello Avenue, rather than splitting northbound and southbound service between Monticello Road and Monticello Avenue, respectively.

Route 1B would operate hourly throughout the service day on weekdays and Saturdays (**Table 4-3**). Key destinations along the proposed alignment include:

- Downtown Transit Station
- East Market Street
- Worksource Enterprises
- Belmont Neighborhood
- Quarry Park

- PVCC

Figure 33 | Route 1B Proposed Alignment

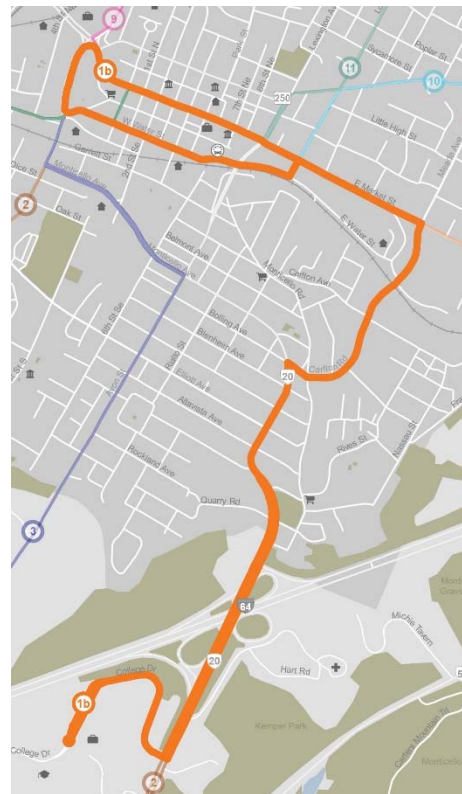


Table 4-3 | Route 1B Proposed Service Levels

Service Day	Approximate Span of Service	Frequency (minutes)
Weekday		
<i>AM Peak</i>	6:00 am – 9:00 am	60
<i>Midday</i>	9:00 am – 3:00 pm	60
<i>PM Peak</i>	3:00 pm – 7:00 pm	60
<i>Evening</i>	7:00 pm – 10:00 pm	60
Saturday	7:00 am – 10:00 pm	60
Sunday	8:00 am – 6:00 pm	60

4.1.3. Recommendation: Extend Route 2 to Mill Creek and PVCC; Provide Bi-Directional Service

The proposed Route 2 (**Figure 34**) would operate between Charlottesville's Downtown Transit Station and Piedmont Virginia Community College, via 5th Street Station. The proposed route would provide bi-directional service along nearly its entire alignment, compared to the current Route 7, which operates clockwise only along 5th Street and Avon Street. It would also introduce new service south of I-64, along Avon Street Extended and Mill Creek Drive.

As shown in **Table 4-4**, Route 2 would operate every 30 minutes during weekday peak periods, and hourly in the off-peak and on Saturdays. Sunday service would operate hourly and only between downtown Charlottesville and 5th Street Station.

Key destinations along the proposed alignment include:

- Downtown Transit Station
- Tonsler Park
- Blue Ridge Commons
- Willoughby Square
- 5th Street Station
- Southside Shopping Center
- Monticello High School
- PVCC

Figure 34 | Route 2 Proposed Alignment

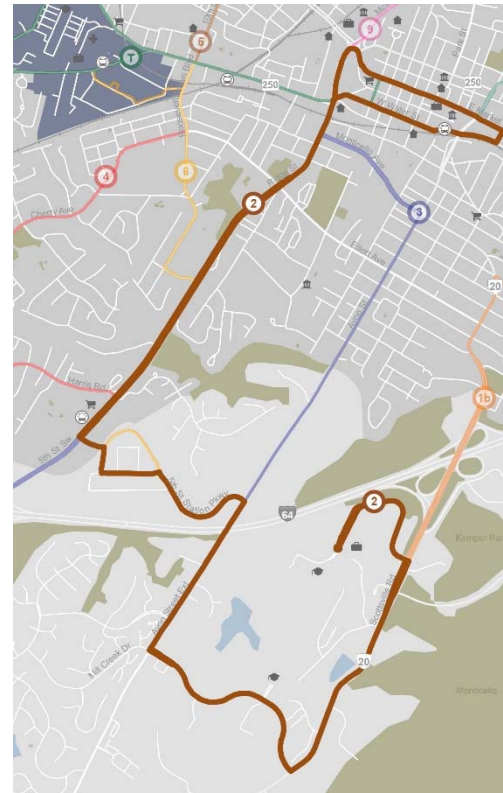


Table 4-4 | Route 2 Proposed Service Levels

Service Day	Approximate Span of Service	Frequency (minutes)
Weekday		
<i>AM Peak</i>	6:00 am – 9:00 am	30
<i>Midday</i>	9:00 am – 3:00 pm	60
<i>PM Peak</i>	3:00 pm – 7:00 pm	30
<i>Evening</i>	7:00 pm – 10:00 pm	60
Saturday	7:00 am – 10:00 pm	60
Sunday	8:00 am – 6:00 pm	60

4.1.4. Recommendation: Shift Route 3 Service to Avon via 5th Street Station; End Route in Downtown Charlottesville

The proposed Route 3 (**Figure 35**) would operate between Charlottesville's Downtown Transit Station and the Southwood Mobile Home Park, via 5th Street Station. This is a substantially new alignment, combining portions of the Avon Street service of the current Route 2 and the Old Lynchburg Road service of the current Route 3. The proposed route would provide direct and bi-directional access to grocery and retail destinations, as well as CAT transfer opportunities, at 5th Street Station from neighborhoods along Avon Street and the Old Lynchburg Road corridor, including the Southwood Mobile Home Park.

Route 3 would operate every 30 minutes during weekday peak periods, and hourly in the off-peak and on Saturdays (**Table 4-5**).

Key destinations along the proposed alignment include:

- Downtown Transit Station
- Friendship Court Apartments

- Belmont Park
- CAT Offices
- 5th Street Station
- Willoughby Shopping Center
- Albemarle County Offices
- Region 10 CSB
- Southwood Mobile Home Park

Figure 35 | Route 3 Proposed Alignment

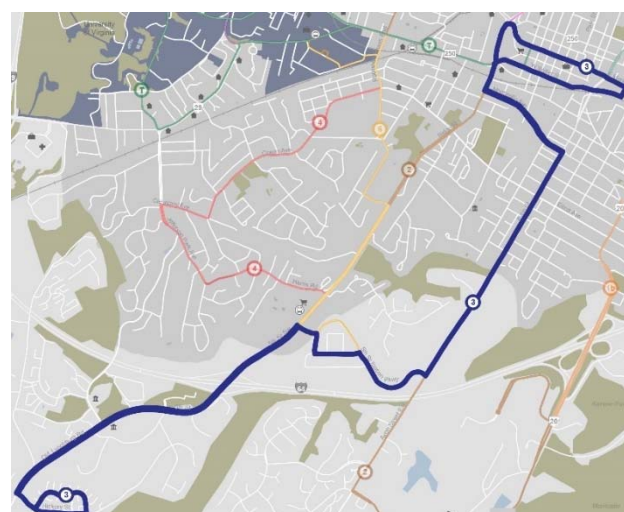


Table 4-5 | Route 3 Proposed Service Levels

Service Day	Approximate Span of Service	Frequency (minutes)
Weekday		
<i>AM Peak</i>	6:00 am – 9:00 am	30
<i>Midday</i>	9:00 am – 3:00 pm	60
<i>PM Peak</i>	3:00 pm – 7:00 pm	30
<i>Evening</i>	7:00 pm – 10:00 pm	60
Saturday	7:00 am – 10:00 pm	60
Sunday	--	--

4.1.6. Recommendation: Extend Route 4 to 5th Street Station; Eliminate Service Between UVA Hospital and Downtown Charlottesville

The proposed Route 4 (**Figure 36**) would operate between UVA Hospital and 5th Street Station, via Cherry Avenue and Harris Road. The primary changes from the current alignment include an extension of the route from its current terminus at Willoughby Square Shopping Center to 5th Street Station, and the elimination of service between UVA Hospital and downtown Charlottesville, which would continue to be linked by the Route 7 and free Trolley.

The proposed route would provide improved access to grocery and retail destinations at 5th Street Station, as well as transfer opportunities to other CAT routes at both 5th Street Station and UVA Hospital.

Route 4 would operate hourly throughout the service day on weekdays and Saturdays (**Table 4-6**).

Key destinations along the proposed alignment include:

- UVA Hospital
- Smith Aquatic Center
- Boys and Girls Club of Central Virginia
- Fry's Spring Beach Club
- Willoughby Shopping Center

- 5th Street Station

Figure 36 | Route 4 Proposed Alignment

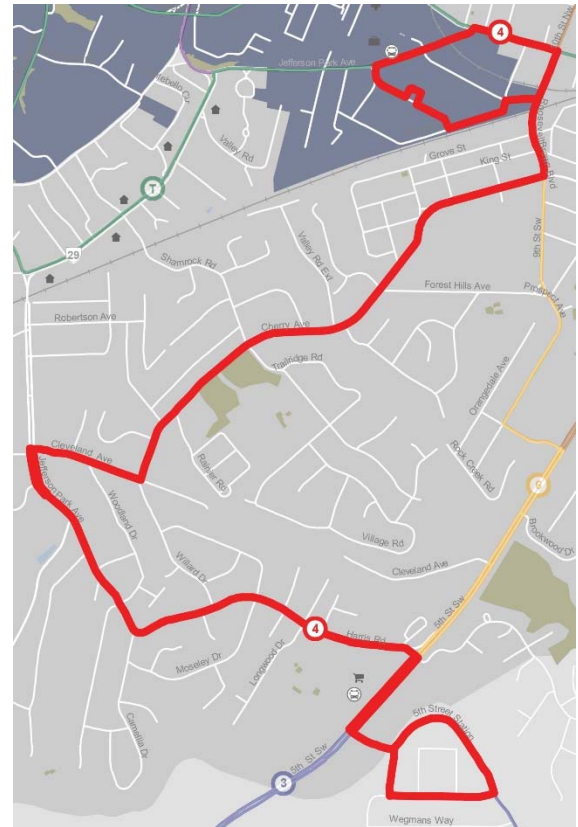


Table 4-6 | Route 4 Proposed Service Levels

Service Day	Approximate Span of Service	Frequency (minutes)
Weekday		
<i>AM Peak</i>	6:00 am – 9:00 am	60
<i>Midday</i>	9:00 am – 3:00 pm	60
<i>PM Peak</i>	3:00 pm – 7:00 pm	60
<i>Evening</i>	7:00 pm – 10:00 pm	60
Saturday	7:00 am – 10:00 pm	60
Sunday	--	--

4.1.7. Recommendation: Eliminated Route 5 Service to Fashion Square Mall; Consolidate with Route 8

The proposed Route 5 (**Figure 37**) would operate between Charlottesville's Downtown Transit Station and the Walmart Supercenter on Seminole Trail and Hilton Heights Road, via Barracks Road Shopping Center. The primary changes from the current alignment include an extension of the route from its current terminus at Barracks Road Shopping Center to downtown Charlottesville using the current Route 8 alignment, and the elimination of service to Fashion Square Mall. In addition, the proposed route would operate along 10th Street and Main Street rather than Preston Avenue, between Grady Avenue and downtown.

The proposed route would provide more direct access to Walmart from neighborhoods along Preston Avenue and Commonwealth Drive, as well as for riders transferring from UTS service at Barracks Road Shopping Center.

Route 5 would operate every 30 minutes throughout the service day on weekdays and Saturdays (**Table 4-7**).

Key destinations along the proposed alignment include:

- Downtown Transit Station
- Washington Park Recreation Center
- Barracks Road Shopping Center
- Shops at Stonefield
- Rio Hill Shopping Center

- Walmart Supercenter

Figure 37 | Route 5 Proposed Alignment

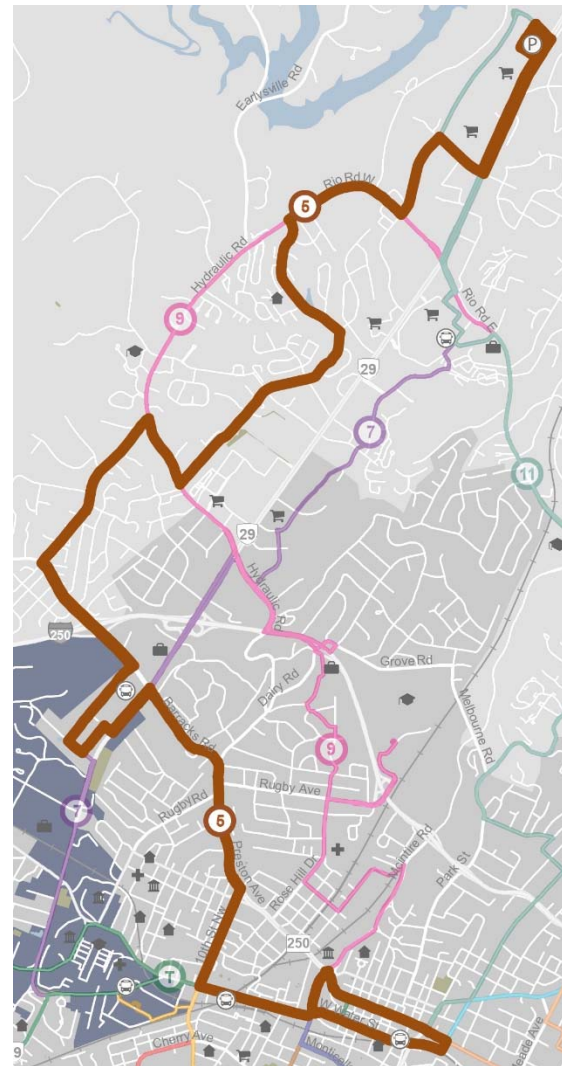


Table 4-7 | Route 5 Proposed Service Levels

Service Day	Approximate Span of Service	Frequency (minutes)
Weekday		
<i>AM Peak</i>	6:00 am – 9:00 am	30
<i>Midday</i>	9:00 am – 3:00 pm	30
<i>PM Peak</i>	3:00 pm – 7:00 pm	30
<i>Evening</i>	7:00 pm – 11:00 pm	30
Saturday	6:00 am – 11:00 pm	30
Sunday	--	--

4.1.8. Recommendation: Provide Bi-Directional Route 6 Service Between UVA Hospital and 5th Street Station; Eliminate Service between Downtown Charlottesville and UVA Hospital

The proposed Route 6 (**Figure 38**) would operate between UVA Hospital and 5th Street Station, via Prospect Avenue. The proposed route would provide bi-directional service along nearly its entire alignment, but would not serve downtown Charlottesville as the current Route 6 does. Instead, service between Willoughby Square and downtown would be provided by proposed Route 2.

The proposed Route 6 would improve service for neighborhoods along Prospect Avenue, including the Blue Ridge Commons Apartments, by providing access to and from grocery, retail, and medical destinations. By comparison, the current route allows residents to travel to Willoughby Square Shopping Center, but not back home without first traveling to downtown.

Route 6 would operate hourly throughout the service day on weekdays and Saturdays (**Table 4-8**).

Key destinations along the proposed alignment include:

- UVA Hospital
- Forest Hills Park
- Blue Ridge Commons Apartments
- Willoughby Square Shopping Center

- 5th Street Station

Figure 38 | Route 6 Proposed Alignment

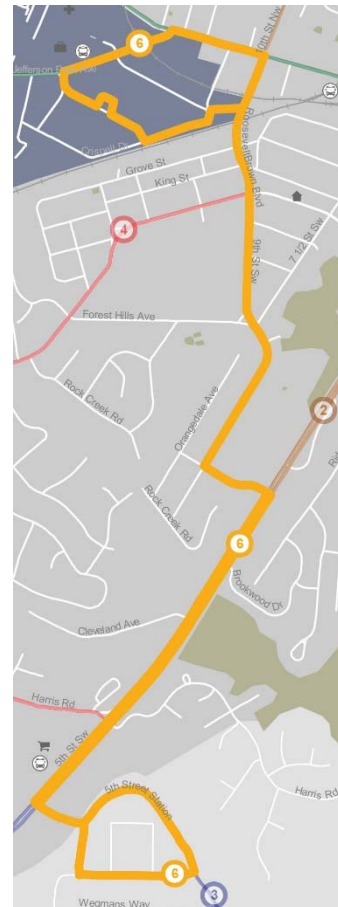


Table 4-8 | Route 6 Proposed Service Levels

Service Day	Approximate Span of Service	Frequency (minutes)
Weekday		
<i>AM Peak</i>	6:00 am – 9:00 am	60
<i>Midday</i>	9:00 am – 3:00 pm	60
<i>PM Peak</i>	3:00 pm – 7:00 pm	60
<i>Evening</i>	7:00 pm – 10:00 pm	60
Saturday	7:00 am – 10:00 pm	60
Sunday	--	--

4.1.9. Recommendation: Eliminate Route 7 Service to the Shops at Stonefield; Extend Route to Walmart; Replace Route 12 on Sundays

The proposed Route 7 (**Figure 39**) would operate between Charlottesville's Downtown Transit Station and the Walmart Supercenter on Seminole Trail and Hilton Heights Road, via UVA and Barracks Road Shopping Center. The primary changes from the current alignment include an extension of the route from its current terminus at Fashion Square Mall to the Walmart Supercenter. In addition, the route would utilize the Hillsdale Drive extension, and operate south/east of Seminole Trail from Fashion Square Mall to Hydraulic Road. Service to the Shops at Stonefield would be provided by proposed Route 9.

Route 7 would operate every 30 minutes throughout the service day on weekdays, Saturdays, and Sundays (**Table 4-9**). Key destinations along the proposed alignment include:

- Downtown Transit Station
- Amtrak Station
- UVA Medical Center
- University of Virginia
- Barracks Road Shopping Center
- Seminole Square Shopping Center
- Fashion Square Mall
- Rio Hill Shopping Center
- Walmart Supercenter

Figure 39 | Route 7 Proposed Alignment

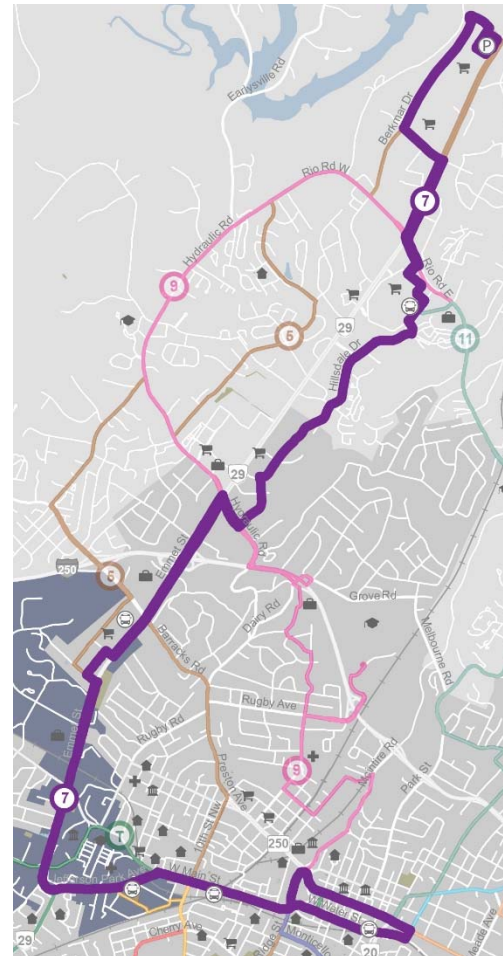


Table 4-9 | Route 7 Proposed Service Levels

Service Day	Approximate Span of Service	Frequency (minutes)
Weekday		
<i>AM Peak</i>	6:00 am – 9:00 am	30
<i>Midday</i>	9:00 am – 3:00 pm	30
<i>PM Peak</i>	3:00 pm – 7:00 pm	30
<i>Evening</i>	7:00 pm – 11:00 pm	30
Saturday	6:00 am – 11:00 pm	30
Sunday	8:00 am – 6:00 pm	30

4.1.10. Recommendation: Extend Route 9 to Fashion Square Mall via Hydraulic Road; Add Service to McIntire/Harris Area

The proposed Route 9 (**Figure 40**) would operate between Charlottesville's Downtown Transit Station and Fashion Square Mall, via McIntire Plaza, Brooks Family YMCA, and the Shops at Stonefield. This is a substantially new alignment combining portions of the current Route 9 service to the YMCA and Route 5 service to Fashion Square Mall.

The proposed route would introduce new service to McIntire Road and Harris Street, and link Albemarle High School and Charlottesville High School to the YMCA and Fashion Square Mall. However, Charlottesville High School would be served via a pedestrian path from the YMCA, rather than from Grove Road. Service to UVA Hospital would be eliminated, but frequent service between downtown and UVA Hospital would continue to be available via Route 7 and the free Trolley.

Route 9 would operate hourly throughout the service day on weekdays and Saturdays (**Table 4-10**).

Key destinations along the proposed alignment include:

- Downtown Transit Station
- McIntire Plaza
- Charlottesville Health Department
- Brooks Family YMCA
- Charlottesville High School
- Shops at Stonefield
- Albemarle High School
- Fashion Square Mall

Figure 40 | Route 9 Proposed Alignment

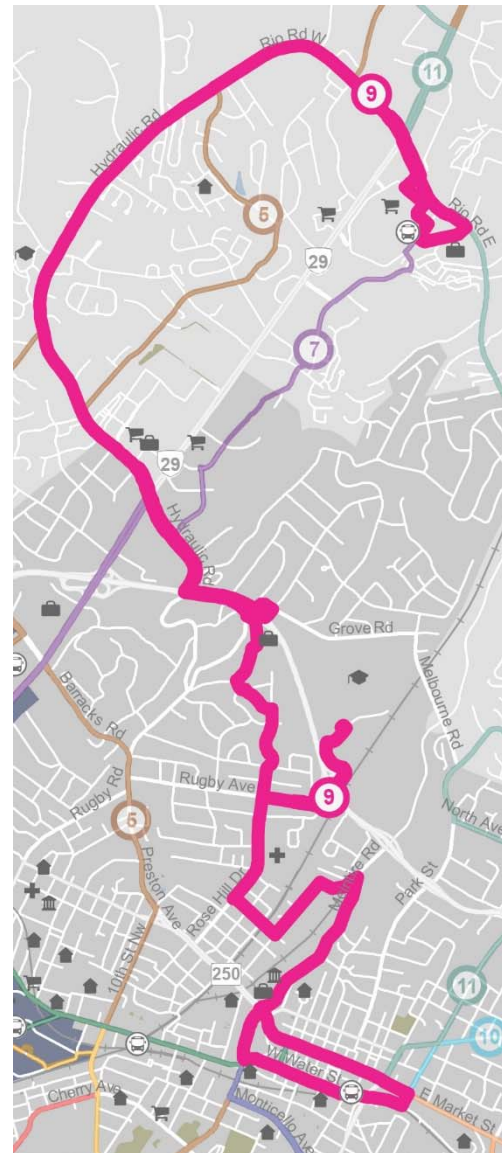


Table 4-10 | Route 9 Proposed Service Levels

Service Day	Approximate Span of Service	Frequency (minutes)
Weekday		
AM Peak	6:00 am – 9:00 am	60
Midday	9:00 am – 3:00 pm	60
PM Peak	3:00 pm – 7:00 pm	60
Evening	7:00 pm – 10:00 pm	60
Saturday	7:00 am – 10:00 pm	60

4.1.11. Recommendation: Provide Bi-Directional Route 10 Service; Shift Service to Avemore Apartments to Route 1A

The proposed Route 10 (**Figure 41**) would operate between Charlottesville's Downtown Transit Station and the Social Security Administration office on Richmond Road, via Pantops Shopping Center and Martha Jefferson Hospital. The primary changes from the current alignment include bidirectional service between Pantops Shopping Center and the Social Security office, and the elimination of service along Stoney Point Road to the Avemore Apartments. The Avemore Apartments would instead be served by the proposed Route 1A.

The proposed route's bidirectional service would more directly link multifamily housing communities along Pantops Drive to employment, medical, and retail destinations along the route, compared to the current route which includes a large counter-

clockwise loop that only allows riders to travel in one direction. As shown in **Table 4-11**, Route 10 would operate every 30 minutes during weekday peak periods, and hourly during off-peak periods and on Saturdays. Sunday service would operate hourly between downtown Charlottesville and Pantops Shopping Center.

Key destinations along the proposed alignment include:

- Downtown Transit Station
- Pantops Shopping Center
- State Farm Operations Center
- Martha Jefferson Hospital
- Virginia Department of Motor Vehicles
- Social Security Administration

Figure 41 | Route 10 Proposed Alignment

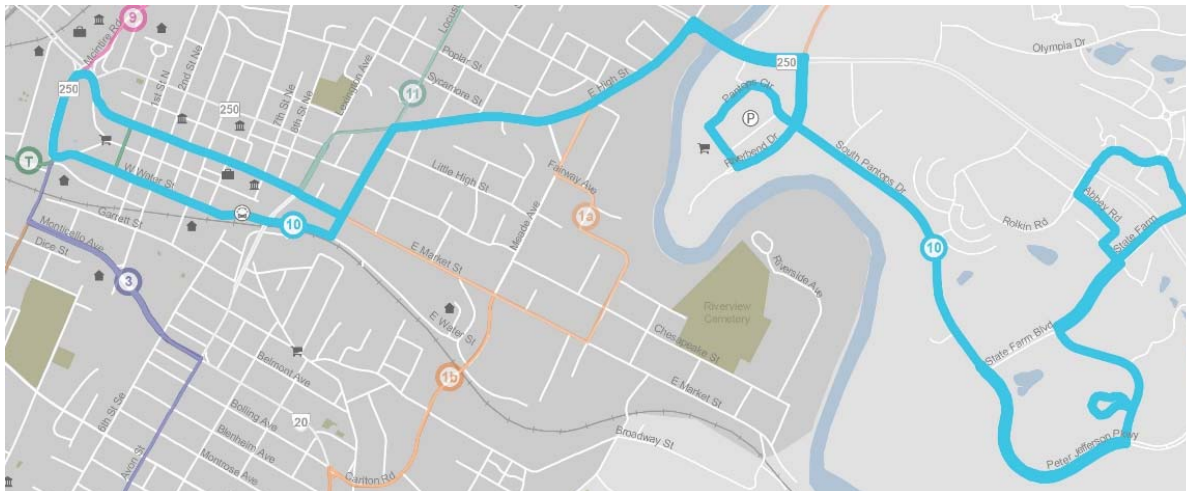


Table 4-11 | Route 10 Proposed Service Levels

Service Day	Approximate Span of Service	Frequency (minutes)
Weekday		
AM Peak	6:00 am – 9:00 am	30
Midday	9:00 am – 3:00 pm	60
PM Peak	3:00 pm – 7:00 pm	30
Evening	7:00 pm – 10:00 pm	60
Saturday	7:00 am – 10:00 pm	60
Sunday	--	--

4.1.12. Recommendation: Streamline Route 11; Extend Service to Walmart

The proposed Route 11 (**Figure 42**) would operate between Charlottesville's Downtown Transit Station and the Walmart Supercenter on Seminole Trail and Hilton Heights Road, via Locust Avenue, Rio Road, and Fashion Square Mall. The primary changes from the current alignment include an extension of the route from its current terminus at Fashion Square Mall to the Walmart Supercenter, and the elimination of a mid-route loop along Locust Avenue, Peartreet Lane, and St. Clair Avenue.

The proposed route would provide the most direct option for travel between downtown and the Walmart Supercenter. It would also streamline service for residents in neighborhoods and apartment complexes along Rio Road, to both downtown and retail destinations including Walmart and Fashion Square mall.

Route 11 would operate hourly throughout the service day on weekdays and Saturdays (**Table 4-12**).

Key destinations along the proposed alignment include:

- Downtown Transit Station
- Charlottesville Catholic School
- Charlottesville-Albemarle Technical Education Center
- Fashion Square Mall
- Rio Hill Shopping Center

- Walmart Supercenter
- Albemarle High School
- Fashion Square Mall

Figure 42 | Route 11 Proposed Alignment

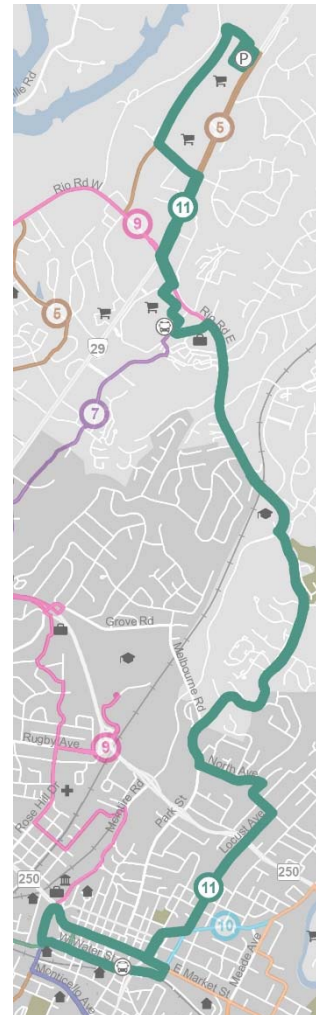


Table 4-12 | Route 11 Proposed Service Levels

Service Day	Approximate Span of Service	Frequency (minutes)
Weekday		
<i>AM Peak</i>	6:00 am – 9:00 am	60
<i>Midday</i>	9:00 am – 3:00 pm	60
<i>PM Peak</i>	3:00 pm – 7:00 pm	60
<i>Evening</i>	7:00 pm – 10:00 am	60
Saturday	7:00 am – 10:00 pm	60
Sunday	--	--

4.1.13. Short-Term Operating Plan

The short-term recommendations described in this section rely heavily on interlining to maximize the amount of service that can be provided with existing resources. Interlining is the practice of operating a single bus or group of buses on multiple routes. Interlining is often used to optimize cycle times and recovery times. For example, if one route has insufficient recovery time while another has excessive recovery time, interlining the routes can result in a cycle with an optimal mix of running time and recovery time.

Cycle times that are factors or multiples of 60 allow for the greatest range of clock-face schedules. Clock-face schedules are schedules that result in buses serving a particular stop at the same time or times past every hour (e.g. 1:10, 2:10, 3:10, etc., or 1:00, 1:30, 2:00, 2:30, etc.). Clock-face frequencies make it easy for riders to remember schedules, and make it easier to coordinate connections at key hubs.

Clock-face schedules are proposed for all of the recommended routes, and recovery times are projected to fall between 10 and 20 percent of total cycle time for nearly every route. When recovery time is less than 10 percent of total cycle time, there is a

high risk of poor on-time performance because there is insufficient buffering between trips. With insufficient recovery time, one late trip can lead to another, causing a bus to get further and further behind schedule. On the other hand, if there is more than 20 percent recovery time in a schedule, buses are sitting unproductively for long periods of time.

The recommended short-term service redesign scenario would require 21 peak vehicles, and would result in 319 weekday revenue hours, 273 Saturday revenue hours, and 50 Sunday revenue hours. By comparison, the existing CAT service requires 23 peak vehicles and includes 313 weekday revenue hours, 297 Saturday revenue hours, and 47 Sunday revenue hours. Assuming 251 weekday, 52 Saturday, and 52 Sunday service days per year, the proposed service would result in 0.43 percent more annual revenue hours than the current service. In other words, the proposed service is essentially cost-neutral compared to current service.

Table 4-13, Table 4-14, and Table 4-15 show the proposed weekday, Saturday, and Sunday service characteristics of each route, including peak vehicles and daily revenue hours. Routes that are shown together (using the '+' symbol) are proposed for interlining.



Weekday Operating Plan

Table 4-13 | Proposed Weekday Service Characteristics: Short-Term

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	Peak Freq.	Peak Hours	Peak Trips	Peak Vehicles	Off-Peak Freq.	Off-Peak Hrs.	Off-Peak Trips	Off-Peak Vehicles	Daily Trips	Daily Hrs. Serv.	Rev. Hrs.
5+7	37.1	12.5	2:58	0:17	3:15	3:30	0:31	15%	0:30	7:00	14	7.0	0:30	10:00	20	7.0	34	17:00	119:00
4+6	11.4	13	0:52	0:05	0:57	1:00	0:07	12%	1:00	7:00	7	1.0	1:00	9:00	9	1.0	16	16:00	16:00
9+1B	24.9	14	1:46	0:10	1:57	2:00	0:13	11%	1:00	7:00	7	2.0	1:00	9:00	9	2.0	16	16:00	32:00
3	11.3	13	0:52	0:05	0:57	1:00	0:07	13%	0:30	7:00	14	2.0	1:00	9:00	9	1.0	23	16:00	23:00
11+1A	23.3	13	1:47	0:10	1:58	2:00	0:12	10%	1:00	7:00	7	2.0	1:00	9:00	9	2.0	16	16:00	32:00
10+2	22.4	13	1:43	0:10	1:53	2:00	0:16	14%	0:30	7:00	14	4.0	1:00	9:00	9	2.0	23	16:00	46:00
T	6	12	0:30	0:03	0:33	0:45	0:15	33%	0:15	7:00	28	3.0	0:15	10:00	40	3.0	68	17:00	51:00

Saturday Operating Plan

Table 4-14 | Proposed Saturday Service Characteristics: Short-Term

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	Peak Freq.	Peak Hours	Peak Trips	Peak Vehicles	Off-Peak Freq.	Off-Peak Hrs.	Off-Peak Trips	Off-Peak Vehicles	Daily Trips	Daily Hrs. Serv.	Rev. Hrs.
5+7	37.1	13.5	2:44	0:16	3:01	3:30	0:45	21%	0:30	7:00	14	7.0	0:30	10:00	20	7.0	34	17:00	119:00
4+6	11.4	13	0:52	0:05	0:57	1:00	0:07	12%	1:00	7:00	7	1.0	1:00	8:00	8	1.0	15	15:00	15:00
9+1B	24.9	14	1:46	0:10	1:57	2:00	0:13	11%	1:00	7:00	7	2.0	1:00	8:00	8	2.0	15	15:00	30:00
3	11.3	13	0:52	0:05	0:57	1:00	0:07	13%	1:00	7:00	7	1.0	1:00	8:00	8	1.0	15	15:00	15:00
11+1A	23.3	13	1:47	0:10	1:58	2:00	0:12	10%	1:00	7:00	7	2.0	1:00	8:00	8	2.0	15	15:00	30:00
10+2	22.4	13	1:43	0:10	1:53	2:00	0:16	14%	1:00	7:00	7	2.0	1:00	8:00	8	2.0	15	15:00	30:00
T	6	13.5	0:26	0:02	0:29	0:30	0:03	11%	0:15	7:00	28	2.0	0:15	10:00	40	2.0	68	17:00	34:00

Sunday Operating Plan

Table 4-15 | Proposed Sunday Service Characteristics: Short-Term

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	Peak Freq.	Peak Hours	Peak Trips	Peak Vehicles	Off-Peak Freq.	Off-Peak Hrs.	Off-Peak Trips	Off-Peak Vehicles	Daily Trips	Daily Hrs. Serv.	Rev. Hrs.
7	17.2	13.5	1:16	0:07	1:24	1:30	0:13	15%	0:30	10:00	20	3.0	0:30	0:00	0	3.0	20	10:00	30:00
2+10	10.5	13	0:48	0:04	0:53	1:00	0:11	19%	1:00	10:00	10	1.0	1:00	0:00	0	1.0	10	10:00	10:00
T	6	13.5	0:26	0:02	0:29	0:30	0:03	11%	0:30	10:00	20	1.0	0:30	0:00	0	1.0	20	10:00	10:00

4.1.14. Short-Term Ridership Estimates

To estimate the expected ridership of the proposed short-term network, a three-step process was used. First, current system ridership was redistributed among the proposed routes based on geographic coverage (**Table 4-16**). If the service area of an existing route is proposed to be picked up by one or more new routes, the current ridership from that route is reassigned proportionally to the new route or routes that will cover the service area. In some cases, some ridership is assumed lost if a current route segment is not covered at all in the proposed redesign. Ridership loss for the proposed network is minimal.

In the second step, the redistributed ridership calculated in Step 1 forms a new baseline (**Table 4-17**). New ridership is then added to this baseline wherever there is new service coverage (**Table 4-18**). In newly served areas, ridership was estimated based on the average boardings at stops that serve similar neighborhoods and destinations. For example, if new service is being added to an apartment complex that was not previously served, the estimated ridership for the new stop is based on the current ridership at similarly sized apartment complexes that are currently being served. A second new ridership baseline is established at the end of Step 2. This baseline reflects the impacts of only the geographic coverage changes to the routes.

The third step of the process estimates the ridership impact of service characteristics such as schedule

changes and directness of service. Each service characteristic was assigned an impact factor based on TCRP research and the experience of the study team with past service redesigns. Increased service frequency was expected to increase ridership, while decreased service reduced ridership. Routes that provide more direct connections between major destinations were also anticipated to have increased ridership over previous alignments. The impact factors (listed in several tables by day type in **Appendix C**) are generally assigned in a binary fashion (i.e. if a route is made more frequent, the impact factor is applied to it, and if it is not made more frequent the factor is not applied). However, in some cases a factor is partially applied, or doubly applied. For example, if a route's frequency is improved during the peak period, but not during the off-peak period of the day, then only half of the frequency impact factor is applied. Similarly, if a route is made more direct, and also made bidirectional at the same time, then the directness factor is applied twice. Finally, all the applicable factors are applied to the ridership baseline established at the end of Step 2 to arrive at a final projected ridership (**Table 4-19**) that reflects both the changes in geographic coverage and service characteristics of each route.

Based on the process described above, the proposed short-term network will increase ridership by 3 percent on weekdays, 19 percent on Saturdays, and 16 percent on Sundays. **Table 4-16** through **Table 4-27** outline the abovementioned process in steps by day type.



Weekday Ridership Estimates

Table 4-16 | Weekday Ridership, Step One: Ridership Redistribution by Geographic Coverage

Existing Ridership		Proposed Route & Distribution Factor											
Route	Daily Ridership	1A	1B	2	3	4	5	6	7	9	10	11	T
1	195	0.40	0.50	--	0.05	--	--	--	--	--	--	--	--
2	154	--	--	0.70	0.30	--	--	--	--	--	--	--	--
3	398	--	0.20	0.25	0.50	--	--	--	--	--	--	--	--
4	402	--	--	--	--	0.90	--	--	0.05	--	--	--	--
5	753	--	--	--	--	--	0.80	--	--	0.20	--	--	--
6	292	--	--	0.20	--	--	--	0.75	--	--	--	--	--
7	2,187	--	--	--	--	--	--	--	0.85	0.10	--	--	--
8	329	--	--	--	--	--	0.90	--	--	0.05	--	--	--
9	126	--	--	--	--	--	0.10	--	0.10	0.75	--	--	--
10	230	0.45	--	--	--	--	--	--	--	--	0.50	--	--
11	229	--	--	--	--	--	--	--	--	--	--	0.95	--
T	2,838	--	--	--	--	--	--	--	--	--	--	--	1.00
Total	8,133												

Table 4-17 | Weekday Ridership, Step One (Continued): New Baseline Ridership Based on Geographic Coverage

Existing Ridership		Proposed Route & Baseline Ridership												
Route	Daily Ridership	1A	1B	2	3	4	5	6	7	9	10	11	T	Total
1	195	78	98	0	10	0	0	0	0	0	0	0	0	
2	154	0	0	108	46	0	0	0	0	0	0	0	0	
3	398	0	80	100	199	0	0	0	0	0	0	0	0	
4	402	0	0	0	0	362	0	0	20	0	0	0	0	
5	753	0	0	0	0	0	602	0	0	151	0	0	0	
6	292	0	0	58	0	0	0	219	0	0	0	0	0	
7	2,187	0	0	0	0	0	0	0	1859	219	0	0	0	
8	329	0	0	0	0	0	296	0	0	16	0	0	0	
9	126	0	0	0	0	0	13	0	13	95	0	0	0	
10	230	104	0	0	0	0	0	0	0	0	115	0	0	
11	229	0	0	0	0	0	0	0	0	0	0	218	0	
T	2,838	0	0	0	0	0	0	0	0	0	0	0	2838	
Total	8,133	182	177	266	255	362	911	219	1,892	480	115	218	2,838	7,914

Table 4-18 | Weekday Ridership, Step Two: New Ridership Based on Added Geographic Coverage

Proposed Route	Estimated Daily Riders (Baseline)	Estimated New Daily Riders (Coverage)	Estimated Total Daily Riders
1A	182	15	197
1B	177	0	177
2	266	30	296
3	255	10	265
4	362	10	372
5	911	0	911
6	219	10	229
7	1,892	20	1,912
9	480	15	495
10	115	0	115
11	218	20	238
T	2,838	0	2,838
Total	7,914	130	8,044

Table 4-19 | Weekday Ridership, Step Three: Ridership Adjustment Based on Service Characteristics

Proposed Route	Estimated Daily Riders Based on Geographic Coverage	Impact Factor from Service Characteristics Impact Calculator ²	Projected Ridership
1A	197	0.10	216
1B	177	0.10	195
2	296	-0.05	281
3	265	0.00	265
4	372	0.03	383
5	911	0.00	911
6	229	0.00	229
7	1,912	-0.05	1,816
9	495	0.63	807
10	115	0.45	167
11	238	0.10	261
T	2,838	0.00	2,838
Total	8,044	--	8,369

² *Factors based on TCRP 66: Fixed-Route Transit Ridership Forecasting and Service Planning Methods and industry/analogous project experience



Saturday Ridership Estimates

Table 4-20 | Saturday Ridership, Step One: Ridership Redistribution by Geographic Coverage

Existing Ridership		Proposed Route & Distribution Factor											
Route	Daily Ridership	1A	1B	2	3	4	5	6	7	9	10	11	T
1	0	--	--	--	--	--	--	--	--	--	--	--	--
2	157	--	--	0.70	0.30	--	--	--	--	--	--	--	--
3	295	--	0.20	0.25	0.50	--	--	--	--	--	--	--	--
4	133	--	--	--	--	0.90	--	--	0.05	--	--	--	--
5	594	--	--	--	--	--	0.80	--	--	0.20	--	--	--
6	172	--	--	0.20	--	--	--	0.75	--	--	--	--	--
7	1,423	--	--		--	--	--	--	0.85	0.10	--	--	--
8	186	--	--	--	--	--	0.90	--	--	0.05	--	--	--
9	59	--	--	--	--	--	0.10	--	0.10	0.75	--	--	--
10	154	0.45	--	--	--	--	--	--	--	--	0.50	--	--
11	162	--	--	--	--	--	--	--	--	--	--	0.95	--
T	1,297	--	--	--	--								1.00
Total	4,632												

Table 4-21 | Saturday Ridership, Step One (Continued): New Baseline Ridership Based on Geographic Coverage

Existing Ridership		Proposed Route & Baseline Ridership												
Route	Daily Ridership	1A	1B	2	3	4	5	6	7	9	10	11	T	Total
1	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	157	0	0	110	47	0	0	0	0	0	0	0	0	
3	295	0	59	74	148	0	0	0	0	0	0	0	0	
4	133	0	0	0	0	120	0	0	7	0	0	0	0	
5	594	0	0	0	0	0	475	0	0	119	0	0	0	
6	172	0	0	34	0	0	0	129	0	0	0	0	0	
7	1,423	0	0	0	0	0	0	0	1,210	142	0	0	0	
8	186	0	0	0	0	0	167	0	0	9	0	0	0	
9	59	0	0	0	0	0	6	0	6	44	0	0	0	
10	154	69	0	0	0	0	0	0	0	0	77	0	0	
11	162	0	0	0	0	0	0	0	0	0	0	154	0	
T	1,297	0	0	0	0	0	0	0	0	0	0	0	1,297	
Total	4,632	69	59	218	195	120	649	129	1,222	315	77	154	1,297	4,503

Table 4-22 | Saturday Ridership, Step Two: New Ridership Based on Added Geographic Coverage

Proposed Route	Estimated Daily Riders (Baseline)	Estimated New Daily Riders (Coverage)	Estimated Total Daily Riders
1A	69	90	159
1B	59	80	139
2	218	15	233
3	195	5	200
4	120	5	125
5	649	0	649
6	129	5	134
7	1,222	10	1,232
9	315	8	322
10	77	0	77
11	154	10	164
T	1,297	0	1,297
Total	4,503	228	4,730

Table 4-23 | Saturday Ridership, Step Three: Ridership Adjustment Based on Service Characteristics

Proposed Route	Estimated Daily Riders Based on Geographic Coverage	Impact Factor from Service Characteristics Impact Calculator	Projected Ridership
1A	159	1.00	319
1B	139	1.00	278
2	233	-0.30	163
3	200	0.00	200
4	125	0.53	191
5	649	0.00	649
6	134	0.00	134
7	1,232	0.22	1,503
9	322	0.63	525
10	77	0.20	92
11	164	0.10	180
T	1,297	0.00	1,297
Total	4,730	--	5,531

Sunday Ridership Estimates

Table 4-24 | Sunday Ridership, Step One: Ridership Redistribution by Geographic Coverage

Existing Ridership		Proposed Route & Distribution Factor			
Route	Daily Ridership	2	7	10	T
2	104	0.60	--	--	--
9	18	--	0.20	--	--
12	467	--	0.85	--	--
T	707	--	--	--	1.00
Total	1,296				

Table 4-25 | Sunday Ridership, Step One (Continued): New Baseline Ridership Based on Geographic Coverage

Existing Ridership		Proposed Route & Baseline Ridership				
Route	Daily Ridership	2	7	10	T	Total
2	104	62	0	0	0	
9	18	0	4	0	0	
12	467	0	397	0	0	
T	707	0	0	0	707	
Total	1,296	62	401	0	707	1,170

Table 4-26 | Sunday Ridership, Step Two: New Ridership Based on Added Geographic Coverage

Proposed Route	Estimated Daily Riders (Baseline)	Estimated New Daily Riders (Coverage)	Estimated Total Daily Riders
2	62	10	72
9	401	0	401
12	0	35	35
T	707	0	707
Total	1,170	45	1,215

Table 4-27 | Sunday Ridership, Step Three: Ridership Adjustment Based on Service Characteristics

Proposed Route	Estimated Daily Riders Based on Geographic Coverage	Impact Factor from Service Characteristics Impact Calculator	Projected Ridership
2	72	-0.30	51
9	401	0.60	641
12	35	1.00	70
T	707	0.05	742
Total	1,215	--	1,504



4.2. MID-TERM (3-10 YEARS) SERVICE IMPROVEMENTS AND NEEDS IDENTIFICATION

With the implementation of the short-term recommendations, CAT service will be well-aligned geographically with the market for transit in the service area. However, a common theme in the rider survey responses presented in Chapter 3 was a desire for more service, including more frequent service on weekdays, and Sunday service on more routes.

The mid-term recommendations build on the network proposed in the short-term recommendations but add 30-minute peak-period service to every route. Saturday service remains unchanged from the short-term recommendations. Sunday service in the mid-term mimics Saturday service, but with an abridged span of service (12 hours for each route). **Table 4-28**, **Table 4-29**, and **Table 4-30** show the mid-term service plans for weekday, Saturday, and Sunday service respectively.

Weekday Operating Plan

Table 4-28 | Proposed Weekday Service Characteristics: Mid-Term

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	Peak Freq.	Peak Hours	Peak Trips	Peak Vehicles	Off-Peak Freq.	Off-Peak Hrs.	Off-Peak Trips	Off-Peak Vehicles	Daily Trips	Daily Hrs. Serv.	Rev. Hrs.
5+7	37.1	12.5	2:58	0:17	3:15	3:30	0:31	15%	0:30	7:00	14	7.0	0:30	10:00	20	7.0	34	17:00	119:00
4+6	11.4	13	0:52	0:05	0:57	1:00	0:07	12%	0:30	7:00	14	2.0	1:00	10:00	10	1.0	24	17:00	24:00
9+1B	24.9	14	1:46	0:10	1:57	2:00	0:13	11%	0:30	7:00	14	4.0	1:00	10:00	10	2.0	24	17:00	48:00
3	11.3	13	0:52	0:05	0:57	1:00	0:07	13%	0:30	7:00	14	2.0	1:00	10:00	10	1.0	24	17:00	24:00
11+1A	23.3	13	1:47	0:10	1:58	2:00	0:12	10%	0:30	7:00	14	4.0	1:00	10:00	10	2.0	24	17:00	48:00
10+2	22.4	13	1:43	0:10	1:53	2:00	0:16	14%	0:30	7:00	14	4.0	1:00	10:00	10	2.0	24	17:00	48:00
T	6.0	12	0:30	0:03	0:33	0:45	0:15	33%	0:30	7:00	14	1.5	0:15	10:00	40	3.0	54	17:00	40:30



Saturday Operating Plan

Table 4-29 | Proposed Saturday Service Characteristics: Mid-Term

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	Peak Freq.	Peak Hours	Peak Trips	Peak Vehicles	Off-Peak Freq.	Off-Peak Hrs.	Off-Peak Trips	Off-Peak Vehicles	Daily Trips	Daily Hrs. Serv.	Rev. Hrs.
5+7	37.1	13.5	2:44	0:16	3:01	3:30	0:45	21%	0:30	7:00	14	7.0	0:30	10:00	20	7.0	34	17:00	119:00
4+6	11.4	13	0:52	0:05	0:57	1:00	0:07	12%	1:00	7:00	7	1.0	1:00	8:00	8	1.0	15	15:00	15:00
9+1B	24.9	14	1:46	0:10	1:57	2:00	0:13	11%	1:00	7:00	7	2.0	1:00	8:00	8	2.0	15	15:00	30:00
3	11.3	13	0:52	0:05	0:57	1:00	0:07	13%	1:00	7:00	7	1.0	1:00	8:00	8	1.0	15	15:00	15:00
11+1A	23.3	13	1:47	0:10	1:58	2:00	0:12	10%	1:00	7:00	7	2.0	1:00	8:00	8	2.0	15	15:00	30:00
10+2	22.4	13	1:43	0:10	1:53	2:00	0:16	14%	1:00	7:00	7	2.0	1:00	8:00	8	2.0	15	15:00	30:00
T	6.0	13.5	0:26	0:02	0:29	0:30	0:03	11%	0:15	7:00	28	2.0	0:15	10:00	40	2.0	68	17:00	34:00

Sunday Operating Plan

Table 4-30 | Proposed Sunday Service Characteristics: Mid-Term

Proposed Route	Avg. Round Trip Miles	Est. Avg. Speed	Run Time	Min. Recovery Time	Min. Cycle Time	Even Cycle Time	Actual Recovery Time	Actual % Recovery	Peak Freq.	Peak Hours	Peak Trips	Peak Vehicles	Off-Peak Freq.	Off-Peak Hrs.	Off-Peak Trips	Off-Peak Vehicles	Daily Trips	Daily Hrs. Serv.	Rev. Hrs.
5+7	37.1	13.5	2:44	0:16	3:01	3:30	0:45	21%	0:30	7:00	14	7.0	0:30	5:00	10	7.0	24	12:00	84:00
4+6	11.4	13	0:52	0:05	0:57	1:00	0:07	12%	1:00	7:00	7	1.0	1:00	5:00	5	1.0	12	12:00	12:00
9+1B	24.9	14	1:46	0:10	1:57	2:00	0:13	11%	1:00	7:00	7	2.0	1:00	5:00	5	2.0	12	12:00	24:00
3	11.3	13	0:52	0:05	0:57	1:00	0:07	13%	1:00	7:00	7	1.0	1:00	5:00	5	1.0	12	12:00	12:00
11+1A	23.3	13	1:47	0:10	1:58	2:00	0:12	10%	1:00	7:00	7	2.0	1:00	5:00	5	2.0	12	12:00	24:00
10+2	22.4	13	1:43	0:10	1:53	2:00	0:16	14%	1:00	7:00	7	2.0	1:00	5:00	5	2.0	12	12:00	24:00
T	6	13.5	0:26	0:02	0:29	0:30	0:03	11%	0:30	7:00	14	1.0	0:30	5:00	10	1.0	24	12:00	12:00



4.2.1. Mid-Term Ridership Estimates

Using the projected ridership for the short-term recommendations as a starting point, the mid-term

recommendations are expected to increase ridership an additional 8 percent on weekdays, and 81 percent on Sundays (**Table 4-31** and **Table 4-32**).

Weekday Ridership Estimates

Table 4-31 | Mid-Term Weekday Ridership Estimates

Proposed Route	Estimated Daily Riders	Impact Factor from Service Characteristics Impact Calculator	Projected Ridership
1A	216	0.25	270
1B	195	0.25	244
2	281	0	281
3	265	0	265
4	383	0.25	479
5	911	0.25	1,139
6	229	0	229
7	1,816	0	1,816
9	807	0.25	1,009
10	167	0	167
11	261	0.25	327
T	2,838	0	2,838
Total	8,369	--	9,063

Saturday and Sunday Ridership Estimates

Table 4-32 | Mid-Term Saturday and Sunday Ridership Estimates

Proposed Route	Saturday			Sunday		
	Estimated Daily Riders (Baseline)	Estimated New Daily Riders (Coverage)	Projected Ridership	Estimated Daily Riders (Baseline)	Estimated New Daily Riders (Coverage)	Projected Ridership
1A	319	--	319	--	159	159
1B	278	--	278	--	139	139
2	153	--	153	51		51
3	195	--	195	--	97	97
4	183	--	183	--	92	92
5	649	--	649	--	324	324
6	129	--	129	--	65	65
7	1,491	--	1,491	641		641
9	513	--	513	--	256	256
10	92	--	92	70		70
11	169	--	169	--	85	85
T	1,297	--	1,297	742		742
Total	5,467	--	5,467	1,504	1,217	2,721

4.3. LONG-TERM (10+ YEARS) SERVICE IMPROVEMENTS AND NEEDS IDENTIFICATION

The US-29 corridor is the second busiest transit corridor in the region, with only the Main Street corridor between downtown and UVA generating more transit trips. Service in the corridor is provided by Route 7, which carries more than 2,100 passengers per weekday and regularly experiences loads in excess of 32 passengers (the seating capacity of a 35-foot transit bus typically assigned to the route). These high passenger loads also weigh on the route's on-

time performance, which currently stands at just 66 percent.

In addition to Route 7, JAUNT operates a specially branded service, called the 29 Express, to provide commuter connections between the Forest Lakes/Hollymead area and the downtown Charlottesville/UVA area. 29 Express buses have a unique brand compared to the general JAUNT fleet and convey an image of enhanced service in the high-traffic corridor. However, the current 29 Express service includes just two southbound trips in the morning and two northbound trips in the afternoon.



If the 29 Express were operated with all day, limited stop service, it would help provide relief to Route 7, and would likely prove very popular with area riders. Rather than serving all stops along the corridor, as Route 7 does, the 29 Express could serve just key destinations such as downtown, UVA Hospital, UVA, Barracks Road Shopping Center, Fashion Square Mall, Walmart, CHO, and UVA Research Park. For additional destinations, passengers could transfer to Route 7 or other routes for local connections.

A benefit of the current 29 Express brand is that it is different than the standard JAUNT brand. This creates an opening for regional partners including CAT and UVA to associate with and even jointly fund the service. Over time, the 29 Express brand could evolve into Bus Rapid Transit service with specialized vehicles and station-like stops.

4.4. CAPITAL IMPROVEMENT PLAN

In 2018 CAT completed a ten-year capital improvement plan (CIP). The document identified several fleet replacement, fleet expansion, passenger amenity, and equipment needs. The system's existing operational facilities can accommodate the current and projected fleet needs and will not require a major capital investment. The fleet investments identified in the capital plan reflect the increase in peak vehicles (and associated contingency fleet) associated with the short- and mid-term service recommendations outlined in this chapter. The single largest expense is the replacement of transit buses at the end of their useful life (76 percent of capital needs).

Table 4-33 | CAT Capital Improvement Plan (No recommendations for FY2019) (All costs in \$ thousands)

Name	Details	Quantity	Total
35-Ft Replacement Diesel Bus	Replace buses 100,102,103	3	\$1,275
Shelters / Passenger Amenities		-	\$77
<30-Ft Replacement Bus	Replace bus 309	1	\$124
30-Ft Replacement Bus	Replace buses 200, 201, 202	3	\$1,228
Upgrade On-Board Bus Video System		1	\$544
2020 Sub-Total			\$3,248
35-Ft Replacement Diesel Bus	Replace buses 101,105,106,107	4	\$1,739
30-Ft Replacement Bus	Replace buses 203,205,206	3	\$1,256
2021 Sub-Total			\$2,995
30-Ft Replacement Bus	Replace buses 204,207,208	3	\$1,289
35-Ft Replacement Diesel Bus	Replace buses 108,109,110,111	4	\$1,783
2022 Sub-Total			\$3,072
35-Ft Expansion Diesel Bus	Addition to fleet	3	\$1,368
30-Ft Replacement Bus	Replace bus 209	1	\$440
<30-Ft Replacement Bus	Replace bus 310	1	\$133
Two-Way Communication Upgrade	Upgrade entire fleet	-	\$547
2023 Sub-Total			\$2,487
<30-Ft Replacement Bus	Replace bus 311	1	\$134
30-Ft Replacement Bus	Replace bus 210	1	\$451
30-Ft Expansion Bus	Addition to fleet	1	\$451
2024 Sub-Total			\$1,486
<30-Ft Replacement Bus	Replace bus 312	1	\$136

Name	Details	Quantity	Total
Replacement Shop Truck	Purchase Replacement Shop Truck	1	\$59
2025 Sub-Total			\$195
35-Ft Replacement Diesel Bus	Replace buses 112,113	2	\$969
<30-Ft Replacement Bus	Replace bus 313	1	\$138
Replacement Replica Trolley Bus	Replace buses 401,402,403	3	\$2,042
2026 Sub-Total			\$3,150
35-Ft Replacement Diesel Bus	Replace buses 114,115	2	\$992
Replacement Support Vehicles	Purchase Replacement Support Vehicles	3	\$111
2027 Sub-Total			\$1,103
35-Ft Replacement Diesel Bus	Replace buses 116,117	2	\$1,016
Replacement Support Vehicles	Purchase Replacement Support Vehicles	2	\$78
2028 Sub-Total			\$1,094
35-Ft Replacement Diesel Bus		2	\$1,034
Replacement Support Vehicles		2	\$79
2029 Sub-Total			\$1,113
Total			\$19,942

*all costs in year of expenditure dollars

4.4.1. Other Capital Needs

There are a handful of capital investments that CAT is interested in exploring further but is not reflected in the CIP. These investments will require a cost/benefit analysis and a change in strategy by the organization.

The first possible investment is the introduction of a mid-life or end-of-life overhaul program for buses. Overhauls can range in scope from a renewal of the bus powertrain to full renovation of the entire vehicle. These investments extend the life of transit buses and improve vehicle reliability. Introducing an overhaul program will require CAT to maintain a higher spare ratio, as buses under overhaul can be out of service for months.

The second investment CAT is interested in exploring is alternative fuel vehicles. The system's existing fleet of hybrid buses have been expensive to maintain and have not resulted in the environmental or operational benefits that were anticipated. These vehicles will be replaced by conventional clean diesel buses at the end of their useful life under the current CIP. CAT sees the adoption of Compressed Natural Gas (CNG) or battery powered electric vehicles as an alternative that warrants further study.



Page Intentionally Left Blank



Chapter 5

Implementation Plan



Page Intentionally Left Blank

5 Implementation Plan

This chapter quantifies the capital improvements necessary for implementing the service enhancements identified in Chapter 4. All elements of this chapter form the basis for a capital improvement program (CIP) to guide CAT throughout a ten-year planning horizon. Primary capital components include the fleet (replacements, ongoing maintenance, and expansion) and facilities (stations, operation/ maintenance facilities, and park and rides). Essential maintenance, rehabilitation, and state of good repair projects are emphasized to inform CAT's ongoing transit asset management program. Funding for project costs will be identified from federal, state, and local sources. This chapter will distinguish those projects in the CIP which CAT reasonably anticipates local funding to be available, and those with no current funding allocated.

5.1. ROLLING STOCK UTILIZATION

This section presents the vehicle replacement and expansion needs to provide envisioned services throughout this TDP period. Included in this section are the implications of right-sizing the fleet/spare ratio, vehicle life-cycle maintenance, technological retrofit, and any impacts to the overall utilization of the fleet during the implementation of new services outlined in Chapter 4.

5.1.1. Fleet Inventory

CAT has a fleet of 36 vehicles for fixed-route revenue service. CAT also maintains a fleet of nine (9) support vehicles, including SUVs, Cargo Vans and a shop truck.

The following adjustments were made to the Federal Transit Administration Useful Life Benchmark (ULB) in

this inventory reporting. A ULB of 14 years for over the road buses was used which is specified by FTA and 2-years in excess of current CAT ULB calculations. A ULB of 8 years for body-on-chassis vans was used, which is 3 years in excess of current CAT ULB calculations yet reflects a lower ULB than prescribed by the FTA. This ULB was established based on the observed actual retirement of CAT vans, which are routinely exceeding their initial 5-year benchmark. All future ULB adjustments in subsequent years should be informed with a qualitative condition assessment as part of the CAT Asset Management program.

All vehicle information for CAT's fixed route and support vehicles is provided in



Transit Development Plan

FY 2019 – FY 2028

Table 5-1 and **Table 5-2.** Vehicle replacement and retirement analysis in the subsequent sections will begin starting with FY2019.

Table 5-1| CAT Fixed Route Fleet Inventory

Year	Make/Model	Length (Feet)	Capacity	FTA ULB (Years)	Number of Vehicles	Unit Number
2008	Gillig Low Floor Trolley Replica Diesel	30	20	14	1	400
2008	Gillig Low Floor Clean Diesel	35	26	14	7	100, 101, 102, 103, 105, 106, 107
2008	Gillig Low Floor Clean Diesel	29	20	14	1	200
2010	Gillig Low Floor Hybrid Electric	29	20	14*	2	201, 202
2010	Gillig Low Floor Clean Diesel	35	26	14	4	108, 109, 110, 111
2011	GM-Goshen BOC Diesel	26	12	8	1	307
2011	Gillig Low Floor Hybrid Electric	29	20	14*	4	203, 204, 205, 206
2012	Gillig Low Floor Hybrid Electric	29	20	14*	3	207, 208, 209
2012	GM-Goshen BOC Diesel	26	12	8	1	308
2013	GM-Goshen BOC Diesel	26	12	8	1	309
2014	Gillig Low Floor Hybrid Electric	29	20	14*	1	210
2014	Gillig Low Floor Trolley Replica Clean Diesel	35	26	14	3	401, 402, 403
2014	Gillig Low Floor Clean Diesel	35	26	14	2	112, 113
2015	Gillig Low Floor Clean Diesel	35	26	14	4	114, 115, 116, 117
2016	GM-Arboc BOC Gasoline	26	12	8	1	310
Total Fleet (In Service)					36	

Table 5-2 | CAT Support Vehicle Inventory

Year	Make/Model	Use	ULB (Years)	Unit Number
2006	Ford Escape	Driver Shift Changes	10	811
2015	Ford F-350	Shop Maintenance Truck	10	813
2015	Ford Explorer	Supervisor Response Vehicle	10	814
2015	Chevrolet Cargo Van	Street Amenities Maintenance	10	815
2016	Dodge Journey	Administration	10	816
2017	Jeep Compass	Driver Shift Changes	10	817, 818, 819
2019	Chevrolet Cargo Van	Street Amenities Maintenance	10	820
Total Support Vehicles			9	



5.1.2. Vehicle Replacement

From FY2019-2029, CAT's baseline fleet requirements would entail retiring a total of 36 vehicles, but only replacing 30 vehicles. This is primarily due to a gradual reduction in the fleet size to better align with the vehicles operated in maximum service (VOMS). The reduction in fleet is gradual and intended to also offset significant vehicle retirements anticipated in FY2022. During this planning period, a spare ratio of 36.1 percent (2019) is reduced to 23.3 percent by FY2022. The lower spare ratio is maintained throughout the duration of the plan, with equal replacement for each retired vehicle resuming.

CAT is anticipated to replace retired vehicles with vehicles of a comparable size with a stated preference for maintaining a similar composition of fleet size, length and vehicle capacity. A notable exception for equivalent replacements are for the 29-foot hybrid electric vehicles. Due to excessively high lifecycle maintenance costs, CAT will replace these vehicles as expeditiously as possible and with clean diesel propulsion only. All hybrid electric vehicles are anticipated to be removed from service by 2024.

The baseline vehicle replacement schedule and analysis are presented in **Table 5-3**. This estimate differs from the CAT CIP primarily due to the gradual

reduction in fleet size and the slightly longer ULB for all vehicles than previously reported. For all Baseline and Expansion scenarios, some adjustments were made to avoid large procurements in one single year. This may entail spreading expenditures across several years and extending some vehicles beyond the ULB (reported as a percent in all tables). Adjusting these expenditures does not impact the timing of new expansion projects from Chapter 4 and as further detailed in the next section.

Total replacement costs were calculated using base vehicle costs for five vehicle types delivered to CAT. All costs were inflated to FY2018 dollars. Vehicle cost estimates used in these calculations include:

- 35' Gillig Low Floor Clean Diesel \$462,000
- 35' Gillig Low Floor Trolley Replica \$531,000
- 29' Gillig Low Floor Clean Diesel \$407,000
- 26' GM-Goshen BOC Diesel \$85,000
- 26' GM-Arboc BOC Gasoline \$120,000

Future vehicle replacement costs are projected to increase at 4 percent per year beginning with FY2019. The results of the baseline vehicle replacement program, identifying the vehicle type by replacement year and subsequent overall cost is presented in **Table 5-4**.

Table 5-3 | CAT Fixed Route Baseline Vehicle Replacement Schedule

	Fiscal Year										
	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029
Carryover	36	36	35	34	30	30	30	30	30	30	30
Retire	1	3	4	9	4	4	2	0	0	5	4
New	1	2	3	5	4	4	2	0	0	5	4
Total Fleet	36	35	34	30	30	30	30	30	30	30	30
VOMS	23	23	23	23	23	23	23	23	23	23	23
Spare Ratio	36.1%	34.3%	32.4%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%	23.3%
Exceeding ULB	0.0%	0.0%	0.0%	0.0%	3.3%	0.0%	6.7%	0.0%	0.0%	0.0%	0.0%

Table 5-4 | CAT Fleet Baseline Vehicle Replacement by Vehicle and Annual Cost

	Fiscal Year										
	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029
Vehicle Type											
35' Bus				3	2	2	2			2	4
29' Bus		1	3	1	2	1					
BOC (Diesel)	1	1		1		1					
BOC (Gas)											
35' Trolley										3	
Total Vehicles				3	2	2	2			2	4
Annual Cost (000s)	\$89	\$532	\$1,369	\$2,179	\$2,086	\$1,756	\$1,182	\$-	\$-	\$3,523	\$2,660

5.1.3. Vehicle Expansion

For CAT to operate the services identified in Chapter 4, the fleet would not need to be expanded above its current size. This is achieved through right-sizing the fleet and new vehicle needs being offset by the existing spare ratio. Due to an initial reduction in VOMs because of proposed route restructuring, CATs spare ratio would increase beyond current levels to 40 percent in FY2020. These spare vehicles help to offset vehicle purchase/replacement needed from FY2021-FY2023. Only two expansion vehicles are needed to be purchased, one each in FY2023 and FY2024. Following an initial decline in fleet size from FY2019-FY2022, the fleet will grow from 31 vehicles to 32 vehicles in FY2023. The fleet will then grow to 33 vehicles in FY2024 and remain at that size through the remainder of the TDP horizon. VOMs will increase with

the expansion vehicles, growing from 21 to 24 in FY2023. VOMs in FY2024 will be 25 vehicles.

All expansion vehicles were assumed to be 35' heavy-duty buses, which may be more conservative than the actual demand may warrant. As the spare ratio is vehicle dependent, CAT noted that initial reduction of the spare ratio would be best served by reducing this class of vehicle. Therefore, by reintroducing these larger buses into the expansion services the future fleet mix generally retains CAT's existing distribution of vehicle sizes/types.

From FY2019-FY2029 CAT's fixed route fleet expansion would require 2 additional vehicles over baseline. The expansion vehicle replacement schedule and analysis are presented in **Table 5-5**. The results of the expansion vehicle acquisitions and baseline replacement program for the existing fleet is presented in **Table 5-6**.

Table 5-5 | CAT Fixed Route Expansion Vehicle Replacement Schedule

	Fiscal Year										
	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029
Carryover	36	36	35	34	31	32	33	33	33	33	33
Retire	1	3	4	8	4	4	2	0	0	5	4



Transit Development Plan

FY 2019 – FY 2028

New	1	2	3	5	5	5	2	0	0	5	4
Total Fleet	36	35	34	31	32	33	33	33	33	33	33
VOMS	23	21	21	21	24	25	25	25	25	25	25
Spare Ratio	36.1%	40.0%	38.2%	32.3%	25.0%	24.2%	24.2%	24.2%	24.2%	24.2%	24.2%
Exceeding ULB	0.0%	0.0%	0.0%	0.0%	3.1%	0.0%	6.1%	0.0%	0.0%	0.0%	0.0%

Table 5-6 | CAT Fleet Expansion Vehicle Acquisition and Baseline Replacement by Vehicle and Annual Cost

	Fiscal Year										
	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029
Vehicle Type											
35' Bus				3	3	3	2			2	4
29' Bus		1	3	1	2	1					
BOC (Diesel)	1	1		1		1					
BOC (Gas)											
35' Trolley										3	
Total Vehicles	1	2	3	5	4	4	2	0	0	5	4
Annual Cost (000s)	\$89	\$532	\$1,369	\$2,179	\$2,640	\$2,329	\$1,182	\$-	\$-	\$3,523	\$2,660

5.1.4. Baseline and Expansion Comparisons

This section contrasts baseline and expansion implementation requirements. **Figure 43** represents the total annual vehicle replacements required for the ten-year period from FY2019-FY2028 for both

baseline and expansion plans. **Figure 44** represents the net effect on the total CAT fleet size over the same ten-year period because of the baseline and expansion vehicle acquisition and replacement programs. **Figure 45** represents the cumulative expenditure over the entire 10-year duration between the baseline and expansion programs.

Figure 43 | Annual Vehicle Procurements FY2019-FY2028

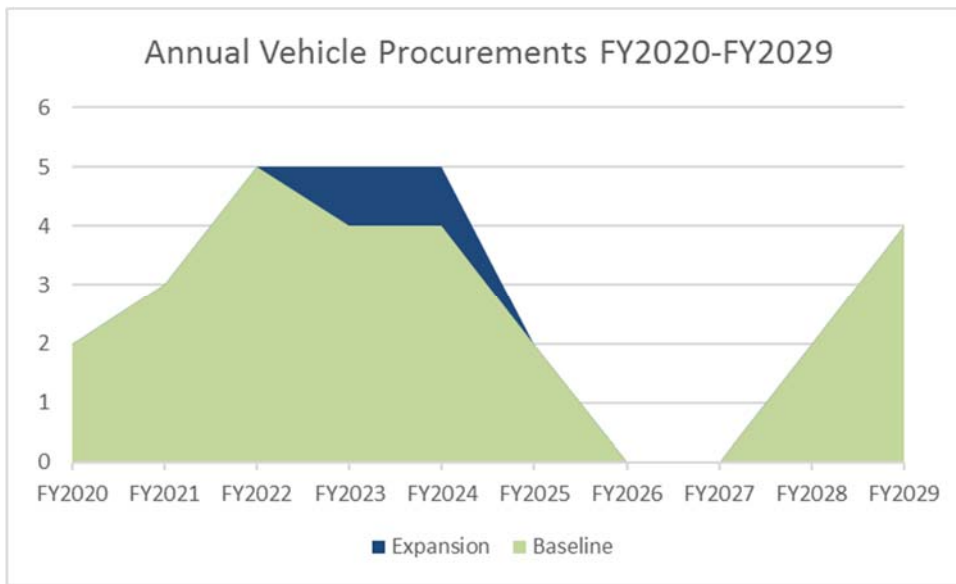


Figure 44 | Total Fleet Size FY2019-FY2028

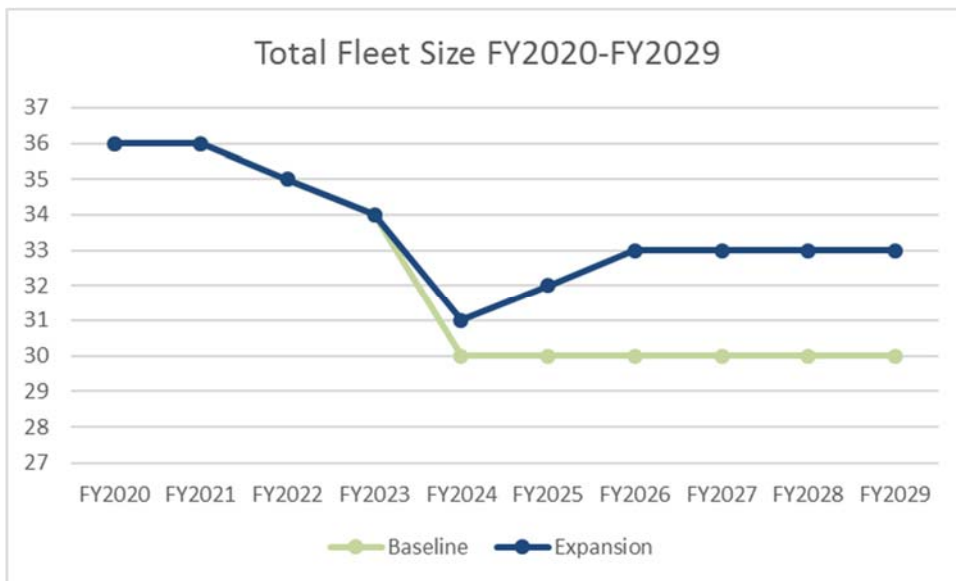
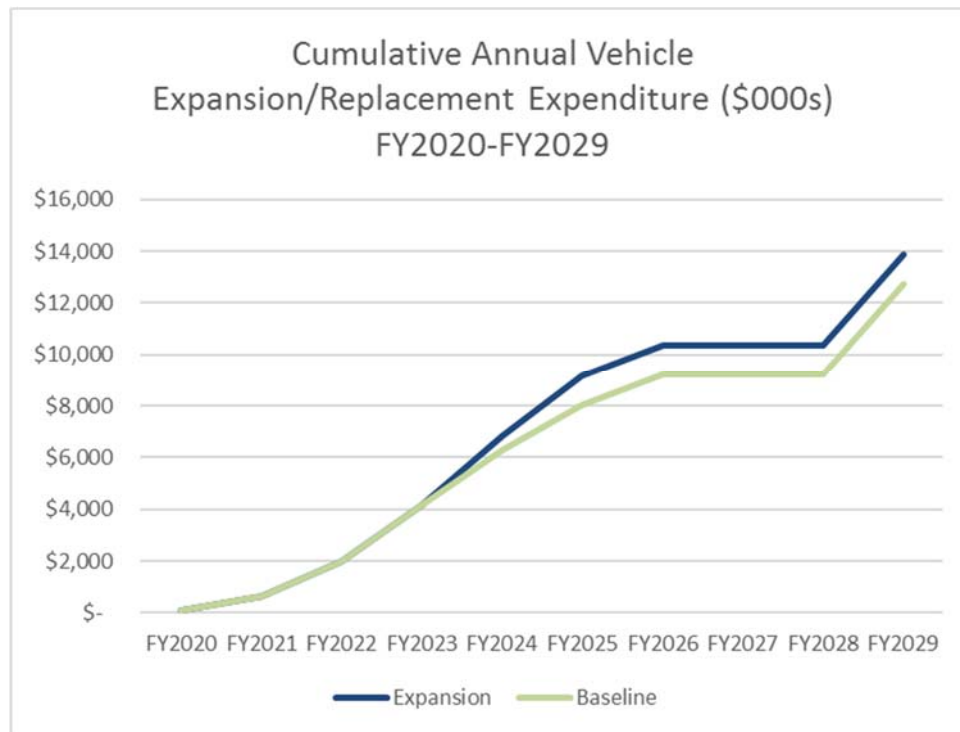


Figure 45 | Cumulative Annual Vehicle Expansion/Replacement Expenditure FY2019-FY2028



5.2. MAJOR SYSTEM MAINTENANCE AND OPERATIONS FACILITIES

The CAT Operations and Maintenance Facility was recently constructed in 2010. The facility is well equipped to handle the CAT fleet and there is no need for facility expansion or improvements during the span of this TDP Update.

5.3. PASSENGER AMMENITIES

There are no specific recommendations for additional passenger amenities included in the CIP.

5.4. NEW TECHNOLOGY SYSTEMS OR UPGRADES

CAT has identified CIP project need for new surveillance and security equipment. This is an upgrade of the existing on-board video system purchased in 2011. The upgrade is planned for FY2025, with a total cost of \$544,000.

CAT also anticipates in FY2022 an upgrade to the existing two-way communication system. The necessity of the upgrade stems from the systemwide P-25 Protocol upgrade and Motorola's discontinuance of the model (1500) in 2016 and discontinuance of support for that model in 2017. Total costs are estimated at \$547,000.

Page Intentionally Left Blank



Chapter 6

Financial Plan



Page Intentionally Left Blank

6 Financial Plan

The purpose of the Financial Plan is to provide a planning-level forecast of CAT's costs and revenue over the 10-year TDP time-frame. The Financial Plan is composed of both an operating and capital component.

The operating budget is associated with regularly reoccurring costs such as labor, maintenance, insurance, and administration. These costs are stable over time and tend to be closely tied to the amount of service provided. The operating budget is broken further down by the cost of operating existing service and the cost associated with implementing the TDP recommendations. The additional cost associated with the TDP recommendations would require local, state, or federal funds above CAT's existing projected funding allocation.

Capital costs reflect one-off investments in procurement of replacement or expansion assets such as vehicles, buildings, and IT systems. These figures fluctuate considerably year over year.

6.1. DATA ASSUMPTIONS AND SOURCES

To develop this financial plan, a range of assumptions were made. Long-range budgets are a projection based on a snapshot in time, and as such should be updated regularly to ensure accuracy. Generally, certainty over costs and revenue decrease further into the future.

6.1.1. Operating Budget Assumptions

Direct Revenue

Direct operating revenue includes funds raised from fares, contracted services, sale of assets, advertising, or any other revenue-generated directly by a transit

property. The direct revenue figures are based on estimates for FY2019 reported in DRPT's FY19 Six-Year Improvement Plan (SYIP). They are broken into four categories: fare revenue, advertising, contract services (direct reimbursements for services by partners like UVA), and other.

These figures have been escalated over time based on the 3% annual growth assumption suggested by DRPT in the TDP guidance. The only exception to this escalation is fare revenue, which is assumed to grow by 2.5%, CAT's four-year average growth rate.

Fare revenue for new service is based off the estimated change in ridership developed in Chapter 4, multiplied by CAT's average fare revenue per trip of 24 cents.

Operating Grant Revenue

The Federal government, Commonwealth of Virginia, and local jurisdictions provide operating assistance to CAT in the form of grants. The base year allocation for federal and state funding is derived from DRPT's FY19 Six-Year Improvement Plan (SYIP). Local funds cover the remaining balance after all other revenues are accounted for.

CAT's federal funding comes from Section 5307 Urbanized Area formula funds. This funding is expected to grow year-over-year by 2.1%, the nationwide average growth of the Federal Formula fund program.

State funding is escalated off the FY19 base year according to changes DRPT's projected statewide transit operating assistance budget from FY20 to FY24 as reported by the FY19 SYIP. After FY24, state operating assistance is assumed to grow by 3%.

Operating Costs

Operating costs are assumed to grow by 3% a year over the FY18 cost per revenue hour of \$74. The operating budget assumes that the TDP short-term



recommendations are implemented in FY20, with the long-term recommendations introduced in FY24.

6.1.2. Capital Budget Assumptions

Capital Revenue

CAT relies of Federal Flexible STP funding for most of its capital needs. The capital budget assumes federal funds will continue to support 80% of capital needs, with 16% coming from state matching funds, and 4% from local matching funds.

Capital Costs

CAT's capital costs are derived from the CIP outlined in Chapter 4. Costs are escalated from FY18 values by 2% a year to account for inflation

6.2. OPERATING BUDGET

Table 6-1 presents the 10-year operating budget forecast for CAT. The budget includes the cost of operating existing service, as well as the net cost associated with the TDP recommendations.

CAT's operating budget is primarily funded through Federal, State, and Local operating grants. Local funding is forecasted to grow faster than the other sources as State and Local funding is forecasted to grow slower than operating costs.

The Short-Term TDP recommendations are essentially cost neutral, with the total cost increase associated with the recommendations totaling only \$3,000. These recommendations will yield higher ridership per revenue hour than the systemwide average.

Mid-term recommendations in FY2024 will yield a more substantial increase in net operating costs of \$1.3 million. No funding has been identified to cover these costs and new sources of revenue will be required to implement the mid-term recommendations.

6.3. CAPITAL BUDGET

Table 6-2 presents the 10-year capital budget forecast for CAT. CAT's capital needs are expected to average \$1.8 million over the 10-year TDP planning timeframe. Needs fluctuate considerably year-over-year based on fleet replacement needs.

6.4. CONCLUSION

As CAT relies extensively on grants to support its operating and capital budget, the agency is susceptible to changes in funding and policy at the state and federal level, including:

- Changes or the complete abolishment of the flexible STP program in the next highway bill
- Major increases in transit service within Virginia (e.g. Silver Line Phase II) that will reduce CAT's share of state operating assistance.
- Changes in state capital match rates.

At the local level, any fluctuations in local general fund revenue may impact the ability of jurisdictions to support CAT service. As CAT relies in part on UVA funding to support particular routes, any change to this funding agreement would also affect CAT's operating budget.



Transit Development Plan
FY 2019 – FY 2028

Table 6-1 | Operating Budget Forecast (Figures in 1000s)

Fiscal Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Operating Revenue										
Direct Revenue										
Fare Revenue	\$556	\$570	\$585	\$599	\$614	\$630	\$645	\$661	\$678	\$695
Advertising Revenue	\$140	\$144	\$149	\$153	\$158	\$162	\$167	\$172	\$177	\$183
Contract Services	\$254	\$261	\$269	\$277	\$286	\$294	\$303	\$312	\$321	\$331
Other	\$46	\$48	\$49	\$51	\$52	\$54	\$55	\$57	\$59	\$61
Ops Revenue Subtotal	\$997	\$1,024	\$1,052	\$1,080	\$1,110	\$1,140	\$1,171	\$1,203	\$1,235	\$1,269
Grants										
Federal	\$1,690	\$1,726	\$1,762	\$1,799	\$1,837	\$1,875	\$1,915	\$1,955	\$1,996	\$2,038
State	\$1,948	\$1,787	\$1,787	\$1,825	\$1,845	\$1,870	\$1,926	\$1,984	\$2,043	\$2,104
Local	\$3,558	\$3,904	\$4,091	\$4,248	\$4,429	\$4,612	\$4,770	\$4,934	\$5,103	\$5,277
Grant Revenue Subtotal	\$7,195	\$7,417	\$7,639	\$7,871	\$8,111	\$8,357	\$8,611	\$8,872	\$9,142	\$9,419
Revenue Total	\$8,192	\$8,438	\$8,691	\$8,952	\$9,220	\$9,497	\$9,782	\$10,075	\$10,377	\$10,689
Operating Cost										
Existing Service	\$8,192	\$8,438	\$8,691	\$8,952	\$9,220	\$9,497	\$9,782	\$10,075	\$10,377	\$10,689
Net Cost of TDP Recommendations	\$0	\$3	\$3	\$3	\$4	\$1,305	\$1,345	\$1,385	\$1,427	\$1,470
Total Operating Costs	\$8,192	\$8,441	\$8,694	\$8,955	\$9,224	\$10,802	\$11,126	\$11,460	\$11,805	\$12,159
Additional Funding Need to Implement TDP Recommendations	\$0	\$3	\$3	\$3	\$4	\$1,305	\$1,345	\$1,385	\$1,427	\$1,470

Table 6-2 | Capital Budget Forecast (Figures in 1000s)

Fiscal Year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Capital Revenue										
Federal (Flex STP)	\$0	\$2,598	\$2,396	\$2,457	\$1,990	\$828	\$156	\$2,520	\$883	\$875
State	\$0	\$520	\$479	\$491	\$398	\$166	\$31	\$504	\$177	\$175
Local	\$0	\$130	\$120	\$123	\$99	\$41	\$8	\$126	\$44	\$44
Revenue Subtotal	\$0	\$3,248	\$2,995	\$3,072	\$2,487	\$1,035	\$195	\$3,150	\$1,103	\$1,094
	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Capital Costs	\$0	\$3,248	\$2,995	\$3,072	\$2,487	\$1,035	\$195	\$3,150	\$1,103	\$1,094



Chapter 7

Regional Coordination



Page Intentionally Left Blank

7 Regional Coordination

The transit operators of the Charlottesville region have a long history of collaboration. Since 1987, ADA complementary paratransit service within the CAT service area has been provided by JAUNT, Inc., through an inter-local agreement. More recently, the Albemarle Board of Supervisors and the Charlottesville City Council agreed to enter into a formal partnership to help advise on improvements to bus service throughout the region. The Regional Transit Partnership (RTP) was established in 2007, and includes representatives from CAT, JAUNT, UTA, CAMPO, and the TJPDC. The RTP has four main goals:

- **Establishing Strong Communication:** The Partnership provides a long-needed venue to exchange information and resolve transit-related matters.
- **Ensuring Coordination between Transit Providers:** The Partnership gives transit providers a venue to coordinate services, initiatives and administrative duties of their systems.
- **Set the Region's Transit Goals and Vision:** The Partnership allows local officials and transit staff to work together with other stakeholders to craft regional transit goals. The RTP also provides, through MPO staff and updates of the Transit Development Plans (TDPs), opportunities for regional transit planning.
- **Identify Opportunities:** The Partnership will assemble decision-makers and stakeholders to identify opportunities for improved transit services and administration, including evaluation of a Regional Transit Authority (RTA).

While a Regional Transit Authority may be a long-term goal of the region, there are a number of initiatives that can be implemented in the shorter term to make the region's transit services more seamless and accessible.

7.1. SEAMLESS CONNECTIONS

7.1.1. Regional Travel Planning

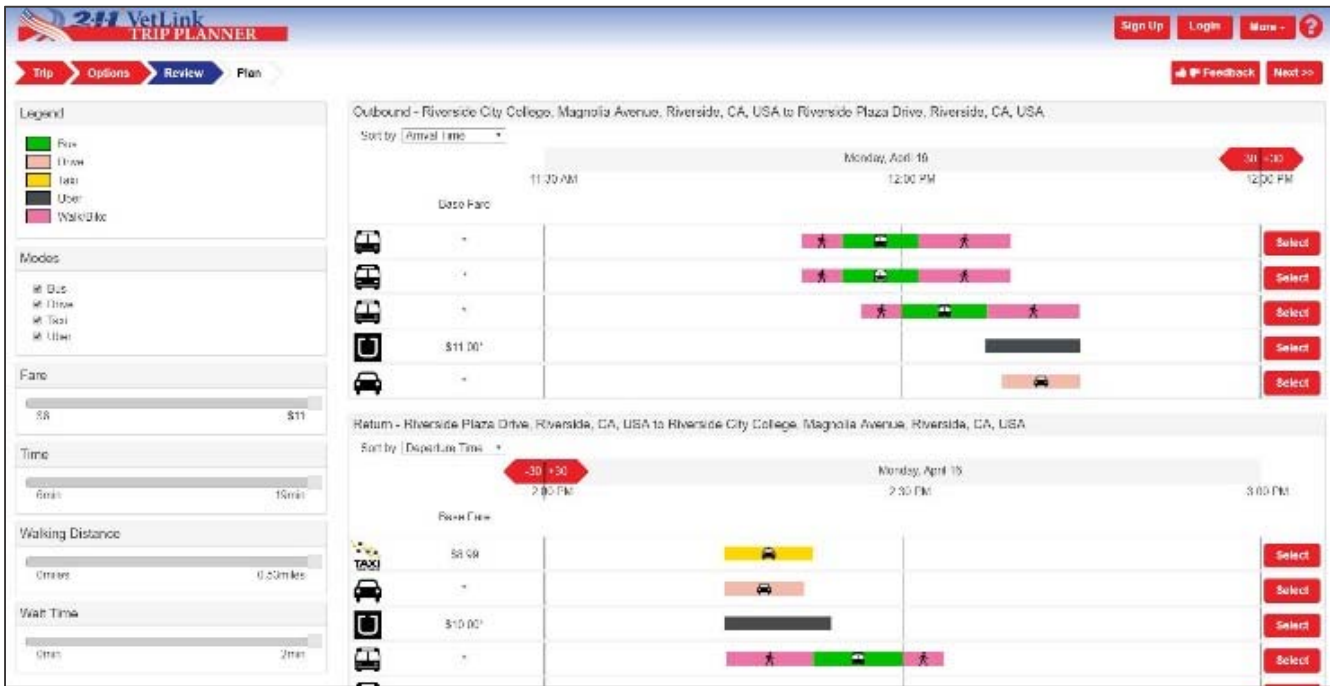
The Charlottesville region has a wide range of urban and rural transit services. While these services provide broad coverage, there are a number of barriers that make it difficult for prospective riders to seamlessly navigate the regional network. Among the first challenges, is the lack of a regional travel planning tool.

Currently, transit user and prospective users must have a general understanding of the services they are looking for, or be willing to spend a substantial amount of time gathering details from different websites to determine their various mobility options. An alternative approach gaining popularity throughout the transit industry is a one-stop regional travel planning tool like the one shown in **Figure 46**. This tool, developed for 211VetLink of Riverside County, CA, integrates bus, paratransit, ride-sharing, and walking options in one easy-to-understand portal. After the user enters their start and end locations, the website presents a table of available mobility options, including travel times, costs, and any special eligibility requirements that may apply. Users can then select a trip for additional information, and in some cases, to book the trip.

A similar tool in the Charlottesville region could provide users with information, including real-time vehicle locations, for CAT, JAUNT, UTS, and Greene County Transit services.



Figure 46 | 211VetLink Trip Planning Website (Riverside, CA)



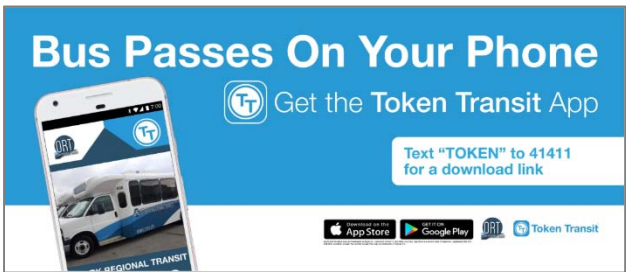
1.1.1 Regional Fares

Once users are aware of the mobility options available to them, the next challenge in creating a seamless network is fare compatibility. Currently, CAT, JAUNT, and Greene County transit each have their own fare structures and policies (UTS service is fare-free). None of the systems accept tickets or passes from the others.

To create a compatible fare system, the three transit operators could coordinate on future farebox technology procurements to ensure to that all fareboxes are able to read and issue tickets and passes that can be read by the other systems. However, given that JAUNT and Greene County Transit do not currently have smart fareboxes, and may not have the resources for them in the future, another option to consider is mobile ticketing (**Figure 47**). Mobile ticketing allows users to purchase fares on their mobile devices. Proof of purchase can then be established by scanning the phone on a smart farebox, or presenting it to a bus driver for inspection,

depending on the technology available on each transit system.

Figure 47 | Mobile Ticketing Platform (Fayetteville, AR)



With mobile ticketing, a regional fare category can be established and overlaid on the fare structures of CAT, JAUNT, and Greene County transit, even if all other fares remain unique to each system. Revenues can be divided among the three providers based on an agreed-upon fare allocation formula.

7.2. REGIONAL SERVICES

7.2.1. US-29 BRT Service

The US-29 corridor is the second busiest transit corridor in the region, with only the Main Street corridor between downtown Charlottesville and UVA generating more transit trips. Service in the corridor is provided by CAT Route 7 and JAUNT's 29 Express Route. Route 7 carries more than 2,100 passengers per weekday and regularly experiences loads in excess of 32 passengers (the seating capacity of a 35-foot transit bus typically assigned to the route). These high passenger loads also weigh on the route's on-time performance, which currently stands at just 66 percent.

Figure 48 | 29 Express Branded Service



JAUNT's 29 Express has a strong brand, but currently operates just four round-trips per day. Through a regional partnership between CAT, JAUNT, and UVA, the 29 Express brand could evolve into a Bus Rapid Transit service with specialized vehicles and station-like stops. If the 29 Express were operated with all day, limited stop service, it would help provide relief to CAT Route 7, and would likely prove very popular with area riders. Rather than serving all stops along the corridor, as Route 7 does, the 29 Express could serve just key destinations such as downtown, UVA Hospital, UVA, Barracks Road Shopping Center,

Fashion Square Mall, Walmart, CHO, and UVA Research Park. For additional destinations, passengers could transfer to CAT Route 7 or other routes for local connections.

7.2.2. Subsidized TNCs and Microtransit

Transportation Network Companies (TNCs) such as Uber and Lyft have emerged over the past several years as viable options for travelers making short-notice trips without relying on a personal automobile. Recently, public transit agencies have begun partnering with TNCs to subsidize certain trip types that cannot be provided as effectively or efficiently with traditional transit modes. Examples of such trips include short-notice demand-response reservations, after-hours trips, or trips in low-density environments.

While subsidized TNC service can work well in urbanized areas with high saturations of Uber and Lyft vehicles, it works less-well in more rural environments where TNC availability is low or nonexistent. As an alternative to subsidized TNC service, some transit agencies are now implementing purpose-built app-based demand response services – sometimes through third-party turn-key contracts, and sometimes through the deployment of technology platforms on their own vehicles. These services, often referred to as “microtransit,” provide the convenience of the now-familiar TNC app interface, but are designed specifically for public transportation purposes.

In the Charlottesville region, JAUNT has traditionally been responsible for operating demand-response services. Given that JAUNT is sub-recipient of Federal funding, it may be necessary for CAT to play a role in any future contracts with TNCs or other app-based service providers. Such an agreement may take the form of a three-party contract where CAT contracts with a TNC or other app-based provider for purchased service, and concurrently with JAUNT to manage the service.



Page Intentionally Left Blank



Appendices

Appendix A: On-Board Survey Results

Appendix B: Route Profiles

Appendix C: Impact Calculation Factors



Page Intentionally Left Blank

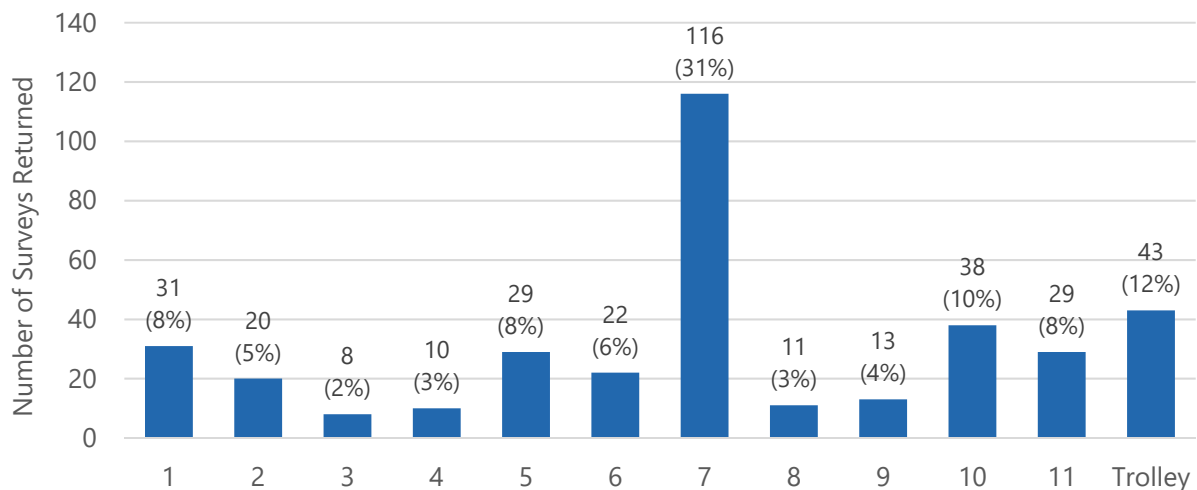
8 Appendix A: On-Board Survey Results

Grouped by question or prompt category, this appendix contains the full results of CAT's on-board rider survey conducted during Fall 2017. CAT riders were asked to provide a wide variety of information regarding use of the system, fare payment, satisfaction, and demographic characteristics.

8.1. RESPONDENT PROFILE

8.1.1. Surveys Returned by Route

Figure 49 | Surveys Returned by Route (n=370)

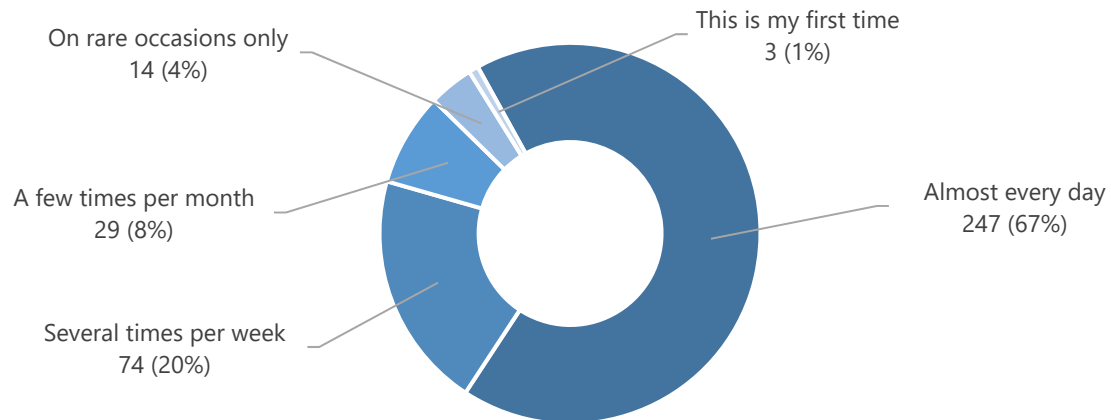


8.2. USE OF SYSTEM

8.2.1. Rider Frequency of Use

QUESTION: How often do you ride Charlottesville Area Transit?

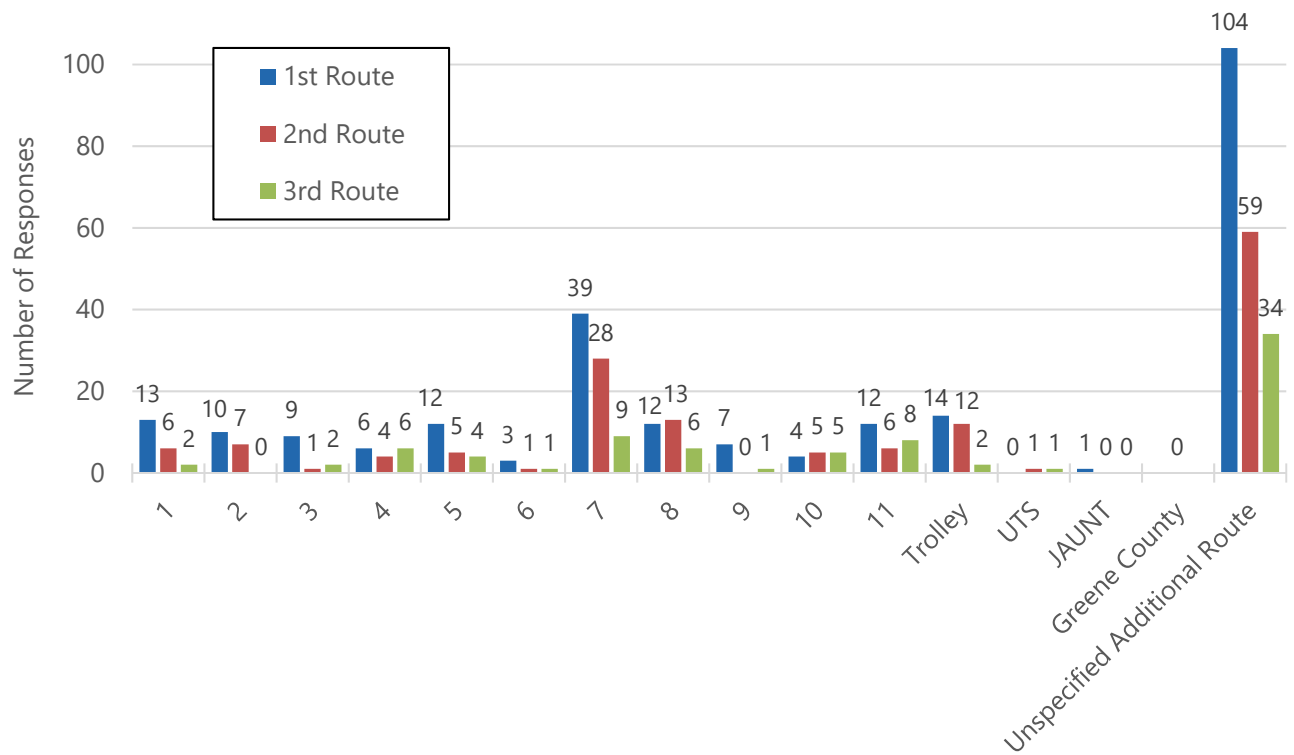
Figure 50 | Frequency of Use (n=367)



8.2.2. Routes Used for Trip

QUESTION: Including this bus, which CAT, UTS, JAUNT, or Greene County Transit routes will you use to complete this one-way trip? [Include first route, and if applicable, second and third routes].

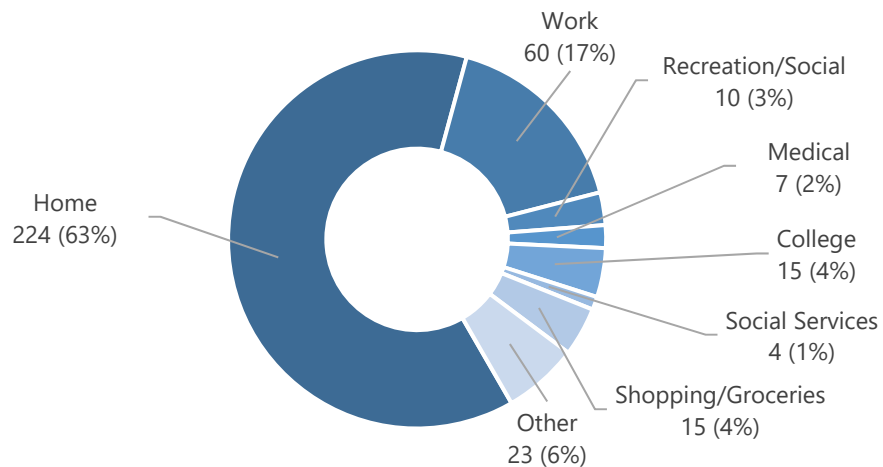
Figure 51 | Routes Used for Survey Trip (n1=246; n2=148; n3=81)



8.2.3. Rider Origin

QUESTION: Where did you begin this one-way trip?

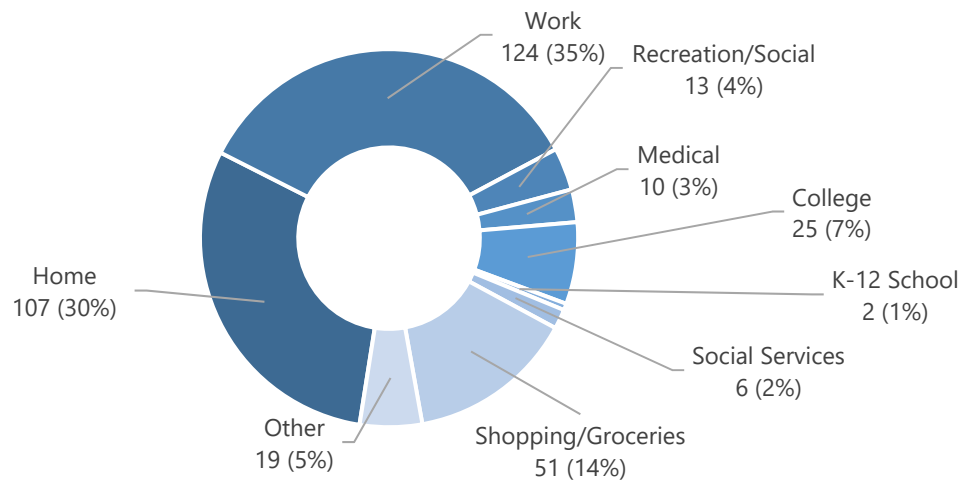
Figure 52 | Trip Origin Type (n=358)



8.2.4. Rider Destination

QUESTION: Where is your final destination on this one-way trip?

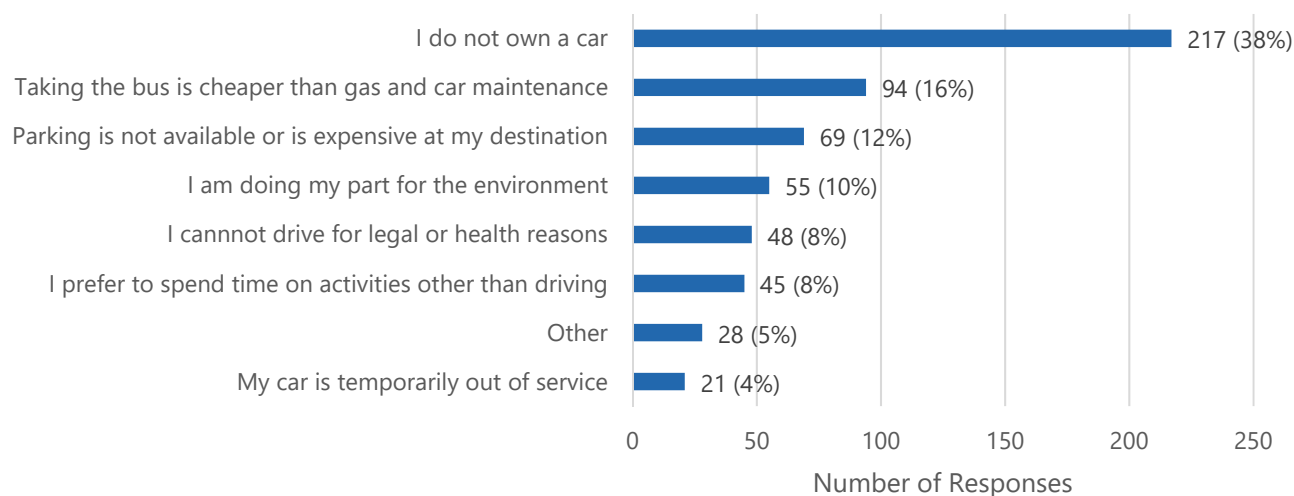
Figure 53 | Trip Destination Type (n=357)



8.2.5. Reasons to use CAT

QUESTION: Which of the following describe the reasons that you use Charlottesville Area Transit? (Select all that apply)

Figure 54 | Reasons to Use CAT (n=577)



8.3. FARE PAYMENT

8.3.1. Smart Card Usage

QUESTION: Did you use a smart card to pay your bus fare today?

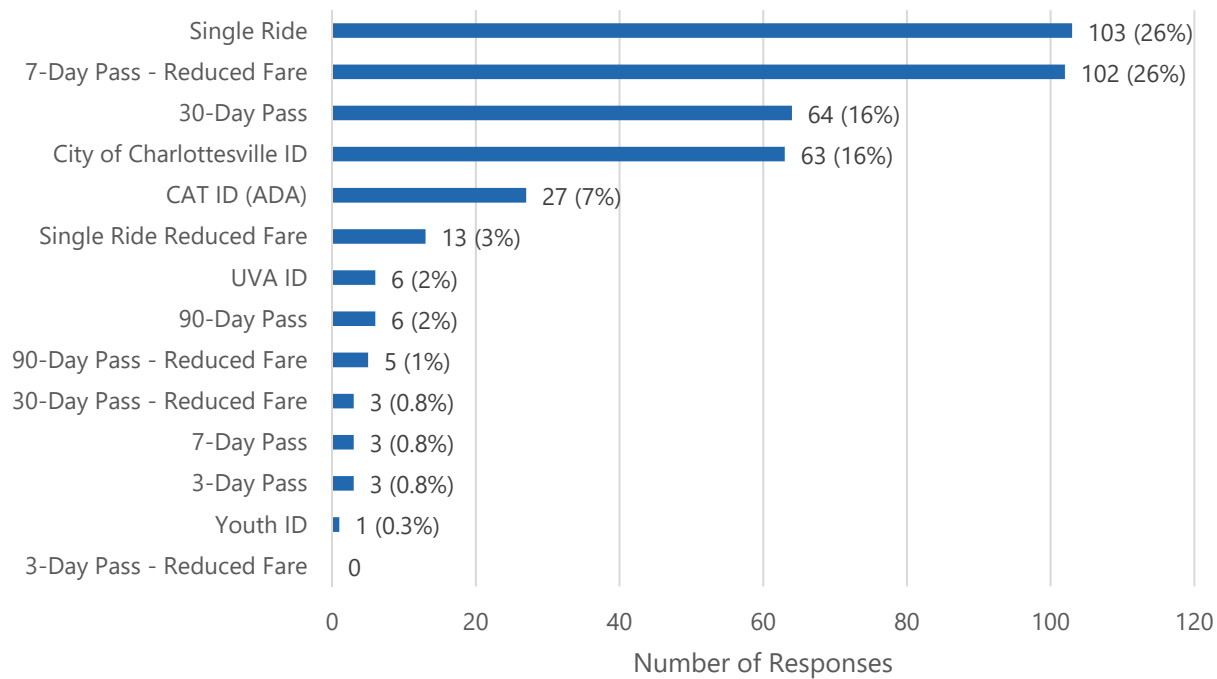
Table 8-1 | Smart Card Usage (n=351)

	Number	Percent
Yes	105	30%
No	246	70%

8.3.2. Fare Payment Type

QUESTION: What type of bus fare did you pay today?

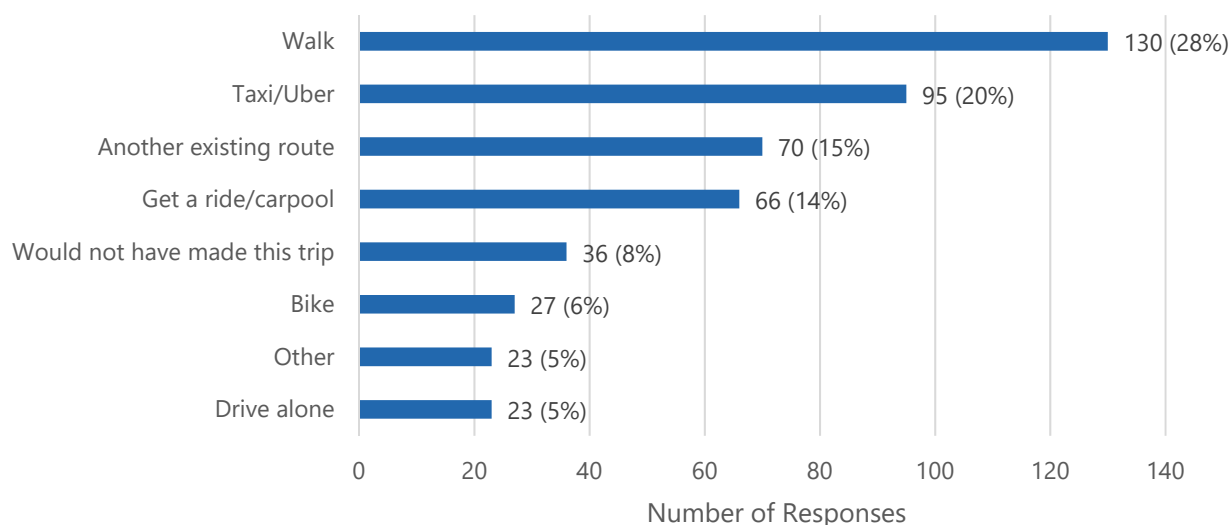
Figure 55 | Fare Type Usage (n=399)



8.3.3. Alternative Transportation Modes

QUESTION: If this route didn't exist, how would you have made this trip?

Figure 56 | Alternative Transportation Modes (n=470)



8.4. CUSTOMER SATISFACTION

8.4.1. Satisfaction Metrics

QUESTION: Based on your experience riding Charlottesville Area Transit, how strongly do you agree with the following statements?

Table 8-2 | Customer Satisfaction

Prompt	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Service is dependable (n=357)	25 (7%)	19 (5%)	47 (13%)	153 (43%)	113 (32%)
Routes get me where I need to go (n=356)	22 (6%)	16 (4%)	24 (7%)	161 (45%)	133 (37%)
Schedules meet my travel needs (n=354)	27 (8%)	29 (8%)	68 (19%)	142 (40%)	88 (25%)
Fares are reasonable (n=355)	22 (6%)	7 (2%)	36 (10%)	130 (37%)	160 (45%)
Buses are comfortable and well kept (n=353)	28 (8%)	14 (4%)	53 (15%)	136 (39%)	122 (35%)
Staff is professional and courteous (n=356)	25 (7%)	14 (4%)	48 (13%)	133 (37%)	136 (38%)
Maps and schedules are easy to understand (n=352)	25 (7%)	19 (5%)	62 (18%)	139 (39%)	107 (30%)



8.4.2. Customer Preferences

QUESTION: Which of the following do you prefer?

Table 8-3 | Customer Preferences

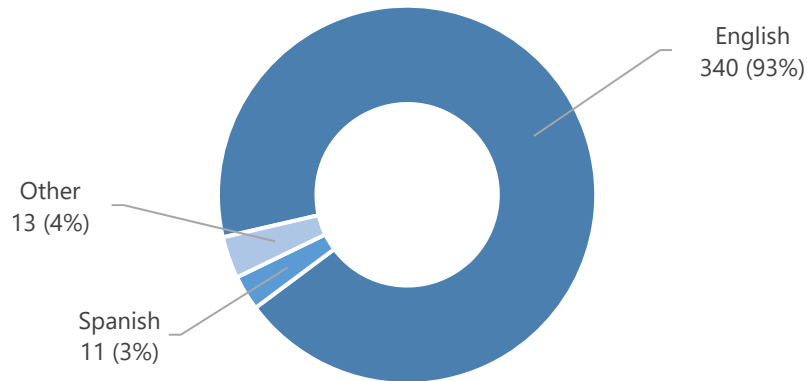
Category	Choice	Number	Percent
Service Frequency and Span (n=307)	More frequent bus service	178	58%
	Longer service hours	129	42%
Weekday/Weekend Service (n=308)	More weekday service	79	26%
	More weekend service	229	74%
Bus Stops (n=292)	More bus stops for shorter walk distance to/from bus stops	200	68%
	Fewer bus stops for faster bus service	92	32%
Bus Street Coverage (n=277)	Buses running more frequently but on fewer streets	172	62%
	Buses running on more streets but less frequently	105	38%
Service Coverage (n=297)	Improve existing service	163	55%
	Serve new areas	134	45%

8.5. DEMOGRAPHIC INFORMATION

8.5.1. Primary Language Spoken

QUESTION: What is the primary language you speak at home?

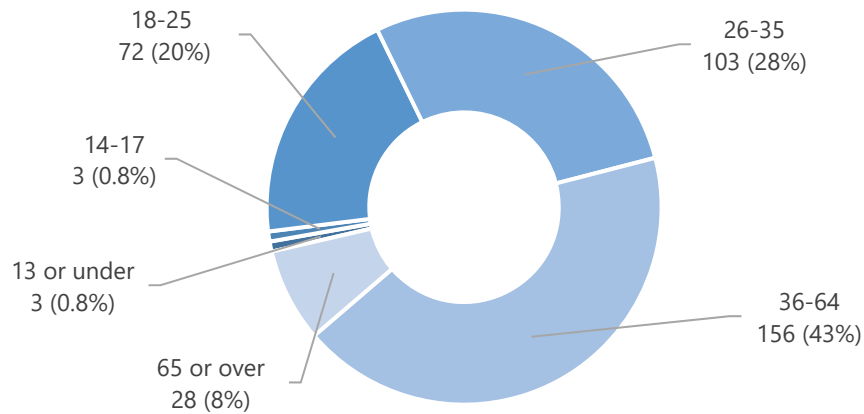
Figure 57 | Primary Language Spoken (n=364)



8.5.2. Age

QUESTION: What is your age?

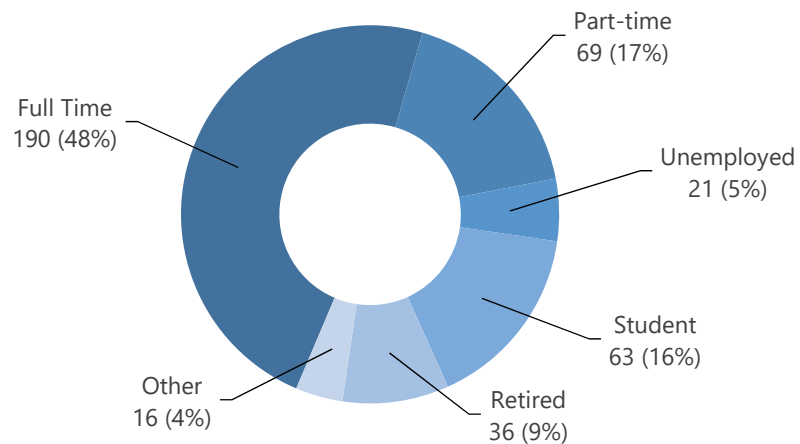
Figure 58 | Age (n=365)



8.5.3. Employment Status

QUESTION: Which of the following best describes your employment status?

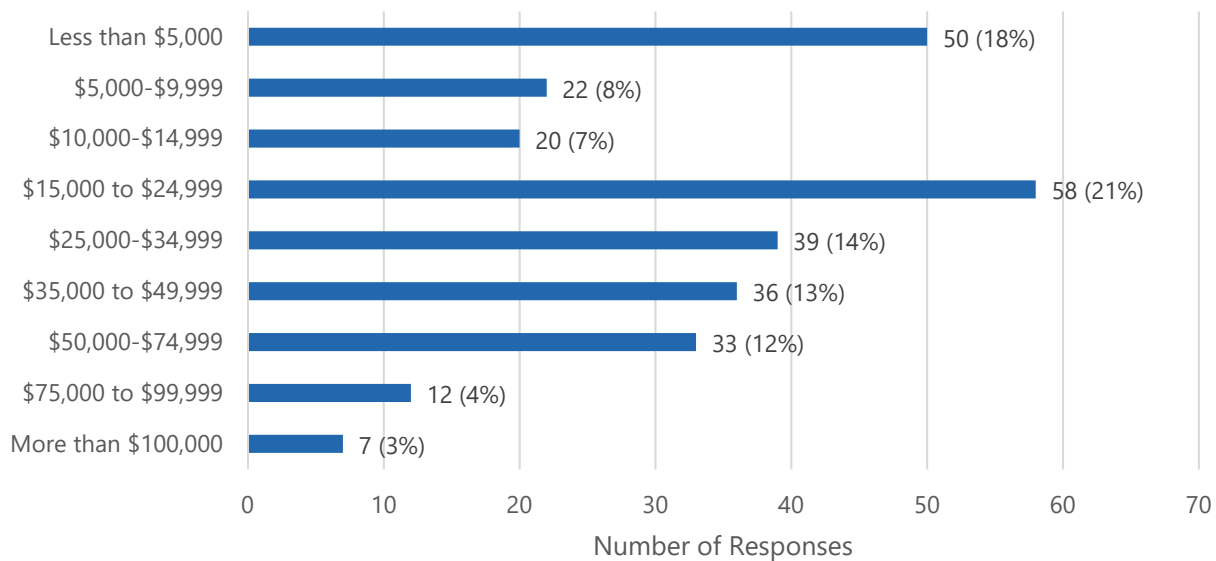
Figure 59 | Employment Status (n=395)



8.5.4. Household Income

QUESTION: What is your approximate household income?

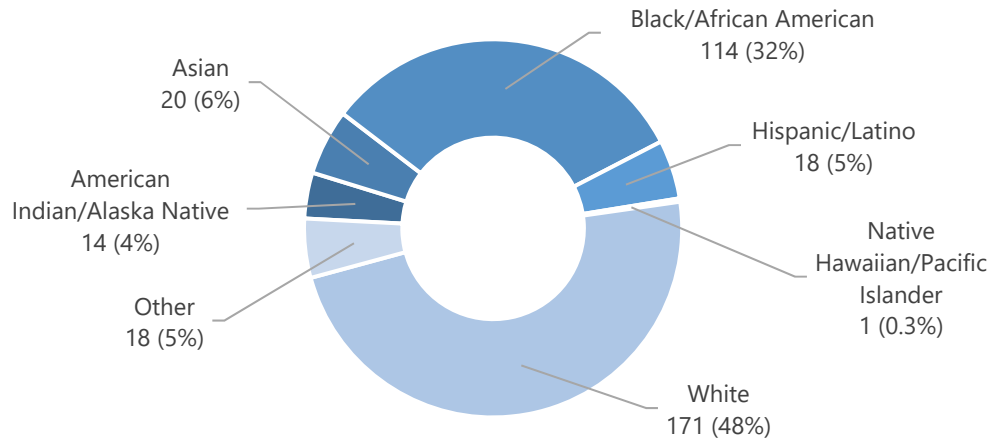
Figure 60 | Approximate Household Income (n=277)



8.5.5. Race/Ethnicity

QUESTION: What is your race/ethnicity?

Figure 61 | Race/Ethnicity



8.5.6. Gender

QUESTION: What is your gender (optional)?

Table 8-4 | Gender (n=359)

	Number	Percent
Female	186	52%
Male	170	47%
Other	3	1%

8.6. CUSTOMER COMMENTS

PROMPT: Please provide any additional comments you have below

Table 8-5 | Customer Comments

Customer Comments
THE FACT THAT YOU ONLY RUN THE 12 AND TROLLEY ON SUNDAY, AND ONLY FOR SO FEW HOURS, IS ABSURD. PEOPLE STILL NEED TO GET AROUND, THE SAME AS ANY OTHER DAY, AS MANY OF US STILL WORK (MYSELF AT KROGER; WHERE SUNDAY IS OUR BUSIEST DAY, AND THE HANDFUL OF INFREQUENT SERVICE HOURS YOU OFFER ARE NOT SOMETHING THEY WISH TO ACCOMMODATE FOR PART-TIME STAFF). ALSO, YOU COULD USE BETTER TRAINING FOR SOME OF YOUR DRIVERS (MANY HAVE DRIVEN PAST STOPS THEY WERE SUPPOSED TO STOP AT), AS WELL AS BETTER NOTIFICATION OF ROUTE CHANGES (THE ONLY THING CLOSE TO A NOTICE FOR REMOVING USUAL SERVICE TO THE THORNTON HILL TROLLEY STOP WAS THE SILENT ADDITION OF A "(NIGHT STOP)" ANNOTATION TO THE APP). ADDITIONALLY, IT WOULD BE NICE (AND MAKE SENSE) TO OFFER A ROUTE TO CONNECT THE OTHER ROUTES WITH HOLLYMEAD (SO PEOPLE COULD STOP AT TARGET AND SUCH WITHOUT THE NEED OF A CAR). FINALLY, SOME DRIVERS SHOULD BE INSTRUCTED ON HOW TO STOP WITHOUT NEEDLESSLY SLAMMING OR PUMPING THE BRAKES.
THE CAT STAFF ARE WONDERFUL!
DOROTHY (DRIVES THE TROLLEY IN THE MORNING) IS FANTASTIC! COURTEOUS PROFESSIONAL AND KIND -MAKES THE MORNING A LITTLE EASIER TO DEAL WITH, MORE PANTOPS SERVICE NEEDED
DRIVES ARE INCONSISTENT AT TIMES THEY LEAVE THE STATION-I ARRIVE 5-7 MIN BEFORE TIME FOR THE BUS TO LEAVE BUT OFTEN THEY HAVE ALREADY LEFT MAKING MY WORK COMMUTE DIFFICULT
I REALLY LIKE THE CAT SERVICE BEING NEW IN TOWN-FURTHER THE STAFF IS ALWAYS NICE & HELPFUL TO NEW COMERS. BE MORE LIBERAL ON THE FOOD & DRINK RESTRICTION-JOHN E HALL 2427 SUNSET RD C'VILLE VA 22903
THANK YOU FOR YOUR CONSIDERATION
HAVE BEEN RIDING BUS TO & FROM WORK FOR MANY YEARS-I FIND THE DRIVERS TO BE UNFRIENDLY SURELY UNHELPFUL & REALLY QUITE RUDE-THERE ARE EXCEPTIONS LIKE DOROTHY ON THE TROLLEY WHO IS EVERYTHING THE OTHER DRIVERS ARE NOT-MARY IS EXCELLENT AS WELL-MAYBE YOU SHOULD GET DOROTHY TO INTERVIEW THE APPLICANTS IN THE FUTURE-DON'T NEED THOSE CONTINUOUS ANNOUNCEMENTS ABOUT WHAT BUSES ARE ON THE ROUTE-WE ARE STOPPING! ANNOYING
I COULD USE MORE SERVICE ON THE WEEKEND, I WISH WE COULD HAVE A WAY TO GET HOME ALL THE WAY TO MONTICELLO VISTA APTS.
I HAVE A PROBLEM WITH THE MAIN POST OFFICE BUS STOP-THERE IS NO STOP OPPOSITE THE MPO GOING BACK DOWNTOWN-THERE IS ONLY A STOP IN COSTCO LOT-I SOMETIMES HAVE PROBLEMS WITH MY KNEES-THERE USED TO BE A STOP NEAR THE SHELL GAS STATION HOPE THAT WILL RETURN
WISH IT WAS ON WEEK ENDS TOO
NEED RT 1 TO SERVICE ON WEEKENDS-ALSO NEED BUSES TO GO OUT TOWARDS TARGET ALSO RT 1 NEED TO NOT LEAVE EARLY BUSES SHOULD GO FURTHER TOWARDS TARGET BE MORE STOPS IN RESIDENTIAL AREAS
THANKS FOR BEING AWESOME
I'VE NEVER HAD A PROBLEM WITH THE BUS SCHEDULES-I THINK THERE ARE PLENTY OF STOPS ALREADY ESPECIALLY IN THE DOWNTOWN AREA-IF I HAD ONE SUGGESTION IT WOULD BE TO ADD ANOTHER ROUTE

TO PVCC BECAUSE RIGHT NOW THERE'S ONLY ONE STOP PER HOUR
I THANK GOD FOR THE TRANSIT-WITHOUT IT I WOULD HAVE TO EITHER WALK OR NOT GET THERE AT ALL-THAT'S HOW I GET TO WORK TO MAKE MY LIVING
PROVIDE COVERED/SAFE BUS STOPS & ESPECIALLY IN LOWER INCOME AREAS-THE #3 BUS STOP NEAR GAS STATION IN BELMONT IS A CRIME-IT IS UNSAFE AND MAYBE INDICATIVE OF RACISM/CLASSIONS
NEED MORE SUNDAY BUSES
WE NEED BUSES GOING TO 29 TARGET AREAS AND MORE ON WEEKEND SERVICES
THERE ARE WONDERFUL DRIVERS WHO SMILE & MAKE YOU FEEL COMFORTABLE THEN YOU HAVE OTHERS WHO YOU WONDER IF YOU SHOULD HAVE GOT ON THE BUS-CHILDREN WITH SPECIAL NEEDS IS A CHALLENGE -MY DAUGHTER HAS ANXIETY DISORDER & IS TERRIFIED AT 16 TO RIDE BUS ALONE ALL BECAUSE A DRIVER WAS SO RUDE TO HER-MY OTHER DAUGHTER HAS ED & ADAD AS WELL AS A MOOD DISORDER-DRIVER STARTED A FULL ARGUMENT WITH HER & EVEN WITH MY EXPLAINING WHAT SHE WAS REACTING TO HE CONTINUED & LAUGHED WHEN WE REACHE OUR STOP & GOT OFF-IT TOOK ME HOURS TO GET HER BACK ON TRACK-THANK YOU! 7 TOO CROWDED-5 TOO SLOW-10 NOT ENOUGH BUSES-T TOO CROWDED-8 TOO CROWDED-4 TOO CROWDED-2 ZZZZ-NEED EASIER WAY TO GET TO WALLY WORLD BUS DRIVERS BE RUDE OMG-TOO MANY SMELLY PEEPS
WE NEED RTEs ON SUNDAYS MORE FREQUENT RTEs ON BUSES 10-3 & 1-PANLOPS BUS COMES ONCE AN HOUR -IF YOU MISS IT YOU MUST WAIT ANOTHER HR-IT IS VERY SLOW-1 MORE RTE ADDED WOULD BE AWESOME-EVERY 30 MIN SHOULD BE SUFFICIENT-HTE BUS IS USUALLY CROWDED IN CERTAIN AREAS & VERY UNCOMFORTABLE-THE 1 ALSO NEEDS AN ADDITIONAL RTE OR 2-IF SERVICES THE PVCC & OTHER NEIGHBORHOODS-IT IS VERY CROWDED & VERY SLOW-EVERY 30 MIN WOULD MAKE FOR A MUCH SMOOTHER RIDE-THE 3 ISN'T THAT BAD EXCEPT FOR WKNENDS-REALLY SLOW ON SAT & DOES NOT RUN AT ALL ON SUN-JUST BECAUSE PEOPLE DON'T WORK DOES NOT MEAN WE DON'T NEED TRANSPORTATION ON THE WEEKEND - PEOPLE BE RUDE-LIKE TOTALLY-DRIVERS ARE EVIL-BUSES ARE POSSESSED AND PEOPLE ARE CRAZY-SMELLY FEET -
I MISS 2 BUSES DURING THE DAY-ONCE AN HOUR ISN'T ENOUGH
THERE'S LOTS OF RUDE DRIVERS & PASSENGERS-NEED MORE ROUTES-SUNDAY ROUTES & WEEKEND TRIPS -WALMART IS IMPOSSIBLE
MORE COVERED AND LIT BUS ROUTES-PLEASE ADD MORE AND LONGER SUNDAY ROUTES
I WOULD LOVE TO HAVE MORE OVER HEADS AT BUS STOPS SO PEOPLE WOULD NOT HAVE TO STAND AND WAIT IN THE RAIN OR SNOW-GETTING ALL WET
RT 5 WHEN IS THIS ROUTE GOING TO SWITCH BACK TO GOING AROUND THE BACK OF SAM'S CLUB? CROSSING THE INTERSECTION BETWEEN WLMART AND SAM'S CLUB IS DANGEROUS IS NOT MARKED FOR PEDESTRIANS AND THERE ARE NO SIDEWALKS-ALSO WILL A ROUTE BE MADE TO SERVICE TARGET KOHLS HARRISS TEETER- THE AIRPORT AND THE SENTARAL MJH FACILITY AT APIRPORT ROAD?
1) WHYA DO WE HAVE TO STAOP AT BARRACKS ROAD MCDONALD'S WHEN WE EXCHANGE BUSES FOR SO LONG? -2) CAN WE HAVE BUSES FREQUENTLY VISITING THE STOPS WITH 15 MIN GAPS & NOT 30 MIN ONES?
MY BIGGEST ISSUE IS MISSING CONNECTIONS-IF I AM RIDING A BUS THAT RUNS MORE FREQUENT TIMES AND THAT BUS CONNECTS TO A BUS THAT RUNS LESS FREQUENT TIMES AND THE FIRST BUS IS LATE MAKING THE TRANSFER POINT-I HAVE TO WAIT A LOT LONGER FOR THE NEXT CONNECTING BUS (DURING BAD WEATHER IT IS A REAL PAIN

BUS SHOULD RUN EVERY 30 MIN MANDATORILY. I HAVE WAITED FOR MORE THAN 1 HOUR MANY TIMES
MORE HOURS ON SUNDAY AND WEEKEND TOO
THAN 1 BUS EACH ON RT 9 AND RT 10-BENCHES AND SHELTERS AT ALL BUS STOPS-MORE RT 7'S
ALL IN ALL I'M SAFISFIED WITH CAT-NEED A LATER BUS SCHEDULFOR CERTAIN RTES THAT SERVE UVA THEIR EMPLOYEES GET OFF 11:30PM & THAT'S CUTS OFF 1 HR LATER WOULD BE HELPFUL-SERVICE ON PANTOPS ON SUNDAY WOULD BE GREAT-THERE ARE METHEDOSE CLINIC THAT IS OPEN 7 DAYS A WEEK AND IT'S HARD TO GO THERE ON SUNDAY WITH NO CAR AND NO BUS SERVICE
EXTEND SERVICE TIMES AT NIGHT IE ROUTES 5 AND 7-UVA HOSPITAL HAS SHIFT THAT ENDS AT 11:30 PM THE LAST ROUTE 7 LEAVES UVA HOSPITAL AT 10:45 PM
MUST DO SOMETHING ABOUT SMOKING AT/NEAR BUS STOPS-I HAVE ALREADY CONTACTED SOME ONE AT CAT AND I GOT A "WE ARE TAKING CARE OF IT" RESPONSE-THAT WAS MONTHS AGO AND I DON'T SEE ANY ADDITIONAL "NO SMOKING" SIGNS AROUND THE STOPS-MORE PEOPLE WOULD PROBABLY TAKE ADVANTAGE OF YOUR BUS SERVICE IF THEY COULD BE ASSURED THAT THEY WOULD NOT BE SUBJECTED TO SMOKE
COVERS FOR STOPS FOR EXTREME WEATHER-STREET LIGHTS AT STOPS ESPECIALLY RT 5-(PAID BY CITY/COUNTY BUSES FOR SPECIAL EVENTS (EX CARNIVAL/COLLEGEL AND HIGH SCHOOL GAMES) TRASH BINS AT POPLAR STOPS OR NEIGHBORHOODS FARE BOXES THAT WORKS AND TAKE 50 CENT PIECES
BUS 5 HAS BEEN CAUSING ME TROUBLES BECAUSE I USE THE APP TO SEE WHERE THE BUSES ARE AND THEY WILL DISAPPEAR AND END UP NOT SHOWING-I HAVE BEEN LATE TO WORK ALOT THIS PAST MONTH BECAUSE OF IT
THE ROUTE 7 10:35 PM BUS WAS OUT THE BLUE PEOPLE W/JOBBS OR GETTING OFF WORK COULD REALLY USE A LATER ROUTE TIME BUSES SHOULDN'T STOP RUNNING UNTIL 12 AM-SUNDAY SHOULD BE MORE BUSES & LONGER ROUTE TIMES FOR WORKING PEOPLE-THANKS DAILY BUS RIDER
ITS PRETTY GOOD THE WAY IT IS
I WOULD LIKE TO SEE MORE BUSES ON SUNDAYS AND EASIER ROUTES TO THE MALL
SUNDAY ROUTES
WALMART BUSES-SUNDAYS BUSES
NEED WALMART BUSES-RUN TOO SLOW AND TAKES A REALLY LONG TIME
BUSES TO WALMART-NO BUSEES ON SUNDAYS-FASTER THANK YOU JOHN
GREAT SERVICE OVERALL-LOT BETTER THAN TIDEWATER AREA & MORE AFFORDABLE RATES ARE GREAT- WONDERFUL SERVICE AROUND THE AREA TO THE MALL/UVA HOSPITAL-THE JEFFERSON SCHOOL TOO-NICE DRIVERS OVERALL TOO A FEW RUDE ONES AT TIMES & NOT VERY HELPFUL WITH HELPING YOU KNOW WHERE TO GO ESPECIALLY IF YOU ARE NEW FROM OUT OF TOWN LEARNING THE AREA-CUSTOMER SERVICE WHEN YOU CALL CAN BE A BIT CONFUSING TOO AT TIMES-AGAIN AS YOU 'RE TREING TO LEARN AREA- MANY TIMES CUSTOMER SERVICE IS RUDE & NASTY WHEN I HAVE CALLED & TOLD ME I WSN'T LOOKING AT MAPS RIGHT TO ME THAT WAS VERY UNPLEASANT-MORE SERVICE EXTENDED ON SUNDAYS AS WELL -#6 BUS COULD RUN ON SUNDAYS TOO-DIFFICULT ROUTE & NOT RUN AS CONSISTANT AS IT SHOULD-SOME DRIVERS AREN'T REALLY NICE EITHER-THANK YOU FOR YOUR SERVICE AROUND THE AREA-REALY APPRECIATE IT-THANK YOU
GREAT SERVICE OVERALL-I PUT NEUTRAL FOR THE SCHEDULE MEETING MY NEEDS BECAUSE I TYPICALLY HAVE TO BE @ WORK BY LAM (TODAY IS UNUSUAL I HAVE TO BE THERE BY 7AM WHICH IS WHY I'M ON T HE BUS THISMORNING) IT WOULD BE GREAT BUT I UNDERSTAND WHY NOT IF THE BUSES RT 7 STARTED R UNNING AT 5:30 INSTEAD OF 6:30 FOR THIS REASON

THE BIGGEST ISSUE W/ RELIABILITY IS DURING PEAK HOURS-CONSIDER ADJUSTING ROUTE SCHEDULE TO RESPOND TO TRAFFIC CONDITIONS OR ADD A FEW BUSES TO MAJOR ROUTES DURING PEAK TIMES (EG 6 RT 7S DURING THIS 4:30P-6:00P)
I FIND THAT THE BUSES LEAVE LATE CONSISTENTLY IN THE MORNINGS-IF THAT WOULD IMPROVE THEN CUSTOMER SATISFACTION WOULD-THIS IS ESPECIALLY MISERABLE WHEN IT GETS COULD OUTSIDE-I ALSO FIND IT VERY FRUSTRATING TO WATCH STAFF SOCIALIZING WHEN IT'S TIME TO LEAVE THE TRANSIT STATION -I WILL SAY THAT THE WOMAN THAT DRIVES THE TROLLEY THAT LEAVES AT 6:35 IS AWESOME-SHE IS THE TRUE EPITOME OF A GREAT BUS DRIVER
MORE BUSES V HIGHER COST-THIS IS A BALANCING ACT THAT CAT HAS SEEMED TO DO FAIRLY WELL
I USE THE PHONE TRACKER/APP WHICH CAN BE UNRELIABLE EG SAY THE BUS IS ,2 MINUTES AWAY WHEN IT TAKES 15 + MINUTES FOR IT TO ARRIVE-THIS IS AT THE EMMET ST SOUTHBOUND STOP NEAR MOSEY RD
NEED A BUS STOP AT ANGUS RD -TOO FAR TO WALK TO CATCH THE 7-TOO MANY BREASK-ALWAYS LATE TO WORK-SET A CERTAIN STOPS FOR TOO LONG-ALWAYS LATE TO WORK
MORE WEEKEND SERVICE-ESPECIALLY ON SUNDAYS
THE SERVICE IS GREAT EXCEPT ON WEEKENDS YOU HAVE TO WAIT ONE HOUR TO CATCH THE SERVICE-THANK YOU
THE REASON I ON YOUR BUS BECAUSE I DON'T HAVE CAR-I GO DMV TO DO EXAM I FL MORE TIME TO CHARLOTTEVILLE TRANSIT I DON'T HAVE ANY COMMENT BECAUSE IT'S EXCELLENT THE BUS COME ON TIME THE DRIVERS THEY ARE NICE-I AM USE THE BUS MONDAY TO SUNDAY
BUS STOP BY WHOLE FOOD NEE DTO BE MOVED TO THE STOP SIGN AT HOTEL
SERVICE TOO STAGGERED ON SUNDAYS-ROUTE 12 SHOULD HAVE MORE BUSES & BROKEN U{ INTO 2 SEPARATE ROUTES
EXAMPLE 1) FASHION SQUARE MALL BUS 7 NEEDS TO WAIT ON BUS 5 GOING TO WALMART FOR 2 MORE MINUTES-SINCE BUS 5 IS THE ONLY ONE GOING THERE MONDAY THRU SATURDAY SOMETIMES BUS 5 WILL BE PULLING OFF AT FASHION SQUARE WHEN BUS 7 NOT DONES IN THE PARKING LOT-BUT UVA HOSPITAL HAS BUSES GOING 7 DAYS A WEEK -JEFERSON HOSPITAL SHOULD ALSO
I HAVE RIDDEN THE BUS SINCE IT WAS A 25 CENT MINI I LUV IT-THE DRIVERS USUALLY GO OUT OF THEIR WAY TO BE HELPFUL-I AM THRILLED TO HAVE MY POEMS ON BUS LINES-THE BUSES LOOK BEAUTIFUL WITH THE BOUWOOD DESIGN WE DO NEED MORE BENCHES AND SHELTERS WITH PEOPLE PAID TO KEEP THEM CLEAN-LITTLE BOXS BY BUS STOPS FINE POLLUTERS
I LIVE ON ALTAVISTA AVE I FEEL THE STOP AT THE TOP OF THE ROAD NEAR MONTICELLO SHOULD BE REINSTATED BECAUSE MOST OF THE PEOPLE LIVING THERE ARE DISABLED AND CAN'T WALK UP THAT STEEP HILL TO GET BACK HOME-I TRY TO USE THE ROUTE 1 TO GO HOME FOR THAT REASON BECAUSE I HAVE HAD 8 HEART ATTACKS AND CAN'T DO THAT HILL BUT THERE IS NO ROUTE 1 ON SATURDAY AT ALL EITHER
CREATE A KEY OF ALL STOP LOCATIONS-IMPROVE APP TO SHOW REAL-TIME LOCATIONS
MORE COVERED STOPS
THEY NEED TO HAVE THE BUS ON TIME AT NIGHT IN STEAD OF PEOPLE HAVE TO WALK HOME TO THEIR DESTINATION-NEEDS TO HAVE BUS RUNNING ON SUNDAY LATER
I HAVE RODE THE CAT TRANSIT SERVICES ALL 4 YOURS OF MY UNERGRAD AT UVA & WORK- I AM SATISFIED WITH IT-THERE HAVE BEEN SOME WEIRD INSTANCES WITH OTHER PASSENGERS BUT THE ONES I HAVE MET ARE REALLY NICE AND ARE A GREAT HELP INFORMATION WISE
ALL BUS NEED TO RUN ON SUNDAY
JAZZ IS A GREAT BUS DRIVER ALWAYS CHEERFUL!

16 THE CHOICES ARE RIDICULOUS THERE SHOULDN'T HAVE TO BE A TRADE-OFF FOR AN OVERALL BETTER SERVICE-MORE FREQUENT SERVICE AND LONGER SERVICE HOURS SHOULD BOTH BE THINGS THAT CAT SERVICES-THE SAME GOES FOR THE REST OF THE CHOICES
WHEN TRANSIT CLOSES @ 8 PM @ NIGHT THERE IS NO WHERE PLACE TO SIT-TO SIT OUTSIDE- NO COMFORTABLE TO SIT OUTSIDE NOT SAFE AT ALL AS A WOMAN-TRANSIT CENTER NEEDS TO STAY OPEN A LITTLE LONGER FOR SAFETY REASONS FOR PEOPLE WAITING FOR BUSES AFTER TRANSIT CLOSES
THANKS FOR SERVICE
ADA CARD BE SCAN BY THE METER-MORE STREET LIGHTS-SHELTERS AT STOPS-MORE NIGHT SERVICE
BUS 8 COULD RUN UNTIL AT LEAST 8 PM M-SATURDAYS-SUNDAYS SERVICE IS RIDUCULOUS IT TAKE S TOO LONG TO TRAVEL FROM DOWNTOWN TO WALMART
I'M PLEASED WITH THE SERVICE BUT WOULD LIKE IT TO EXPAND TO IVY AND FURTHER NORTH
NEED PAYMENT VIA CARD-MORE COVERED STOPS
I PREFER TO HAVE CAT SERVICE IN NEW AREAS
MORE SUNDAY BUSES
STOP RUNNING TO YOUR DAD
NEED SUNDAY BUSES
OVERALL-NOT BAD THE WAY IT IS-1) SUNDAYS & WEEKENDS IN GENERAL COULD USE MORE ROUTES-2) #1 BUS-ADD ANOTHER BUS POSSIBLY (EVERY 30 MIN)-3) #10 BUS-ADD ANOTHER BUS (EVERY 30 MIN)-4) #5 NOT SURE! TAKES A REALLY LONG TIME TO GET TO THE SHOPPING CENTERS AROUND WALMART AREA- MOST DRIVERS ARE VERY HELPFUL AND FRIENDLY-BASIC BUS RIDING TIPS OR PLANNING METHODS POSTED SOMEWHERE EASY TO SEE AND UNDERSTAND
I BELIEVE AN EXTRA BUS WOULD IMPROVE THIS ROUTE TREMENDOUSLY-EVERY 30 MIN AS OPPOSED TO ONCE AN HOUR-CROWDED & SLOW AT TIMES
NEED SUNDAY ROUTES-QUICKER ROUTES-EVERY 30 MIN?
MORE THAN 1 RT 9 & 10-BENCHES & SHELTERS AT ALL STOPS
APPRECIATE THE GOOD SERVIE (THAT CAT DOES FOR OUR COMMUNITY) I ENJOY RIDING THE BUS
YMCA STOP ADDED IS UNNECESSARY AS THERE NOW NO PASSENGER GET DOWN OR GETS UP FROM THE STOP ALSO IT TAKES EXTRA 5-7 MINTUES OF TIME
I RIDE THE #9 BUS 6 DAYS A WEEK-THE NEW NIGHT & SUNDAY SERVICE IS GREAT-HOWEVER THE MAIN BUS USED ON THAT ROUTE (#310) IS VERY BONE RATTLING BUMPY HARD TO BOARD AND ALL AROUND UNCOMFORTABLE-ALL CAT SUPERVISORS AND MR JONES SHOULD TEST RIDE THIS BUS!
SOME MORE EXPERIENCED DRIVERS ARE RUDE-REFUSE TO LOWER THE BUS-BUSES STINK (NEED AIR FRESHENERS-NEW DRIVERS AREN'T HELPFUL AND NEED MORE TRAINING ON THE BUS ARRIVAL TIMES- DRIVERS LEAVE STOPS BEFORE DUE TIME-WHY IS THE AIR STILL ON SO? THE BUSES BE WAY TO COLD FOR MID SEPT-HAPPY W THE EXTENDED 8/9 ROUTES!!
#9 BUS NEEDS NEW SHOCKS OR SPRINGS-VERY BOUNCY AND THE DRIVERS ARE ON THE BUS FOR HOURS -COULD SERVICE BE EXTENDED TO COMMUITER TOWNS SCOTTSVILLE-LAKE MONTICELLO-FOREST LAKES- WAYNESBORO ETC?
I WAS USING JAUNT BUT REMOVE ME FROM SERVICES
I WAS VERY DISAPPOINTED WHEN ROUTE 9 SERVICE WAS CHANGED TO DISCONTINUE STOPS NORTH OF KENWOOD DR-I USED TO BE ABLE TO USE THE BUS SERVICE MORE FREQUENTLY WHEN ROUTE 9 SERVED THE GREENBRIER ELEMENTARY SCHOOL BUS STOP

MORE BETTER SVC & ROUTES
NEED TO RUN MORE & LONGER ON SUNDAYS AND SOME BUS DRIVERS NEED TO MIND THERE OWN BUSINESS
WOULD LIKE TO SEE THE TRANSIT STATION OPEN BY 6:30 AM
ON ADDITIONAL BUS ON LOCUST & CALHOUN WOULD BE NICE AND TO RUN LONGER THAN 8:30 PM
IF WOULD BE NICE TO HAVE A SHELTER AND SEATS AT ALL BUS STOPS-MORE SUNDAY BUSES
IT'S IMPORTANT FOR THE ADVERTISEMENTS TO EXPAND THIS SERVICE-MORE PPL SHD TAKE THE BUS-PLEASE EXTEND THE SYSTEM OUT TO OTHER CITIES 20 MILES PAST COUNTY-THIS WD MEAN MORE USES YET THE WOULD BE USED-RENTS TOO HIGH-THANK YOU GAIL K TUMONIZURLI
THE SERVICE IS GREAT
I SHOULD LIKE TO SEE BUS SERVICE ON SUNDAYS TO THE PANTOPS AREA EVEN IF IT'S NOT ALL DAY SERVICE
I WOULD LIKE RT 10 TO HAVE SUNDAY SERVICE AND EXTENDED SERVICE ON SUNDAYS SO I CAN INCREASE MY AVAILABILITY ON SUNDAY-I WOULD ALSO LIKE TO A CAT ROUTE GO TO HOLLYMEAD/FOREST LAKES/AIRPORT
PEOPLE WITH DIASBLE ARE HAVING HARD TIME GETTING THE FREE PASS CARD
NEED SUNDAY BUSES TO HIGH SCHOOL MHS AVON ST-THANK YOU-NEED MORE BENCHES NEAR THE HIGH SCHOOL FOR DISABLE PEOPLE TO SIT
HELO I LIVE IN BLEMONT HAVE TO GO TOO PANTOPS TO WORK BY CAR I'M ONLY 7 MINS-BUS 2 1/2 HOURS ONE WAY-I WORK ONLY PART TIME-I TRAVEL BACK N FOURTH MORE HRS THAN I WORK-NEED DESPERTLY A SUNDAY BUS TO GO TO PANTOPS-SOMETIMES IF I CAN'T FIND A RIDE IT TAKES ME AN HOUR AND 10 MINS TO WALK AND BUS 3 BELMONT BUS SHOULD BE AT THE SAME STATION AS THE OTHER BUES-NOT IN ANOTHER AREA SAFETY REASONS
BUS STOP NEAR HAVE TO WAIT HAS PAINS IN HIS LEGS ROUTE #5 BUS-EVEN IN THE RAIN AND COLD-WISH HAD PARK BENCH #5 ROUTE BARRACKS RD HYDRLIC RD
SOUNDAY ROUTE 12 IS NOT LONG ENOUGH ON END RUN TIME-IT SHOULD RUN UNTIL 7 PM INSTEAD OF 5 PM-THIS WILL HELP LOTS OF PEOPLE WHO HAVE TO WORK UNTIL 6 PM ON SUNDAY
BUSES NEED TO RUN LONGER 24HR SERVICE-CERTAIN BUSES NEED TO RUN LATER AND EARLIER
I RIDE THE #5 ON THE FIRST TRIP IN THE MORNINGS-THE BUS TRANSFERS TO THE #7 AT BARRACK'S RD-THE DRIVERS NEED TO BE AWARE NOT TO LEAVE IN THE MORNINGS UNTIL WE TRANSFER-PEOPLE DEPEND ON IT TO GET TO WORK AND OTHER APPOINTMENTS-SO THEY NEED TO COMMUNICATE BETTER SO WE CAN GET THERE ON TIME-THIS IS THE ONLY WAY SOME PEOPLE CAN GET WHERE THEY NEED SO PLEASE TRY TO LET ALL NEW DRIVERS KNOW THIS-THANKS FOR YOUR SERVICE
BUS SERVICE IS GREAT-GLAD HAVE BUSES TO GET AROUND-HAVE NO BIKE AND TAKE BUSES TO GET AROUND AND DISABILED AND HOMELESS-APPRECIATE SERVICE
SUNDAY ROUTES!!
BRING BACK BUS #9
THE BUS SERVICE NEEDS TO TELL PEOPLE IF THEY ARE GOING TO BE ON TIME OR NOT THROUGH THE CAT APP
I WOULD LIKE EVERYTHING AT #16 BUT I KNOW I AM NOT THE ONLY ONE USING THE BUS-MY ROUTE IS NOT EVERYONE ELSE'S AND THERE ARE FINANCIAL CONSTRICTIONS-I LIKE THE BUS VERY MUCH AND LOOK FORWARD TO THE 11 BUS RUNNING TWICE AN HOUR AND ALL THE OTHER IMPROVEMENT IN THE FUTURE-I DID USE THE #9 ON THE OLD RT TO FASHION SQ & MISS THAT BUT I COULD SEE IT WAS NOT TRAVELED WELL



RTE 10 NEEDS TO BE ON A 30 MIN SCHEDULE/ADD ADDITIONAL BUS RTE 11 SERVICE NEED TO BE EXTENDED ON WEEKENDS/SATURDAY EVENING I MISSED THE 6:00 BUS TO GET HOME-HAD TO WALK @9 PM FROM CAT TO CALHOUN/SHERIDAN AVE-BUS STOPS AT 6:42 ON MY STREET-NO MORE SERVICE -SUNDAY SERVICE NEEDS TO BE EXTENDED I HAVE TO WALK TOO FAR TO CATCH THE BUS ON SUNDAYS-ADD MORE STOPS FEMALES SHOULD HAVE TO WALK FAR TO GET HOME LEADS TO POSSIBLE DANGEROUS SITUATIONS
DON'T LIKE BUS NOT SERVING MAIN PAT JPA GOING WEST-NEEDS TO GO THROUGH UNIVERSITY AVENUE
MORE PROTECTION FROM RAIN AT SOME STOPS
BEING ON THE 11 ITS SOMETIMES DIFFICULT TO TRANSITION TO THE 5 TO GO TO WORK AS THE 5 IS THE ONLY BUS THAT GOES THAT FAR NORTH-SO IF THE 11 IS EVEN A COUPLE MINUTES BEHIND I'M KINDA SCREWED FOR ABOUT 30 MIN
I WAS A DAILY RIDER WHEN I LIVED NEAR THE MALL BUT THEN I MOVED TO HOLLYMEAD & TRIED TO USE THE RT 29 EXPRESS & WALKING TO GET TO/FROM WORK ON LOCUST NEAR SYCAMORE ST- UNFORTUNATELY THE RT 29 EXPRESS SERVICE IS VERY POOR BECAUSE THE DRIVERS ARE INCONSIDERATE & KEEP THE BUS VERY HOT & THE ENTIRE COMMUTE TOOK 2.5 HRS EACH DAY-I WAS HAPPY TO BE ABLE TO CARPOOL TO THE MALL SO I COULD GO BACK TO RIDING CAT OR 11-DRIVERS ARE ALWAYS VERY THOUGHTFUL & THE BUS TEMPERATURE IS PLEASANT & THE TRIP ONLY TAKES 30 MIN EACH WAY-THANK YOU & PLEASE START SERVING HOLLYMEAD NOW THAT BERKMAR RD HAS BEEN EXTENDED
SERVICE IS GOOD-VERY GOOD THE BUSES I TAKE ARE GOOD-FARE IS VERY EXPENSIVE ON BUDGET-NO STRESS TAKING BUS KEEPS STRESS DOWN TAKING THE BUS-LIMIT STRESS UNLIKE TAKING CAR LOTS OF STRESS
I WOULD LIKE SOME RULES TO BE REINFORCED NOT EATING-USING TIGHT CONTAINERS TO DRINK-NOT CURSING-NOT USING CELL PHONE WITHOUT EARPHONES-SOME DRIVERS APPLY SOME RULES BUT NOT OTHERS-SOME DRIVERS DON'T CARE AT ALL
FIND THE DRIVERS TO BE POLITE & FORMAL HAVE NEVER CAME ACROSS A UNPOLITE DRIVER-MAPS UPDATED AND MAKE DETAILS-ANNOUNCEMENTS ARE HELPFUL B/C VISUAL IMPAIRED
THANKFUL FOR THIS SERVICE! NO CAR NEEDED

9 Appendix B: Route Profiles

This appendix provides a detailed profile of each of the 12 fixed-routes operated by CAT during weekday service. Each route profile relies on ridership data collected during the week of September 11th, 2017. As ridership data was collected for weekday service only, Route 12 is not included in this set of profiles. However, as Route 12 is a Sunday-only hybrid of Routes 7 and 5, the findings of those two profiles can be applied to the analysis of Route 12.

Each route profile includes a route description, and a discussion of operating characteristics and service performance. Each profile concludes with a summary of strengths, weaknesses, and opportunities.



9.1. ROUTE 1: PVCC & WOOLEN MILLS

9.1.1. Service Description

Route 1 (**Figure 62**) operates on weekdays only between Piedmont Virginia Community College (PVCC) and Riverview Park, via downtown Charlottesville. The route travels primarily along College Drive, Route 20/Scottsville Road, Monticello Avenue, Little High Street, and Riverside Avenue. Some segments of Route 1, such as Market Street and Water Street, are served in one direction only. Additionally, the route is presented in maps and schedules as beginning and ending at the Downtown Transit Station, alternating service between PVCC and Riverview Park.

Passengers may transfer between Route 1 and other services at the Downtown Transit Station, which offers connections to most other CAT routes. Excluding the first trip of the day (6:15 AM) which runs solely from Riverside Avenue to the Downtown Transit Station, and the last trip of the day (9:30 PM) which skips Riverside Avenue, all Route 1 trips operate along the route's full alignment.

Figure 62 | Route 1 Map



9.1.2. Operating Characteristics

Error! Reference source not found. summarizes Route 1's operating characteristics. The route operates on an hourly frequency over the entire weekday service day. Route 1 costs \$283,026 to operate per year, ranking 11th in the CAT system. The route connects to all weekday routes excluding Routes 5 and 12, and serves a several activity generators, including downtown Charlottesville, Riverview, Meade, Belmont, Quarry, Rives Parks, and PVCC.

Table 9-1 | Route 1 Operating Characteristics

Destination	From		Riverview Park
	To		Piedmont Virginia Community College
Span	Weekday		6:15 AM – 10:05 PM
	Saturday		--
	Sunday		--
Frequency	Weekday	Peak	60
		Off-Peak	60
	Saturday		--
	Sunday		--
Annual Operating Costs			\$283,026
Route Connections			2, 3, 4, 6, 7, 8, 9, 10, 11, Trolley
Key Destinations			Downtown Mall, Downtown Transit Station, PVCC

9.1.3. Weekday Service Productivity

With 12.4 passengers per hour, Route 1 ranks 10th in the system and falls below the system average of 20.8. The route similarly falls below average in passengers per trip (5.9), also ranking 10th. Route 1's on-time performance rate is 83 percent (16 percent early and one percent late), ranking sixth and just above the weekday system average. Finally, at \$5.63 per passenger trip, Route 1 has the third-highest operating cost per passenger among CAT routes.

Table 9-2 summarizes service productivity metrics for Route 1.

Table 9-2 | Route 1 Weekday Service Productivity Metrics

Passengers per Hour	On-Time Performance
<p>Average 20.8</p> <p>12.4</p>	<p>Average 82%</p> <p>83%</p>
Passengers per Trip	Operating Cost per Passenger
<p>Average 11.5</p> <p>5.9</p>	<p>Average \$4.62</p> <p>\$5.63</p>

9.1.4. Ridership

Route 1 averages 195 passengers per weekday (ranking 10th) over 33 trips. The route also ranks 10th in annual ridership (45,962 riders).

Ridership by Stop

Figure 63 and **Figure 64** summarize weekday passenger activity (boardings and alightings) by stop in the northbound direction. Northbound passengers tend to board at PVCC and along Monticello Road, alighting most often at stops surrounding the Downtown Mall (such as the Omni Hotel and West Market Street at Old Preston). Boardings are highest at PVCC and the intersection of Monticello Road and Carlton Road; alightings are highest at stops serving the downtown area.

Figure 65 and **Figure 66** summarize total activity by stop in the southbound direction. In this direction, boarding activity is highest at the Downtown Transit Station and most alightings take place along Monticello Avenue and at PVCC.

Figure 63 | Route 1 Weekday Ridership by Stop: Northbound

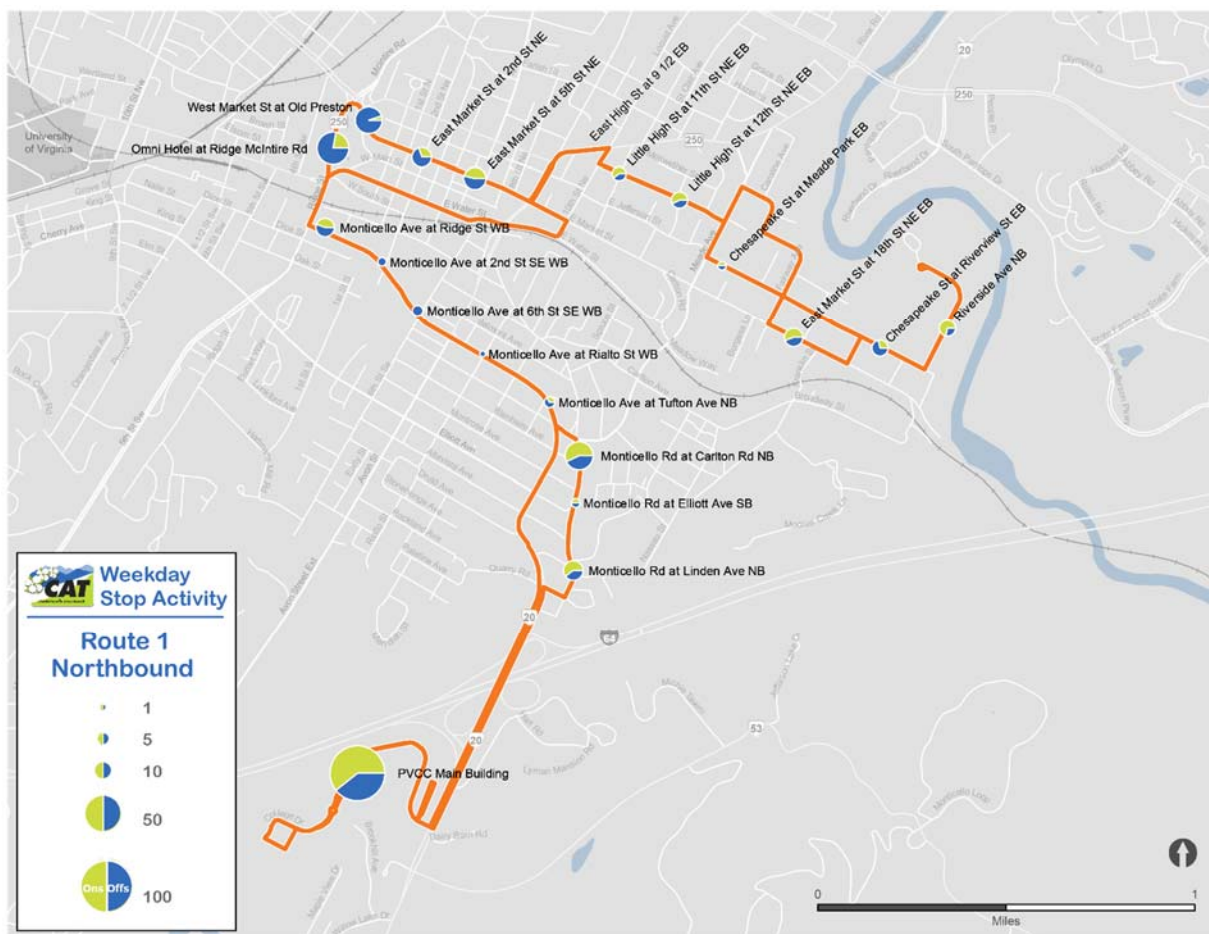


Figure 64 | Route 1 Weekday Boardings and Alightings, by Stop: Northbound

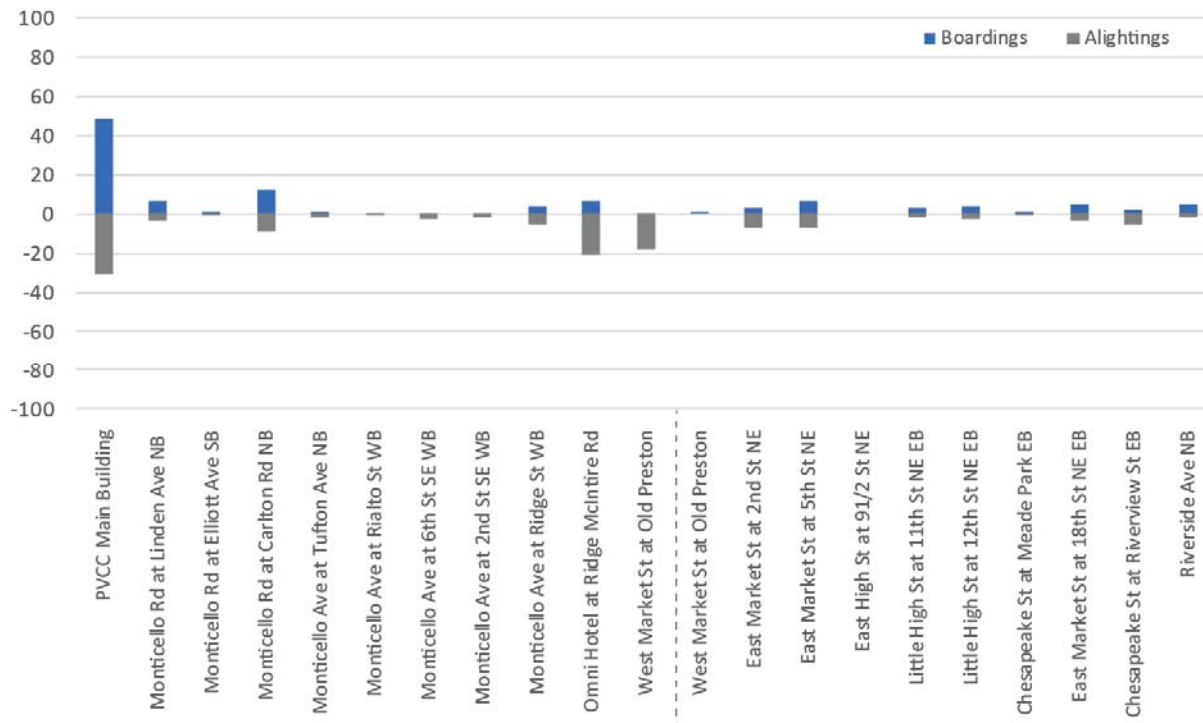


Figure 65 | Route 1 Weekday Ridership by Stop: Southbound

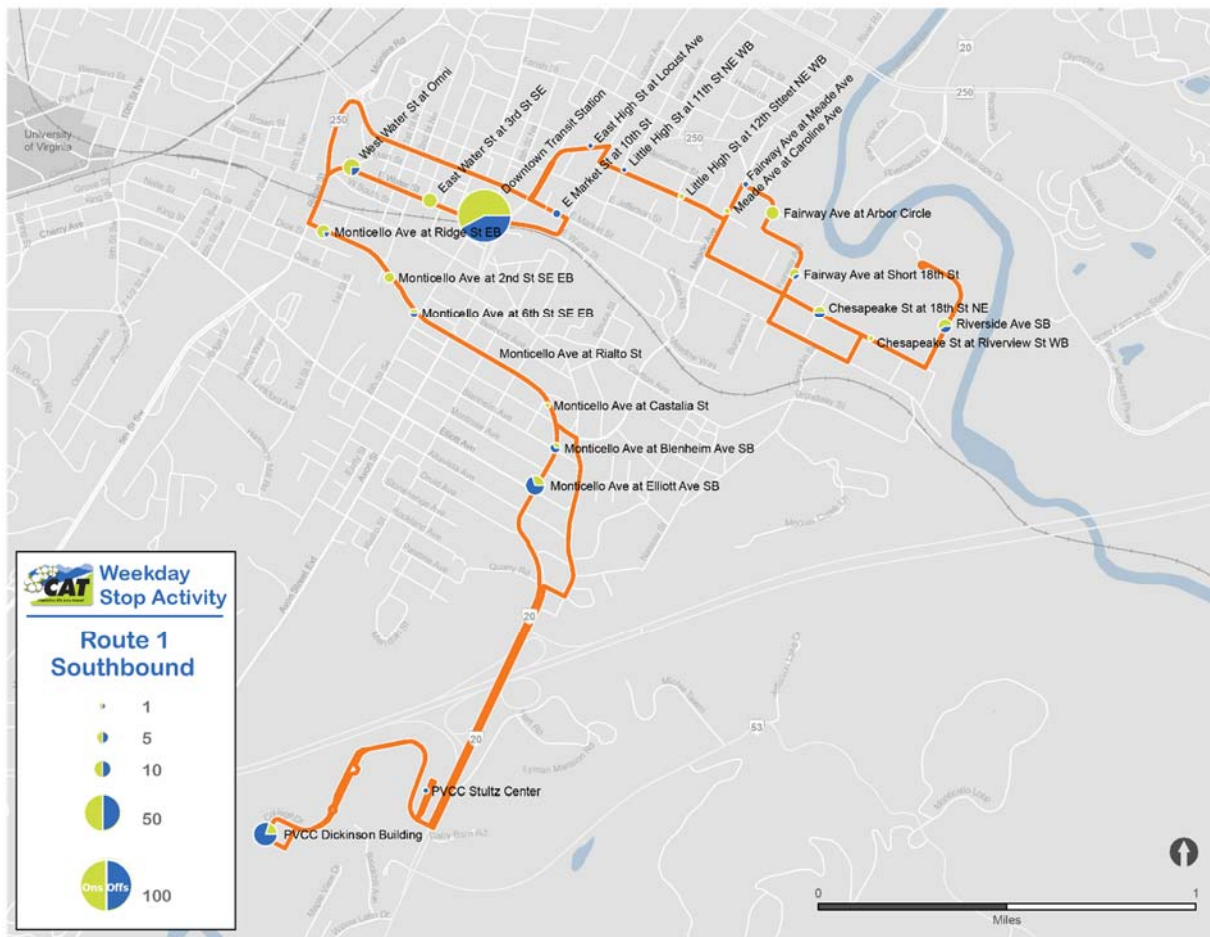


Figure 66 | Route 1 Weekday Boardings and Alightings by Stop: Southbound

Ridership by Trip

Figure 67 (northbound) and **Figure 68** (southbound) show the boardings and maximum load for each trip per direction over the course of a typical weekday.³ No Route 1 trips exceed a maximum load of 32 passengers, the seating capacity for the 35ft. transit buses typically assigned to this route. Northbound activity is busiest between 10:00 AM and 5:00 PM; southbound activity is busiest between 8:00 AM and 2:00 PM.

³ On certain trips profiled in this assessment, the maximum load exceeds the total number of boardings per direction for a trip. This can occur when riders board a bus traveling in one direction, but then stay on as the bus reverses direction to begin its next directional trip.

Figure 67 | Route 1 Weekday Ridership per Trip: Northbound

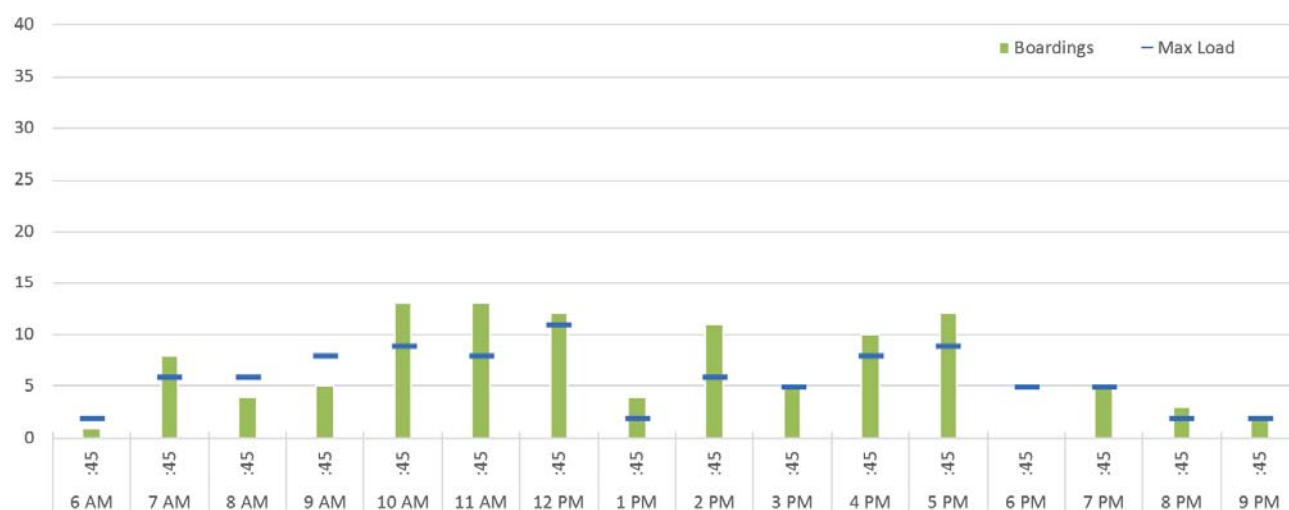
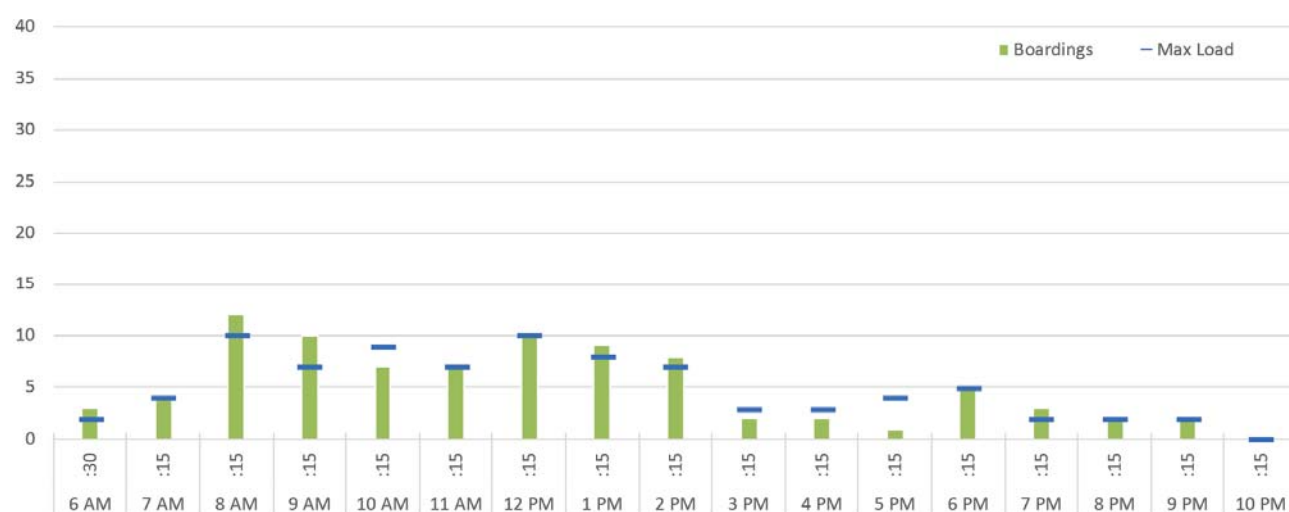


Figure 68 | Route 1 Weekday Ridership per Trip: Southbound



9.1.5. Summary of Observations

Strengths

- Only route with direct service to PVCC, a key regional destination
- Extensive span of service (6:15 AM – 10:05 PM)
- Easy-to-remember clock-face frequency
- Multiple connection opportunities in downtown Charlottesville

Weaknesses

- Service design with alternating branches makes passenger information overly complex
- Several segments of one-way service requiring passengers to board and alight route on different streets



- Below-average productivity in terms of passengers per hour and passengers per trip
- Above-average cost per passenger trip
- Relatively poor on-time performance
- No weekend service
- Difficult turn-around location at Riverside Avenue
- No direct access to major grocery stores

Opportunities

Potential opportunities to strengthen Route 1 are listed below. Some suggestions may be contradictory, as there is usually more than one approach to improving a route.

- **Split Route 1 into two separate routes.** The southern and eastern branches of Route 1 serve very different markets, and there appears to be relatively few through-riders between the branches. Splitting the route into two separate routes serving PVCC and Riverside Avenue, respectively, would make each resulting route easier to understand for users, and could give CAT more flexibility in terms of interlining various routes to maximize service efficiency. In addition, splitting the routes would allow for different service frequency to different markets. As PVCC is a relatively high-ridership stop, increased peak frequency may be justified in the future.
- **Simplify alignments.** Route 1 operates along different alignments, depending on direction, at several points along the route. In most cases, the ridership gained from deviating from a single consistent alignment does not appear to justify the deviation. To simplify service, Route 1 should operate along the same alignment in both directions wherever possible. For example, buses could operate along Chesapeake Street between Meade Avenue and Riverside Avenue for inbound and outbound trips.
- **Truncate route at Riverview Street.** The current end-of-the-line for Route 1 is a cul-de-sac on Riverside Avenue. When cars are parked along this cul-de-sac, there is little room for buses to turn around without being forced to perform a multi-point turn. This maneuver can be risky without a spotter, especially when it is dark. Truncating Route 1 at Riverview Street would allow for a safer turn-around via Market Street and impact relatively few riders as ridership is generally low along Riverside Avenue.
- **Interline with another route at PVCC.** PVCC is a major ridership generator, and has the potential to serve as a secondary hub for CAT. Route 1 could interline with a redesigned Route 2 to provide a one-seat ride to retail and grocery destinations at 5th Street Station.

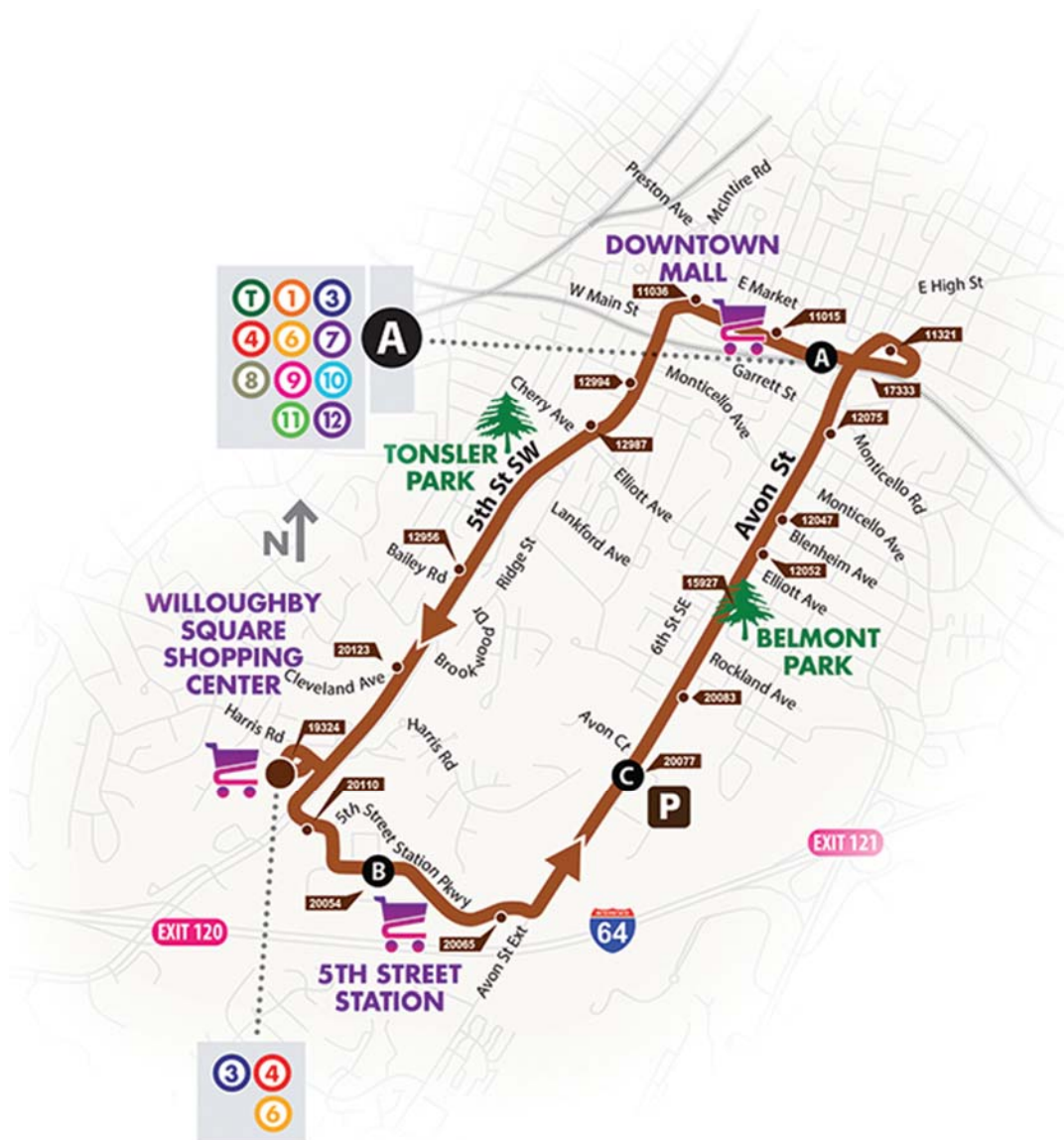
9.2. ROUTE 2: 5TH STREET STATION

9.2.1. Service Description

Route 2 (**Error! Reference source not found.**) is a counterclockwise circulator service connecting downtown Charlottesville with the Willoughby Square Shopping Center and 5th Street Station, via 5th Street SW and Avon Street. The route operates seven days a week, and also provides access to the CAT operations and maintenance facility on Avon Road Extended.

Passengers may transfer between Route 2 and other services at several locations, including the Downtown Transit Station and Willoughby Square Shopping Center. Excluding the first weekday trip (6:35 AM) which runs from the Avon Street Extended Park-and-Ride to the Downtown Transit Station, all Route 2 trips operate along the route's full alignment.

Figure 69 | Route 2 Map



9.2.2. Operating Characteristics

Table 9-3 minute frequency on weekdays, Saturdays, and Sundays. Sunday service begins an hour later and ends significantly earlier than Weekday and Saturday service. The route costs \$231,407 to operate per year, ranking 10th in the CAT system. The route offers connections to all routes excluding Route 5, and serves a variety of activity generators, including downtown Charlottesville, Willoughby Square Shopping Center, 5th Street Station, and Belmont Park.

Table 9-3| Route 2 Operating Characteristics

Destination	From		Downtown Transit Station
	To		5 th Street Station
Span	Weekday		6:35 AM – 11:42 PM
	Saturday		6:35 AM – 11:42 PM
	Sunday		7:35 AM – 5:42 PM
Frequency	Weekday	Peak	30
		Off-Peak	30
	Saturday		30
	Sunday		30
Annual Operating Costs			\$231,407
Route Connections			1, 3, 4, 6, 7, 8, 9, 10, 11, 12, Trolley
Key Destinations			Downtown Mall, Downtown Transit Station, 5 th Street Station, Willoughby Square Shopping Center

9.2.3. Weekday Service Productivity

With 9.6 passengers per hour, Route 2 ranks 12th in the system and falls below the system average of 20.8. The route falls well below average in passengers per trip (4.4), ranking 11th. Route 2's on-time performance rate is 83 percent (17 percent early and zero percent late), ranking sixth and just above the weekday system average. Finally, at \$7.79 per passenger trip, Route 2 has the highest operating cost per passenger among CAT routes.

Table 9-4 summarizes service productivity metrics for Route 2.

Table 9-4 | Route 2 Weekday Service Productivity Metrics

Passengers per Hour	On-Time Performance
<p>Average 20.8</p> <p>9.6</p>	<p>Average 82%</p> <p>83%</p>
Passengers per Trip	Operating Cost per Passenger
<p>Average 11.5</p> <p>4.4</p>	<p>Average \$4.62</p> <p>\$7.79</p>

9.2.4. Ridership

Route 2 averages 154 passengers per weekday (ranking 11th) over 35 trips; 157 passengers per Saturday (ranking eighth) over 35 trips; and 104 passengers per Sunday over 20 trips (ranking third). The route ranks 12th in annual ridership (28,849 riders).

Ridership by Stop

Figure 70 and **Figure 71** summarize weekday passenger activity (boardings and alightings) by stop. On the route's northern end, passengers tend to board and alight more frequently at the Downtown Transit Station and West Water Street near the Omni Hotel. On the southern end of the route, passenger activity is heaviest at Willoughby Square Shopping Center and 5th Street Station. The route sees relatively low ridership activity at intermediate stops along 5th Street and Avon Street.

Figure 70| Route 2 Weekday Ridership by Stop

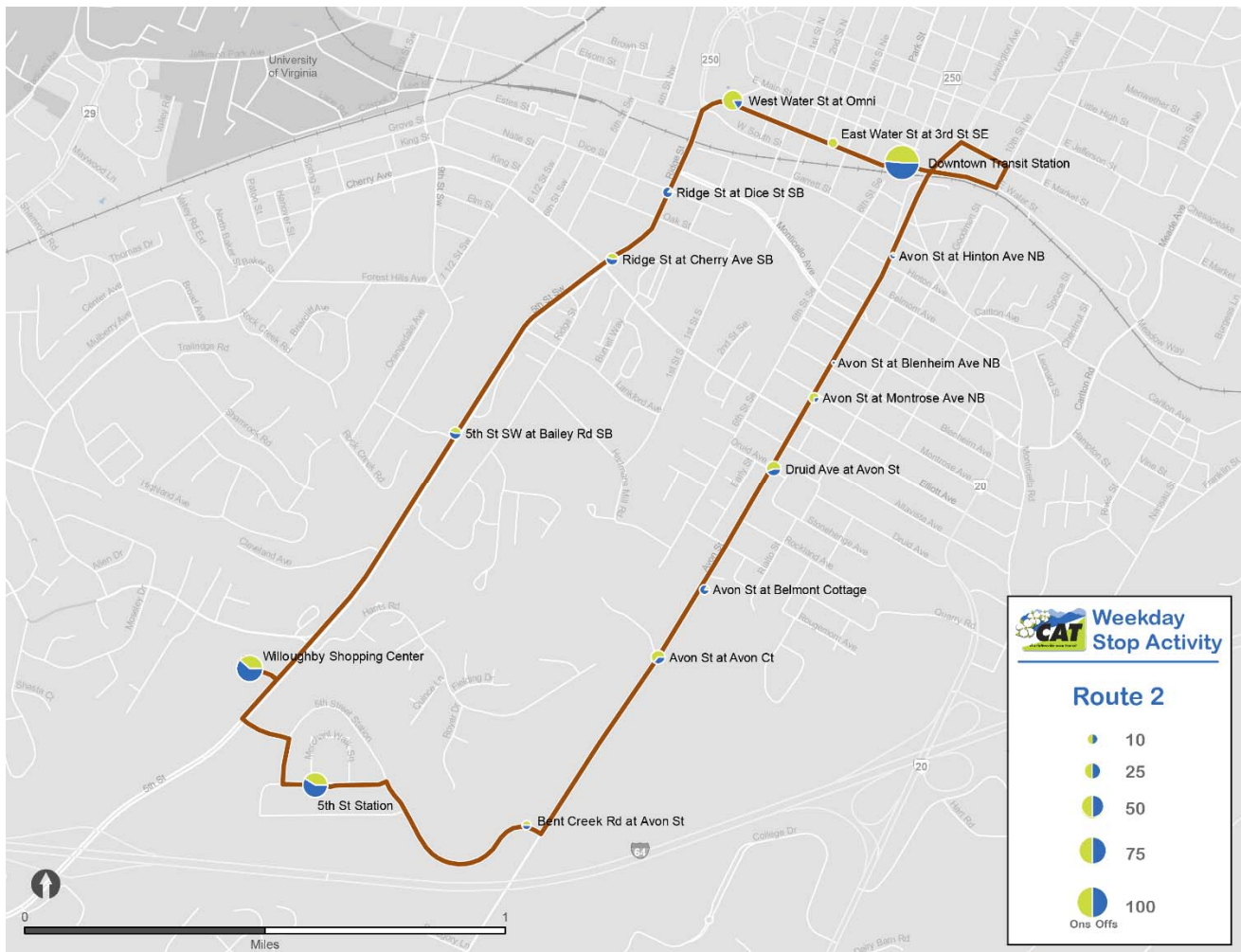
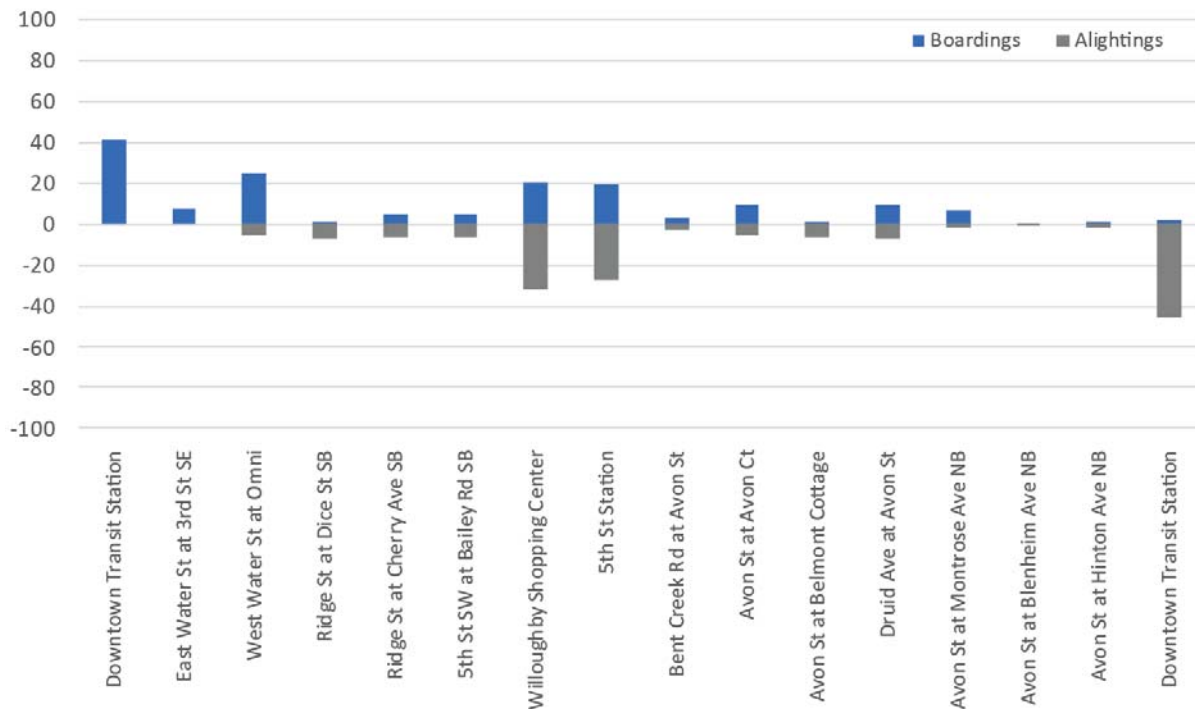


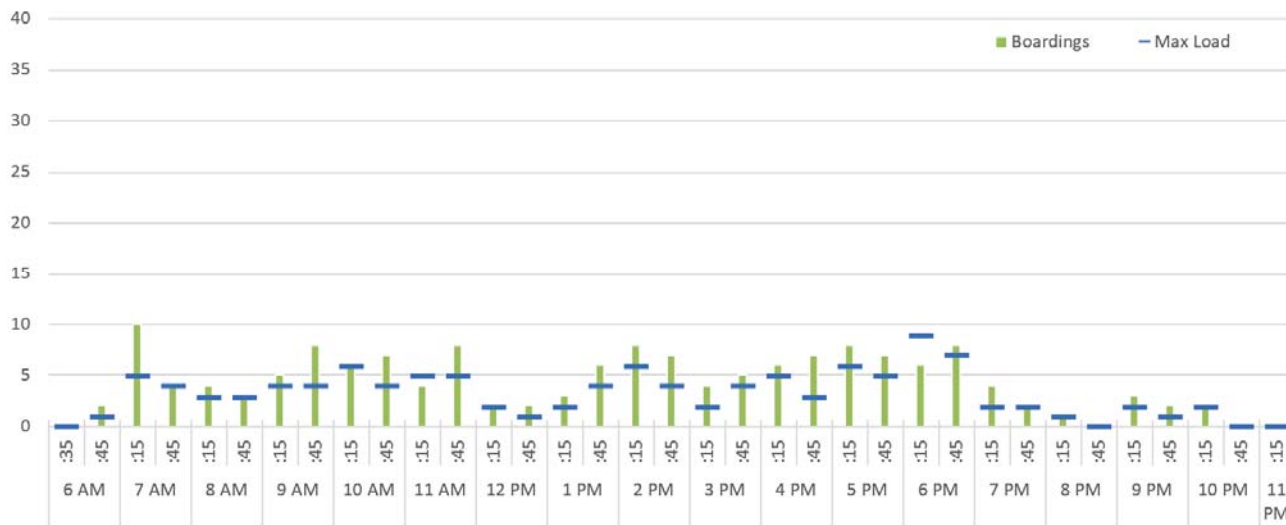
Figure 71 | Route 2 Weekday Boardings and Alightings, by Stop



Ridership by Trip

Figure 72 shows the boardings and maximum load for each trip over the course of a typical weekday. No Route 2 trips exceed a maximum load of 32 passengers, the seating capacity for the 35ft. transit buses typically assigned to this route. The route is busiest from 7:00 AM to 12:00 PM and from 2:00 PM to 7:00 PM.

Figure 72 | Route 2 Weekday Ridership per Trip



9.2.5. Summary of Observations

Strengths

- Simple and direct alignment
- Only route with direct service to 5th Street Station, a key regional destination
- Extensive span of service on Weekdays and Saturdays (6:35 AM – 11:42 PM)
- Relatively frequent service with easy-to-remember clock-face headways
- Multiple connection opportunities in downtown Charlottesville and Willoughby Square Shopping Center
- Above-average on-time performance

Weaknesses

- Poor productivity in terms of passengers per hour and passengers per trip
- Very low ridership before 7:00 AM and after 7:00 PM
- Above-average operating cost per trip
- One-way service design forces out-of-direction travel for residents in neighborhoods along 5th Street SW and Avon Street

Opportunities

Potential opportunities to strengthen Route 2 are listed below. Some suggestions may be contradictory, as there is usually more than one approach to improving a route.

- **Reduce service frequency outside of peak periods.** Route 2 averages fewer than five passengers per trip, suggesting that the Route 2 service frequency exceeds market demand. Reducing the service during off-peak hours would likely improve the route's ridership per trip and ridership per revenue hour.
- **End service earlier on weekdays and Saturdays.** Route 2 ridership drops off significantly after 7:00 PM. Ending service earlier would improve the route's over-all productivity. Stopping service in the 9:00 hour would eliminate several unproductive trips while still maintaining an extensive span of service.
- **Provide bi-directional service and extend route to PVCC.** PVCC is a major ridership generator, and has the potential to serve as a secondary hub for CAT. Route 2 could be restructured to continue south along Avon Street Extended to Mill Creek Drive, after serving 5th Street Station. The route could then continue to PVCC via Scottsville Road. This extension would also add service to several large apartment complexes, a Food Lion, and Monticello High School – all potentially strong ridership generators.



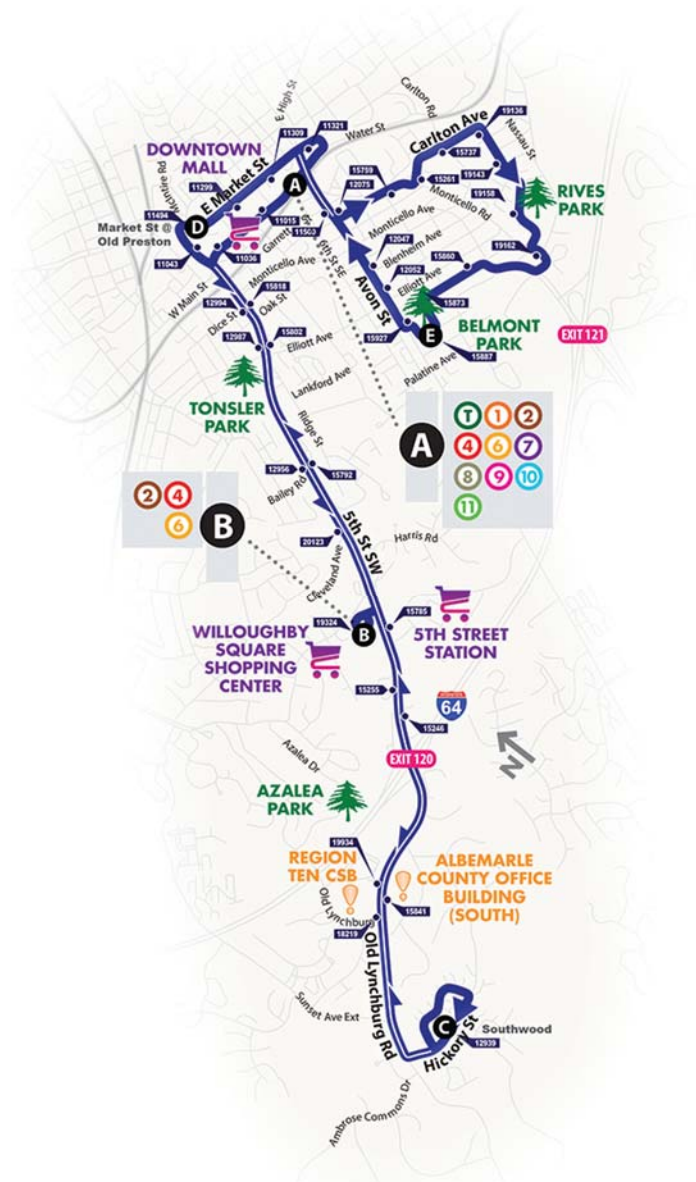
9.3. ROUTE 3: SOUTHWOOD & BELMONT

9.3.1. Service Description

Route 3 (**Figure 73**) operates Monday through Saturday, between the Southwood neighborhood and Belmont Park via downtown Charlottesville. The route travels primarily along Carlton Avenue, Avon Street, 5th Street SW, and Old Lynchburg Road. Some segments of Route 3, such as Market Street and Water Street, are served in one direction only. In addition, the Downtown Transit Center is only served when traveling toward Southwood. The route is presented in maps and schedules as beginning downtown and alternating between service to Southwood and Belmont Park.

Passengers may transfer to other services at the Downtown Transit Station and Willoughby Square Shopping Center. Excluding the first (6:00 AM) and last (11:30 PM) trips, which respectively run from Market Street at Old Preston to the Downtown Transit Station and from the Downtown Transit Station to Southwood, all Route 3 trips operate along the route's full alignment.

Figure 73 | Route 3 Map



9.3.3. Operating Characteristics

Table 9-5 summarizes operating characteristics for Route 3. On weekdays, the route operates a 30-minute frequency during peak periods and hourly service off-peak; on Saturdays, service is provided hourly. At \$488,268 per year, the route has the fifth-highest operating cost among CAT routes. Route 3 offers connections to all routes excluding Routes 5 and 12, and serves several activity generators, including the Albemarle County Office Building, the Region Ten Community Service Board, and Azalea, Tonsler, Rives, and Belmont Parks.

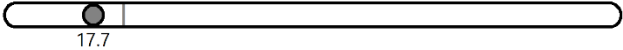
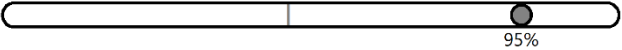
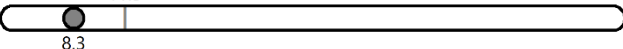
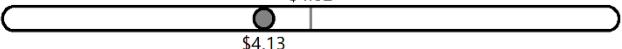
Table 9-5 | Route 3 Operating Characteristics

Destination	From		Southwood
	To		Belmont Park
Span	Weekday		6:00 AM – 11:45 PM
	Saturday		6:00 AM – 11:45 PM
	Sunday		--
Frequency	Weekday	Peak	30
		Off-Peak	60
	Saturday		60
	Sunday		--
Annual Operating Costs			\$488,268
Route Connections			1, 2, 4, 6, 7, 8, 9, 10, 11, Trolley
Key Destinations			Downtown Mall, Downtown Transit Station, 5 th Street Station, Willoughby Square Shopping Center, Albemarle County Office Building, Region Ten CSB

9.3.4. Weekday Service Productivity

With 17.7 weekday passengers per hour, Route 3 ranks fourth in the system but falls just below the system average of 20.8. In addition, Route 3 reports 8.3 passengers per trip, falling below average and ranking sixth. Route 3's on-time performance rate is 95 percent (three percent early and two percent late), ranking second and well above the weekday system average. Finally, at \$4.13 per passenger trip, Route 3 has the fourth lowest operating cost per passenger among CAT routes. **Table 9-6** summarizes the route's weekday service productivity metrics.

Table 9-6 | Route 3 Weekday Service Productivity Metrics

Passengers per Hour	On-Time Performance
<p>Average 20.8</p>  <p>17.7</p>	<p>Average 82%</p>  <p>95%</p>
Passengers per Trip	Operating Cost per Passenger
<p>Average 11.5</p>  <p>8.3</p>	<p>Average \$4.62</p>  <p>\$4.13</p>

9.3.5. Ridership

Route 3 averages 398 passengers per weekday (ranking fifth) over 48 trips, and 295 passengers per Saturday (ranking fourth) over 36 trips. The route ranks fifth in annual ridership (110,148 riders).

Ridership by Stop

Figure 74 and **Figure 75** summarize weekday boardings and alightings by stop in the northbound direction (southbound, east of downtown). In this direction, ridership activity is highest at the ends of the line, at the Albemarle County Office Building, near the Omni Hotel, along East Market Street and along Carlton Avenue.

Figure 76 and **Figure 77** summarize southbound ridership activity (northbound, east of downtown). Ridership activity in this direction is highest near Belmont Park, at the Downtown Transit Station, Willoughby Square Shopping Center, and near the Albemarle County Office Building.

Figure 74 | Route 3 Weekday Ridership by Stop: Northbound

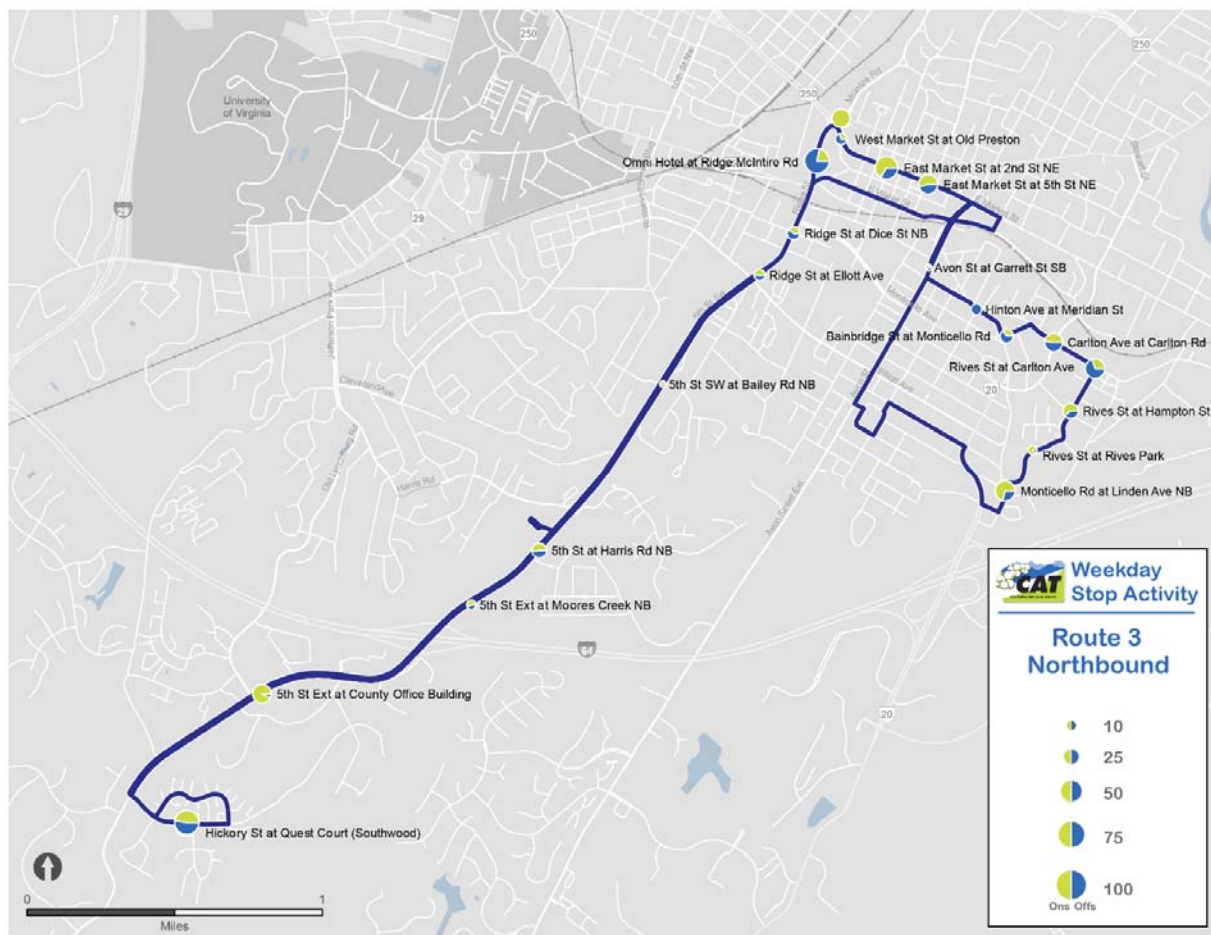


Figure 75 | Route 3 Weekday Boardings and Alightings, by Stop: Northbound

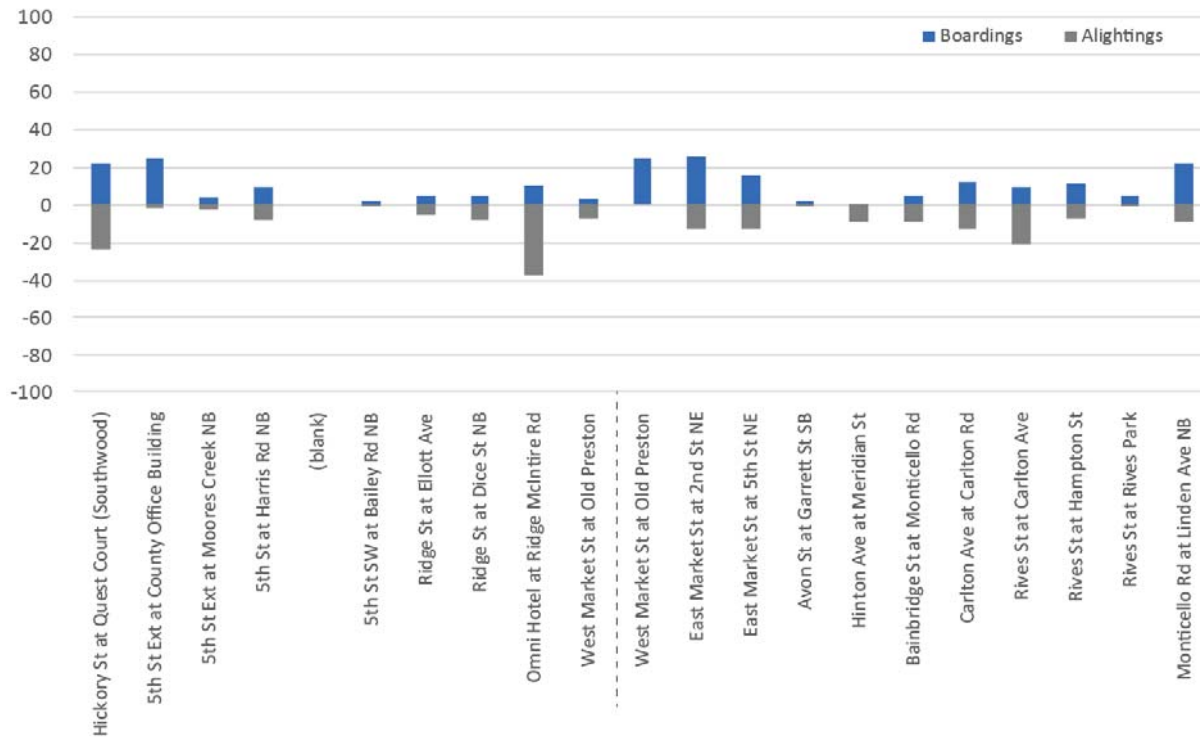


Figure 76 | Route 3 Weekday Ridership by Stop: Southbound

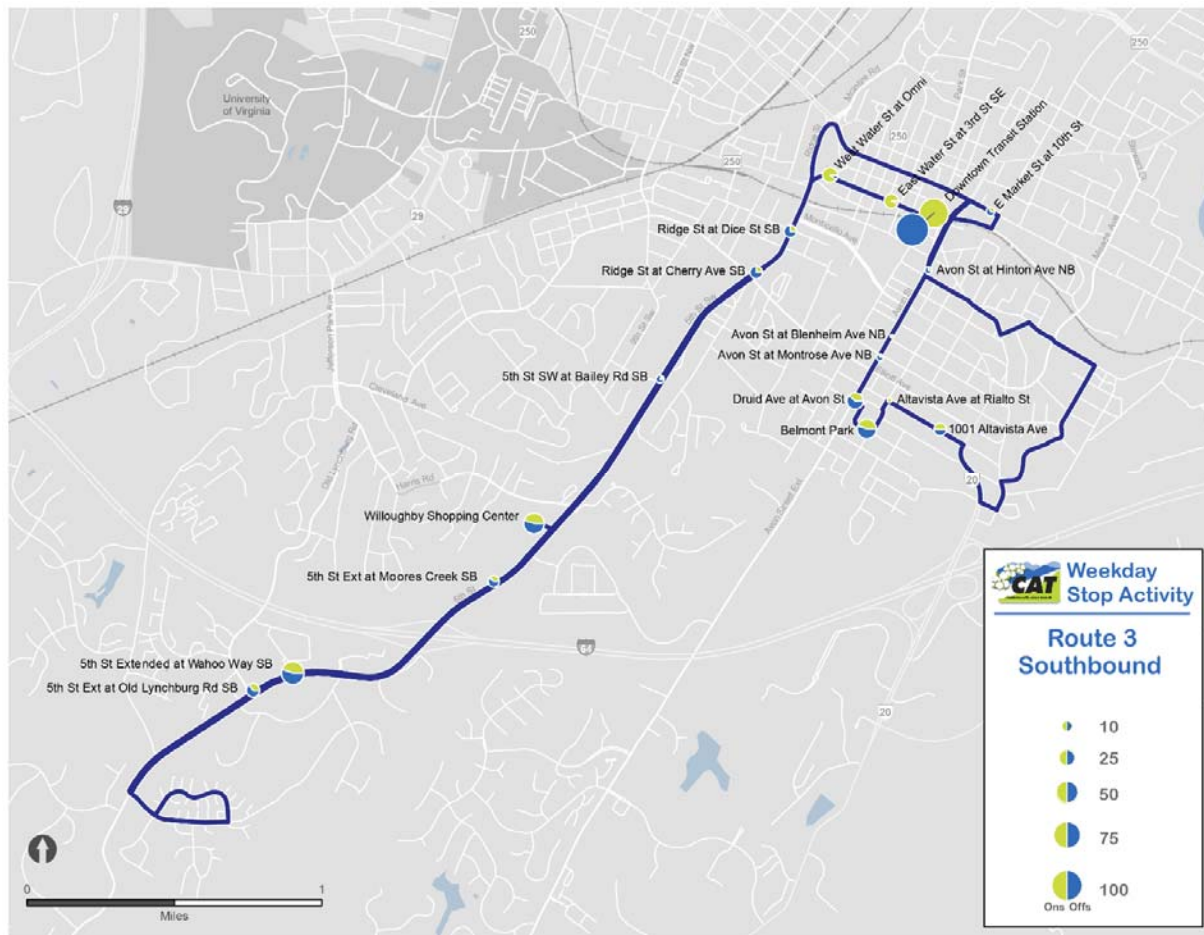
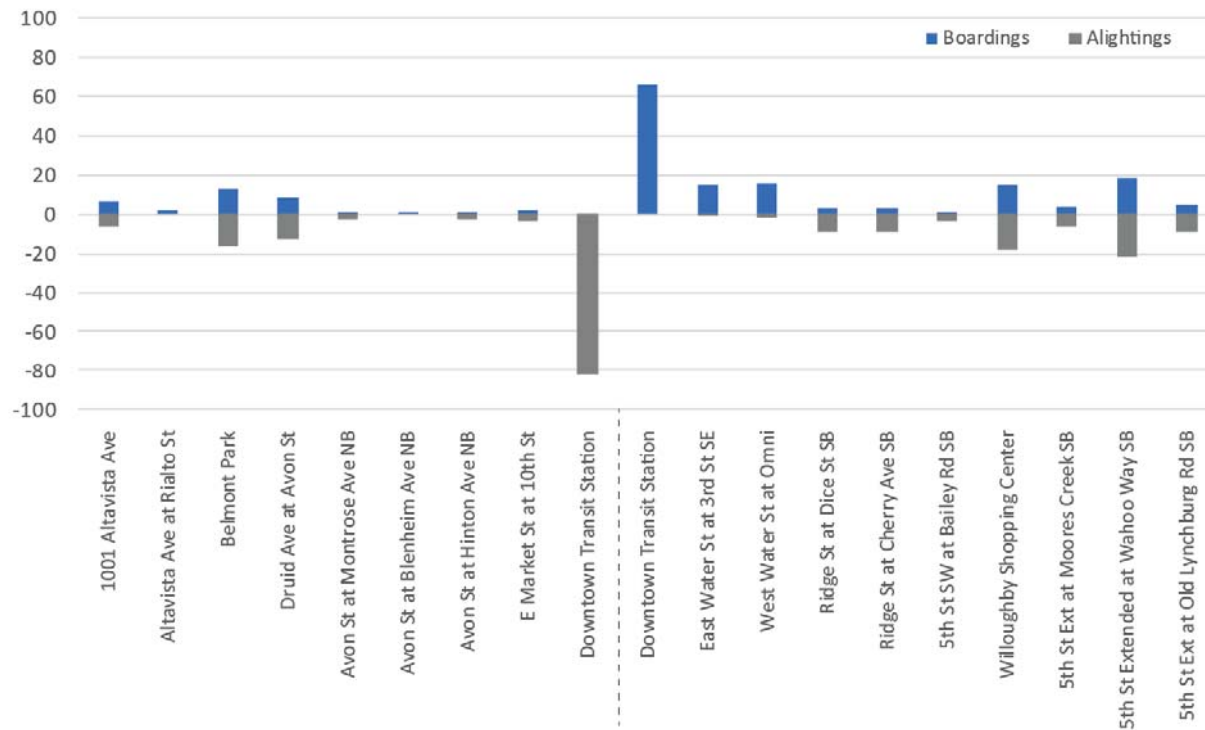


Figure 77 | Route 3 Weekday Boardings and Alightings by Stop: Southbound



Ridership by Trip

Figure 78 (northbound) and **Figure 79** (southbound) show the boardings and maximum load for each trip per direction over the course of a typical weekday. No Route 3 trips exceed a maximum load of 32 passengers, the seating capacity for the 35ft. transit buses typically assigned to this route. While passenger load levels fluctuate over the service day, route activity is busier during service hours prior to 7:00 PM in the northbound direction, and prior to 10:00 PM in the southbound direction.

Figure 78 | Route 3 Weekday Ridership per Trip: Northbound

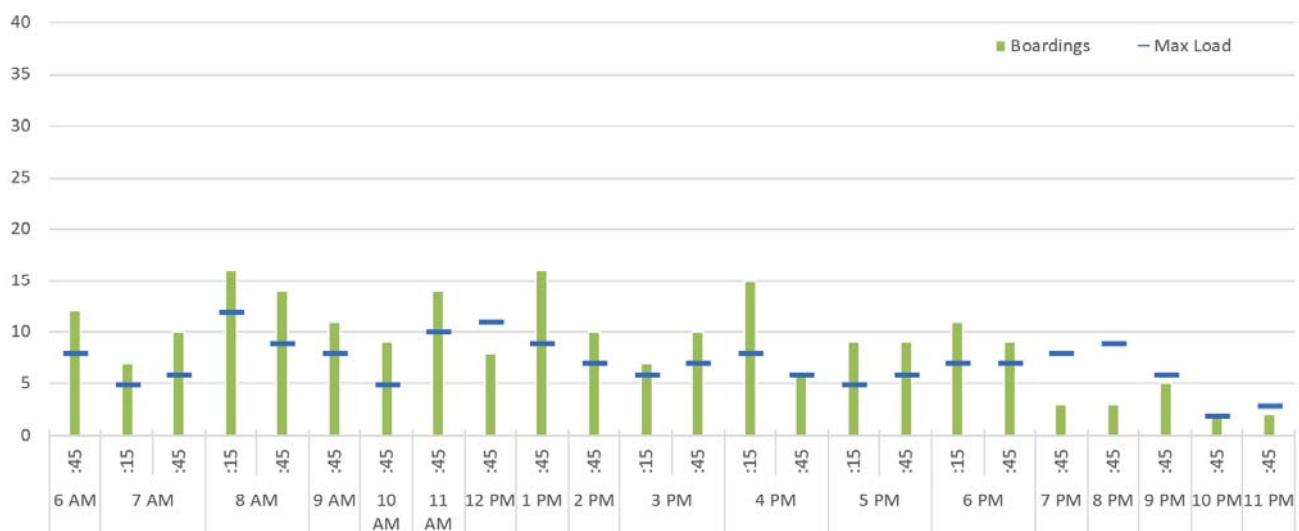
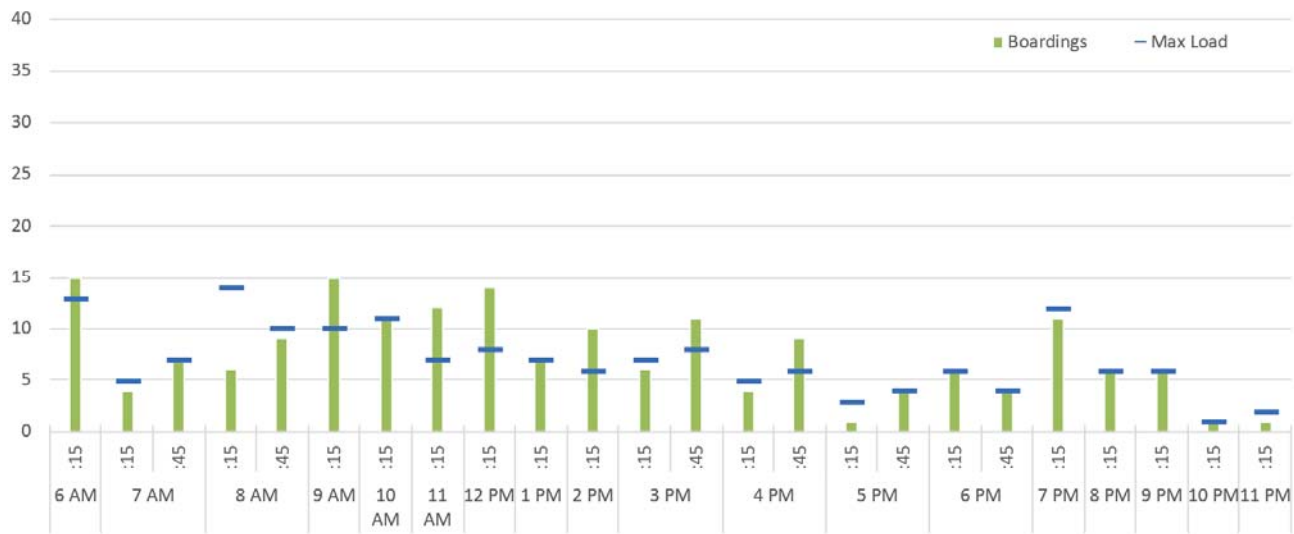


Figure 79 | Route 3 Weekday Ridership per Trip: Southbound



9.3.6. Summary of Observations

Strengths

- Only route with direct service to the Albemarle County Office Building and Region Ten CSB, key regional destinations
- Extensive span of service (6:00 AM – 11:45 PM)
- Easy-to-remember clock-face frequency
- Multiple connection opportunities in downtown Charlottesville
- Very strong on-time performance
- Below-average operating cost per passenger trip

Weaknesses

- Service design with alternating branches makes passenger information overly complex
- Below-average productivity in terms of passengers per hour and passengers per trip
- Difficult turn-around location at Riverside Avenue
- No direct access to major grocery stores
- Low ridership after 10:00 PM
- Infrequent stop spacing along portions of 5th Street SW

Opportunities

Potential opportunities to strengthen Route 3 are listed below. Some suggestions may be contradictory, as there is usually more than one approach to improving a route.

- **Split Route 3 into two separate routes.** The southern and eastern branches of Route 3 serve very different markets, and there appear to be relatively few through-riders between the branches. Splitting the route into two separate routes serving Southwood and Belmont Park, respectively, would make each resulting route easier to understand for users, and could give CAT more flexibility in terms of interlining various routes

to maximize service efficiency. In addition, splitting the routes would allow for different service frequency to different markets.

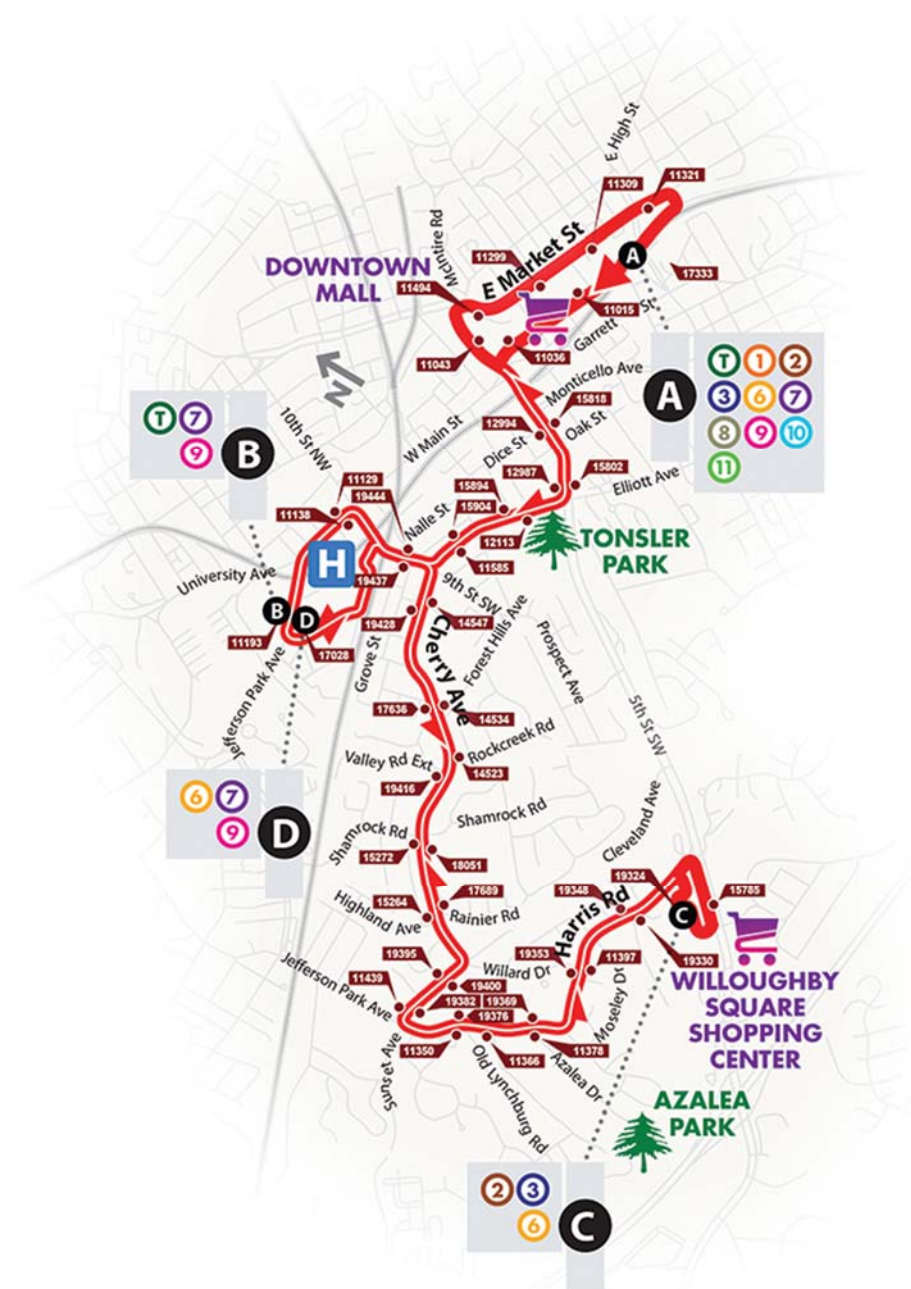
- **Add stops along 5th Street SW.** Route 3 passes by 5th Street SW entrance to Blue Ridge Commons, a large low-income apartment community. Adding stops at this location would give residents an additional transit option, and would likely result in higher ridership on Route 3.
- **Alternate service between 5th Street SW and Avon Street corridors.** Route 3 ridership is relatively low between Willoughby Square Shopping Center and downtown Charlottesville. Alternating service between the 5th Street SW and Avon Street corridors would provide more residents direct access to the County Office Building and Region TEN CSB and would provide improved access to 5th Street Station from the Southwood neighborhood. If each branch operated hourly, there would still be 30-minute service between downtown Charlottesville and the Albemarle County Office Building.
- **End service earlier.** Route 3 ridership drops off significantly after 10:00 PM. Ending service earlier would improve the route's over-all productivity. Stopping service in the 10:00 hour would eliminate several unproductive trips while still maintaining an extensive span of service.

9.4. ROUTE 4: CHERRY AVENUE & HARRIS ROAD

9.4.1. Service Description

Route 4 (**Figure 80**) operates Monday through Saturday from downtown Charlottesville to Willoughby Square Shopping Center, via UVA Hospital. The route travels primarily along Ridge Street, Cherry Avenue, Jefferson Park Avenue, and Harris Road. Passengers may transfer to other services at the Downtown Transit Station, UVA Hospital, and Willoughby Square Shopping Center. All Route 4 trips operate along the route's full alignment.

Figure 80 | Route 4 Map



9.4.2. Operating Characteristics

Table 9-7 summarizes operating characteristics for Route 4. On weekdays, the route operates every 23 minutes during peak periods and every 70 minutes during the off-peak. On Saturdays, service is provided every 70 minutes. At \$594,306 per year, the route has the fourth-highest operating cost in the CAT system. Route 4 offers connections to all routes excluding Route 5 and 12, and serves several activity generators, including the Downtown Transit Station, UVA Hospital, Willoughby Square Shopping Center, and Tonsler Park.

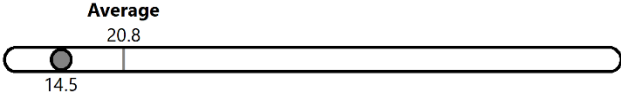
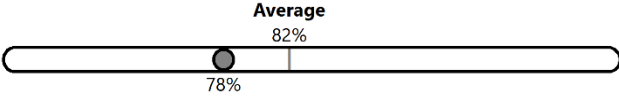
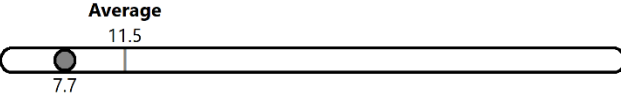
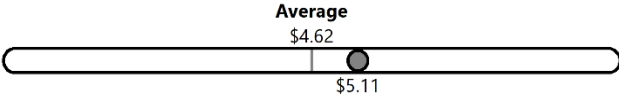
Table 9-7 | Route 4 Operating Characteristics

Destination	From		Downtown Transit Station
	To		Willoughby Square Shopping Center
Span	Weekday		6:25 AM – 12:03 AM
	Saturday		6:36 AM – 12:03 AM
	Sunday		--
Frequency	Weekday	Peak	23
		Off-Peak	70
	Saturday		70
	Sunday		--
Annual Operating Costs			\$594,306
Route Connections			1, 2, 3, 6, 7, 8, 9, 10, 11, Trolley
Key Destinations			Downtown Mall, Downtown Transit Station, UVA Hospital, Willoughby Square Shopping Center

9.4.3. Weekday Service Productivity

With 14.5 weekday passengers per hour, Route 4 ranks eighth among CAT routes and falls below the system average of 20.8. With 7.7 passengers per trip, Route 4 ranks seventh and falls below average for this metric as well. Route 4 has a below-average on-time performance rate at 78 percent (19 percent early and three percent late), ranking eighth among CAT routes. Finally, at \$5.11 per passenger trip, Route 4 has the fourth-highest operating cost per passenger among CAT routes. **Table 9-8** summarizes weekday service productivity metrics for Route 4.

Table 9-8 | Route 4 Weekday Service Productivity Metrics

Passengers per Hour	On-Time Performance
 <p>Average 20.8 14.5</p>	 <p>Average 82% 78%</p>
Passengers per Trip	Operating Cost per Passenger
 <p>Average 11.5 7.7</p>	 <p>Average \$4.62 \$5.11</p>

9.4.4. Ridership

Route 4 averages 402 passengers per weekday (ranking fourth) over 52 trips, and 133 passengers per Saturday (ranking tenth) over 30 trips. The route ranks fourth in annual ridership (117,687 riders).

Ridership by Stop

Figure 81 and **Figure 82** summarize weekday boardings and alightings by stop in the eastbound direction. Ridership activity is highest at Pinn Hall, serving the UVA Hospital. No other stops have more than 30 boardings or alightings per weekday.

Figure 83 and **Figure 84** summarize total stop activity in the westbound direction. The westbound ridership trend is largely the reverse of the eastbound one: a good number of passengers board in the downtown area and alight at Pinn Hall. Remaining alightings are split relatively evenly among the southern portion of the route.

Figure 81 | Route 4 Weekday Ridership by Stop: Eastbound



Transit Development Plan

FY 2019 – FY 2028

Figure 82 | Route 4 Weekday Boardings and Alightings, by Stop: Eastbound

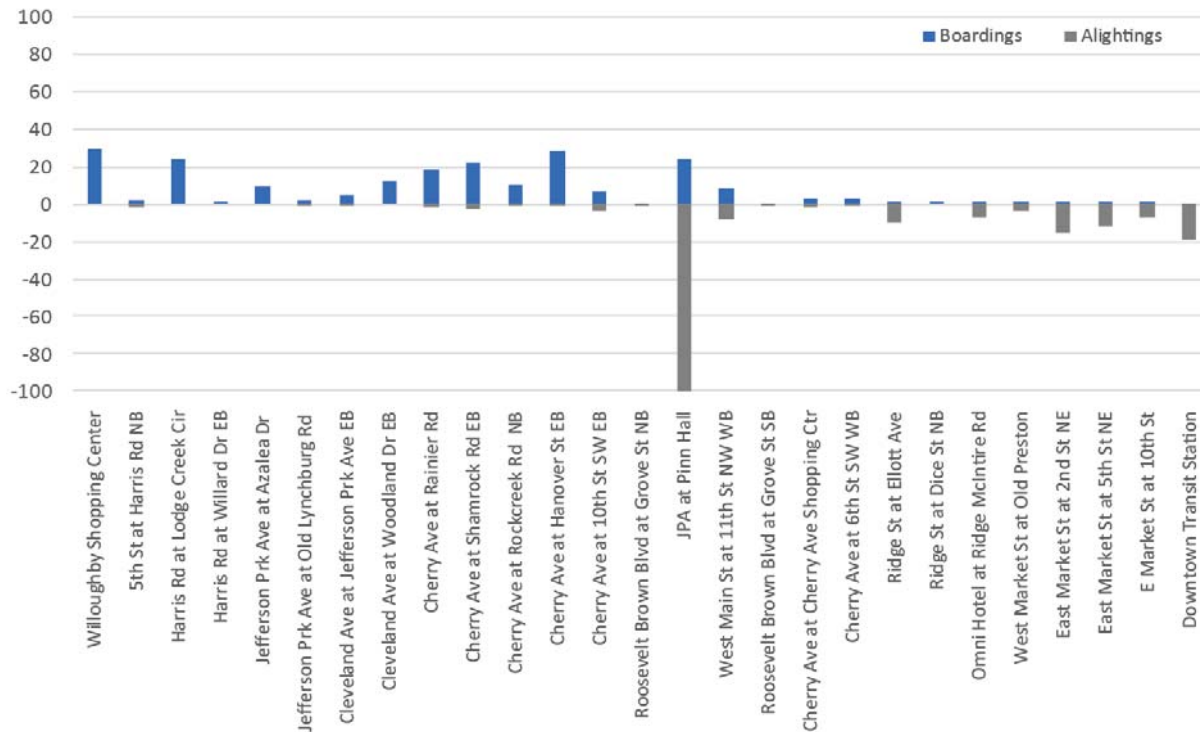


Figure 83 | Route 4 Weekday Ridership by Stop: Westbound

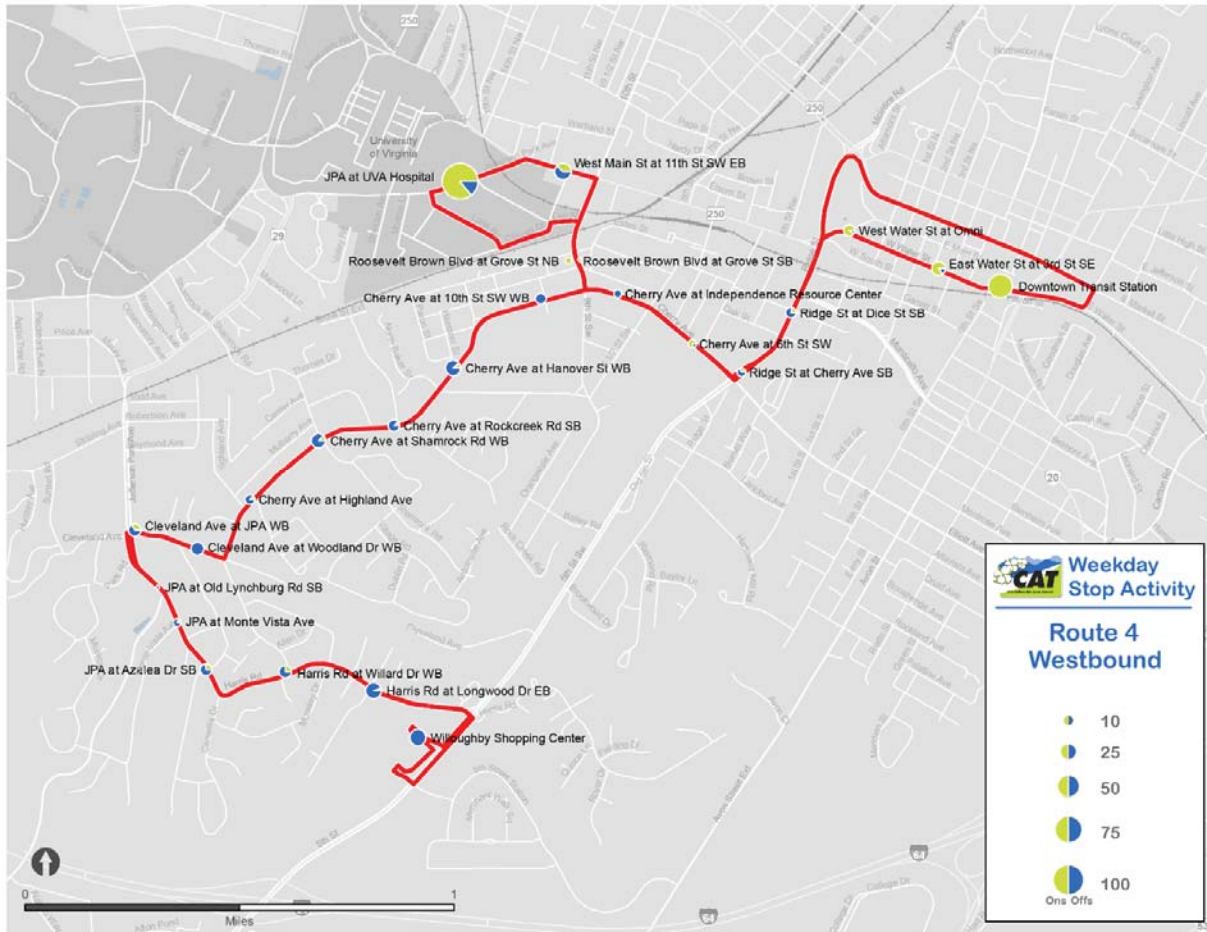
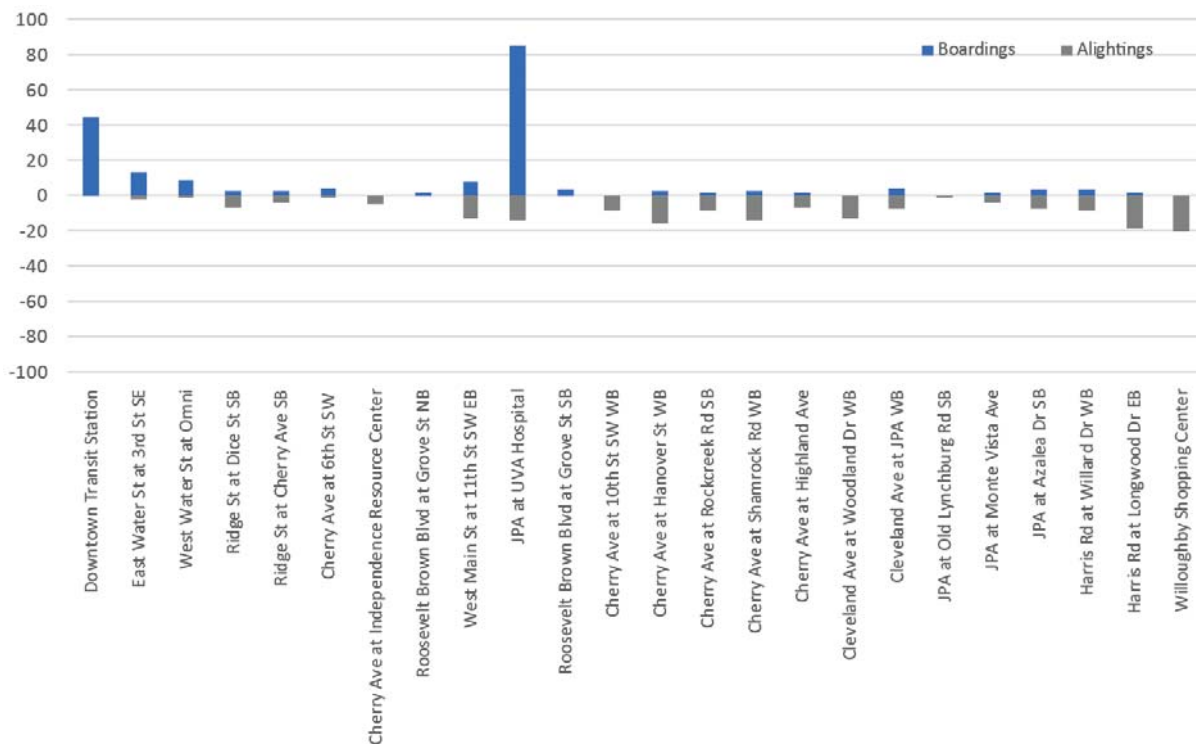


Figure 84 | Route 4 Weekday Boardings and Alightings by Stop: Westbound



Ridership by Trip

Figure 85 (eastbound) and **Figure 86** (westbound) show the boardings and maximum load for each trip per direction over the course of a typical weekday. No Route 4 trips exceed a maximum load of 26 passengers, the seating capacity for the 30ft. transit buses typically assigned to this route. Route activity is generally higher during the morning in the eastbound direction, and in the afternoon in the westbound direction.

Figure 85 | Route 4 Weekday Ridership per Trip: Eastbound

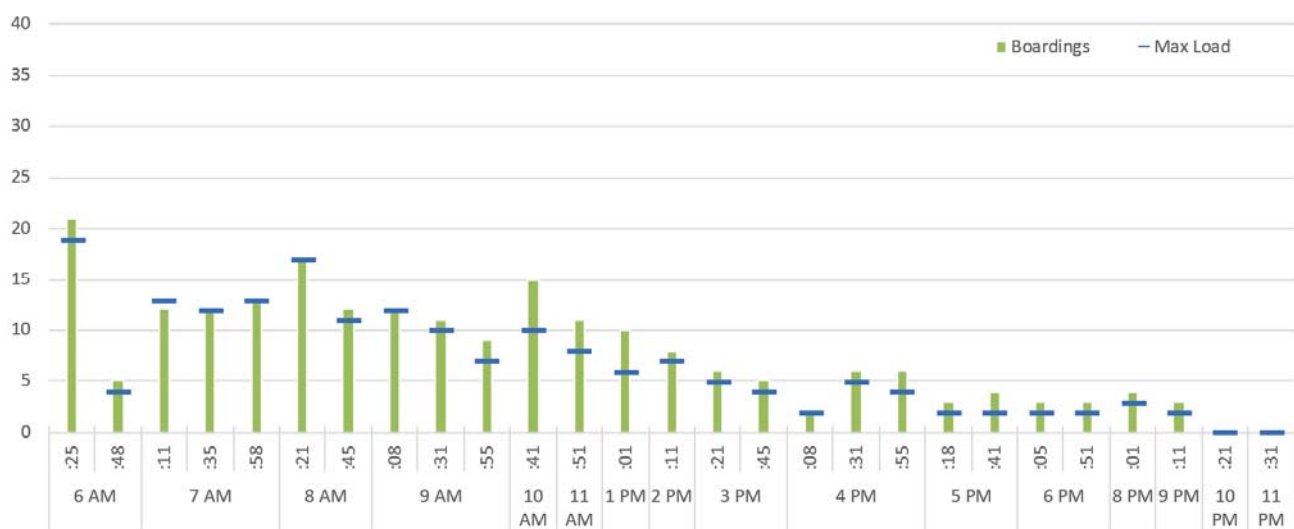
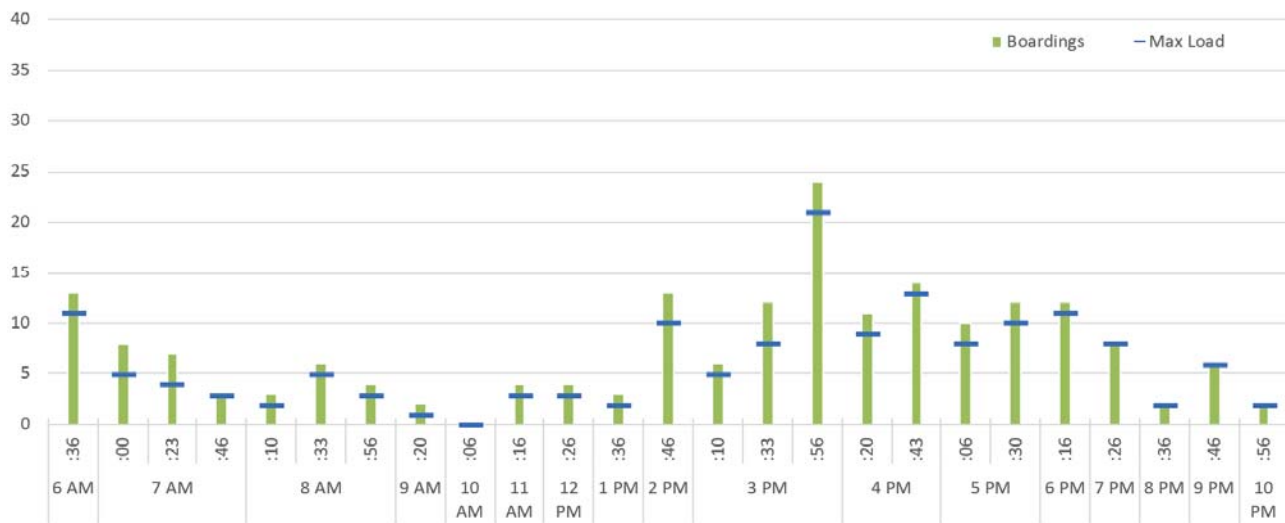


Figure 86 | Route 4 Weekday Ridership per Trip: Westbound



9.4.5. Summary of Observations

Strengths

- Links residential neighborhoods south of UVA directly to UVA Hospital
- Includes three strong anchors: downtown Charlottesville, UVA Hospital, and Willoughby Square Shopping Center
- Extensive span of service (6:25 AM – 12:03 PM)
- Multiple connection opportunities
- Strong peak-period ridership

Weaknesses

- Non-clock-face frequency resulting in missed connections and a difficult-to-remember schedule
- Poor mid-day frequency
- Below-average productivity in terms of passengers per hour and passengers per trip
- Above-average cost per passenger
- No direct access to major grocery stores
- Below-average on-time performance
- Low ridership after 10:00 PM

Opportunities

Potential opportunities to strengthen Route 4 are listed below. Some suggestions may be contradictory, as there is usually more than one approach to improving a route.

- **Interline with another route to create more regular cycle time and improve on-time performance.** Route 4 has a 70-minute cycle time results in non-clock-face frequency in both the peak and off-peak. In addition, it has below-average on-time performance, suggesting that the route requires more running and/or recovery time. Interlining Route 4 with another route could give Route 4 a more manageable cycle time. If one route has insufficient running time, and another has running time to spare, operationally linking

the routes together can optimize running time and recovery time on both routes. To interline two routes, they must have a common terminus and justify similar levels of service.

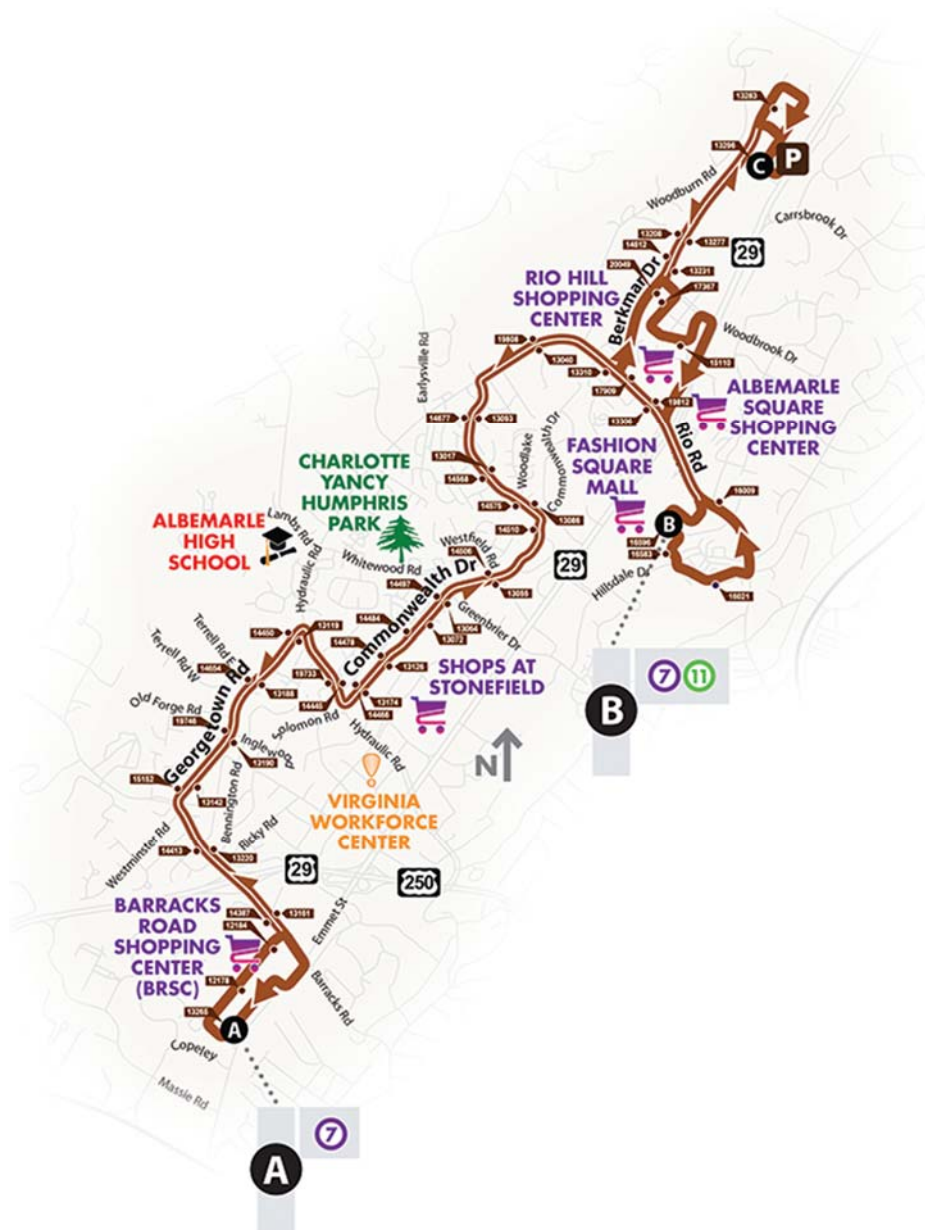
- **Extend route to 5th Street Station or PVCC.** Extending Route 4 to 5th Street Station or PVCC would add additional ridership generators to the route, and could produce a 90 or 120-minute cycle time that would allow for a clock-face frequency of 30 or 60 minutes.
- **Eliminate service between UVA Hospital and downtown Charlottesville.** Route 4 ridership is strongest between Willoughby Square Shopping Center and UVA Hospital. Eliminating service between the hospital and downtown would likely improve the route's on-time performance by reducing the route's exposure to congestion-related delays. If paired with a service extension to 5th Street Station or PVCC, truncating Route 4 at UVA Hospital could produce a more manageable cycle time. If Route 4 service is eliminated between the hospital and downtown, frequent connections between the two activity centers would still be provided by the Trolley and Route 7/12.
- **End service earlier.** Route 4 ridership drops off significantly after 10:00 PM. Ending service earlier would improve the route's over-all productivity. Stopping service in the 10:00 PM hour would eliminate several unproductive trips while still maintaining an extensive span of service.

9.5. ROUTE 5: COMMONWEALTH DRIVE

9.5.1. Service Description

Route 5 (**Figure 87**) operates Monday through Saturday from the Charlottesville Walmart to Barracks Road Shopping Center. It is the only CAT route to not serve the Downtown Transit Station. The route travels primarily along Berkmar Drive, Rio Road, Commonwealth Drive, Georgetown Road, and Barracks Road. While the second trip of the day (6:30 AM) runs from Fashion Square Mall to Barracks Road, and the final trip (10:30 PM) terminates at Fashion Square Mall, all other trips operate along Route 5's full alignment.

Figure 87 | Route 5 Map



9.5.2. Operating Characteristics

Table 9-9 summarizes operating characteristics for Route 5. The route operates a consistent 30-minute frequency on weekdays and Saturdays. At \$1,040,928 per year, the route has the third-highest operating cost in the CAT system. From Route 5, passengers may can transfer to Routes 7 and 11 at Fashion Square Mall. Route 5 serves several large retail centers, including the Barracks Road Shopping Center, Fashion Square Mall, Rio Hill Shopping Center, and Albemarle Square Shopping Center.

Table 9-9 | Route 5 Operating Characteristics

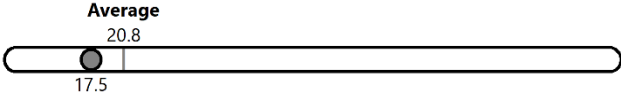
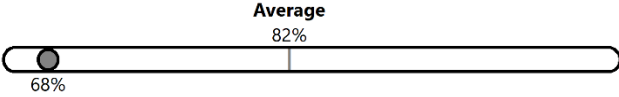
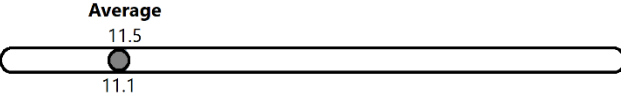
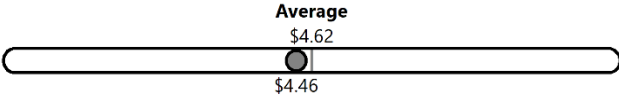
Destination	From		Walmart
	To		Barracks Road Shopping Center
Span	Weekday		6:15 AM – 11:00 PM
	Saturday		6:15 AM – 11:00 PM
	Sunday		--
Frequency	Weekday	Peak	30
		Off-Peak	30
	Saturday		30
	Sunday		--
Annual Operating Costs			\$1,040,928
Route Connections			7, 11
Key Destinations			Barracks Road Shopping Center, Fashion Square Mall, Rio Hill Shopping Center, Albemarle Square Shopping Centers

9.5.3. Weekday Service Productivity

Route 5 ranks sixth among CAT routes for passengers per hour (17.5) and third for passengers per trip (11.1). The route's on-time performance rate is 68 percent (29 percent early and three percent late), ranking 10th and well below the weekday system average. The operating cost per passenger for Route 5 is \$4.46, close to the system average.

Table 9-10 summarizes service productivity metrics for Route 5.

Table 9-10 | Route 5 Weekday Service Productivity Metrics

Passengers per Hour	On-Time Performance
 <p>Average 20.8 17.5</p>	 <p>Average 82% 68%</p>
Passengers per Trip	Operating Cost per Passenger
 <p>Average 11.5 11.1</p>	 <p>Average \$4.62 \$4.46</p>

9.5.4. Ridership

Route 5 averages 753 passengers per weekday (ranking third) over 68 trips, and 594 passengers per Saturday (ranking third) over 68 trips. The route also ranks third in annual ridership (220,586 riders).

Ridership by Stop

Figure 88 and **Figure 89** summarize weekday boardings and alightings by stop in the northbound direction. Ridership activity is highest at Barracks Road Shopping Center, Fashion Square Mall, and Walmart. Relatively less (yet significant) boarding and alighting activity occurs along Commonwealth Drive.

Figure 90 and **Figure 91** summarize weekday ridership activity in the southbound direction. The southbound ridership trend largely mirrors the northbound one, with the highest ridership at Walmart, Fashion Square Mall, and the Barracks Road Shopping Center.

Figure 88 | Route 5 Weekday Ridership by Stop

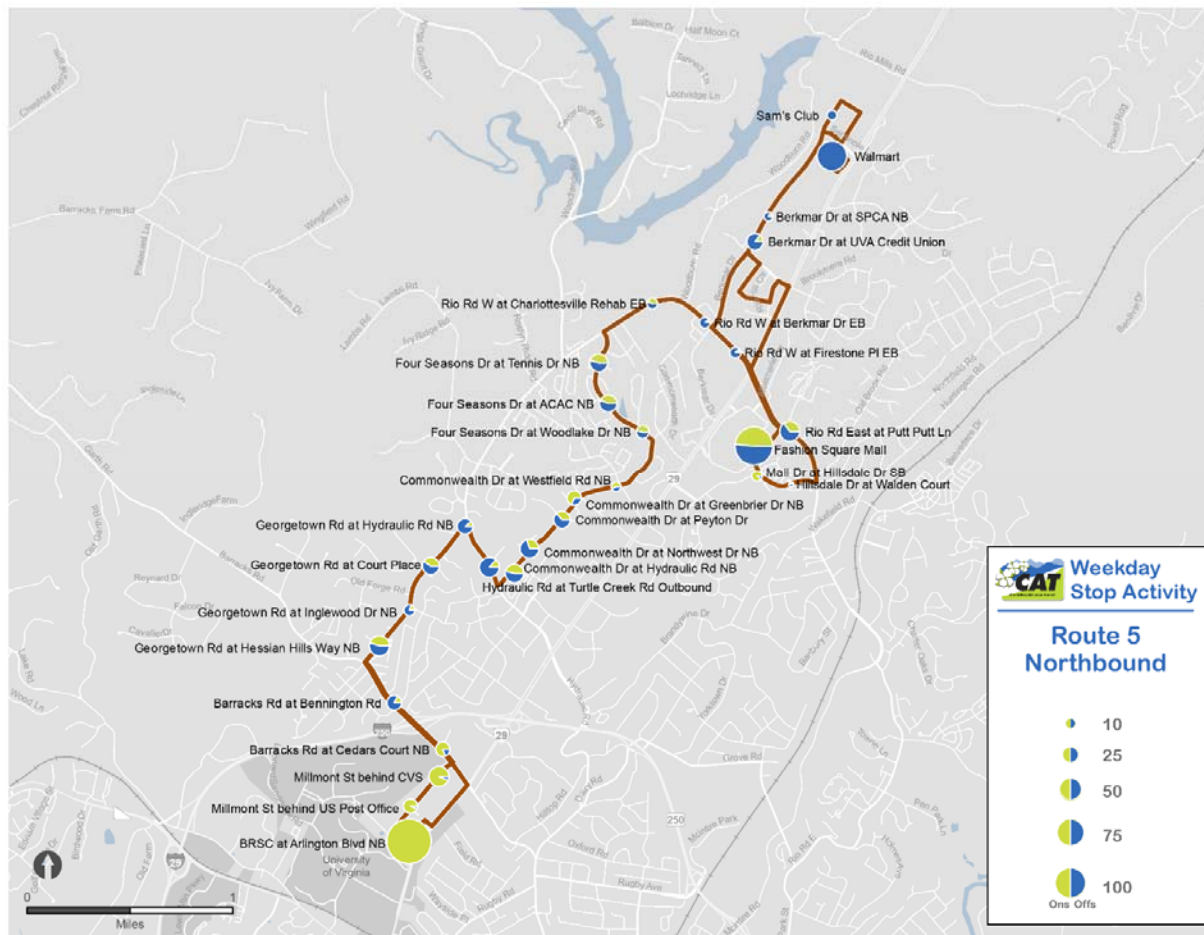


Figure 89 | Route 5 Weekday Boardings and Alightings, by Stop: Northbound

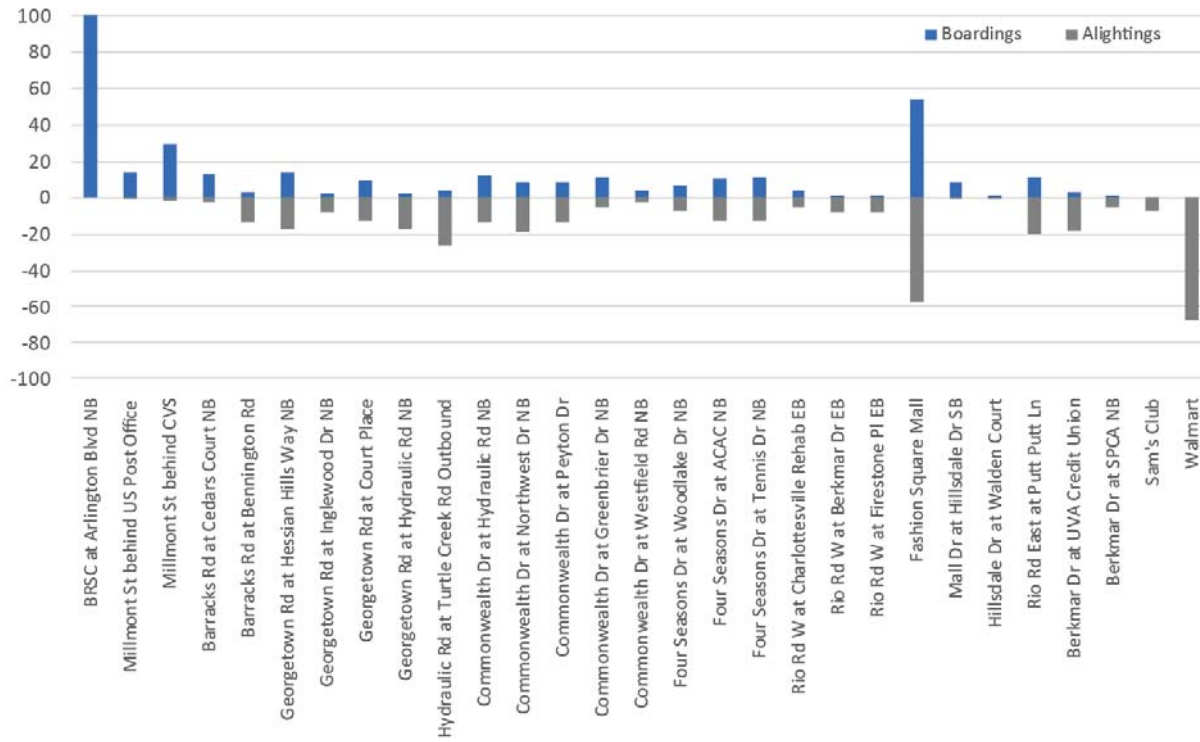


Figure 90 | Route 5 Weekday Ridership by Stop: Southbound

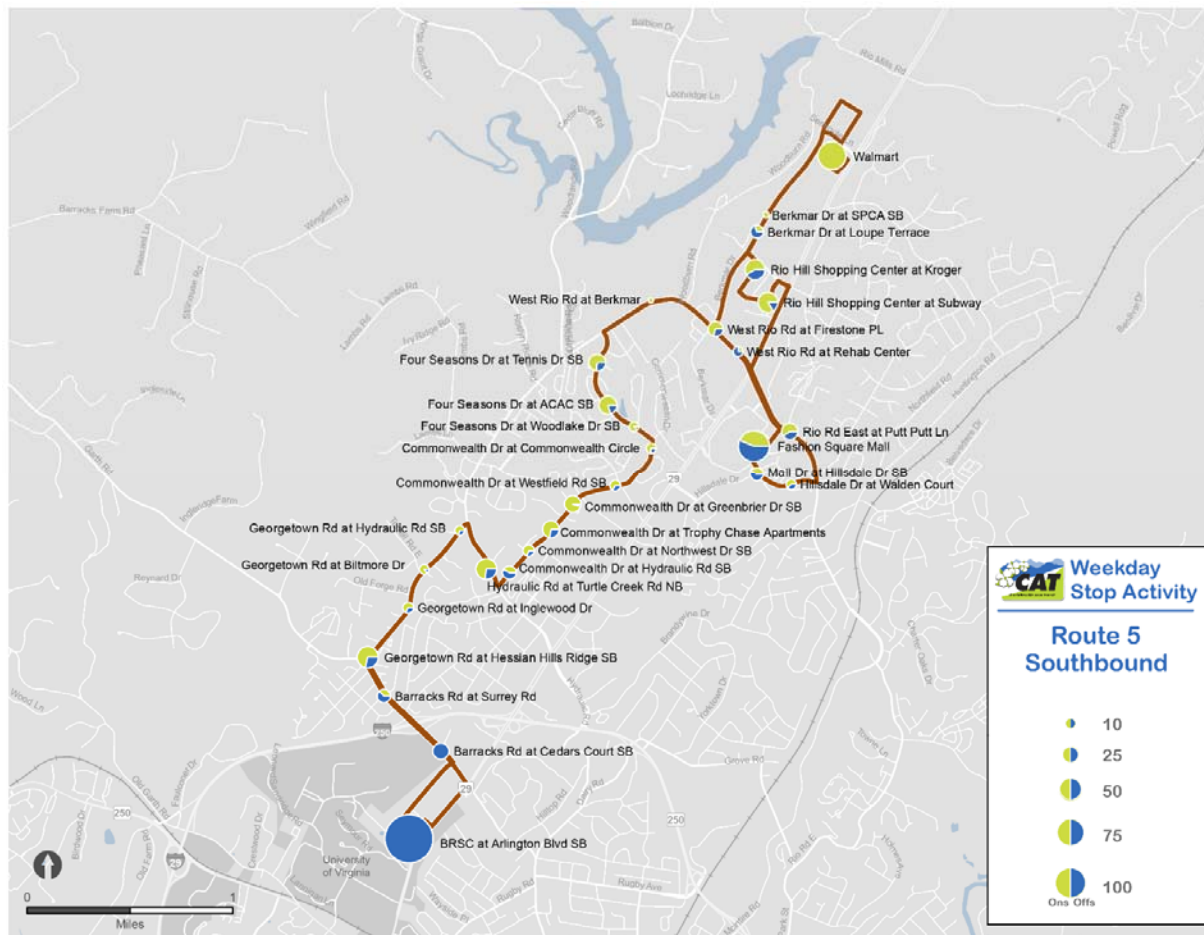
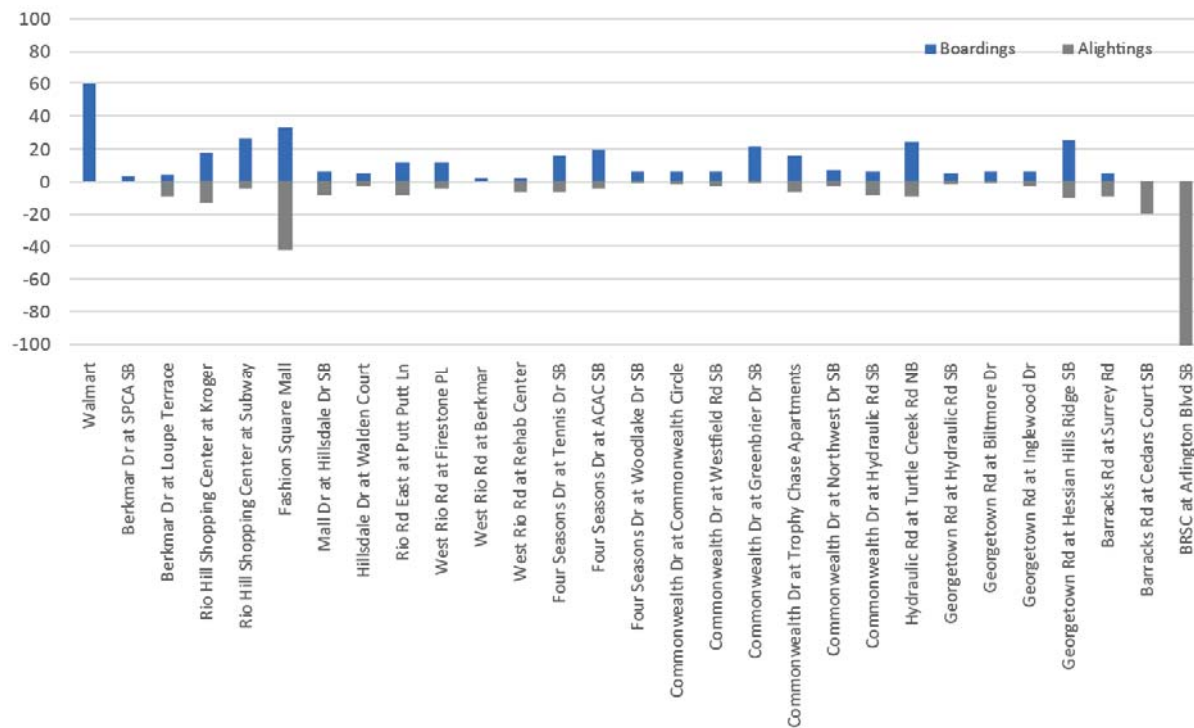


Figure 91 | Route 5 Weekday Boardings and Alightings by Stop: Southbound



Ridership by Trip

Figure 92 (northbound) and **Figure 93** (southbound) show the boardings and maximum load for each trip per direction over the course of a typical weekday. No Route 5 trips exceed a maximum load of 32 passengers, the seating capacity for the 35ft. transit buses typically assigned to this route. In both directions, service is generally busiest during the 4:00 PM hour.

Figure 92 | Route 5 Weekday Ridership per Trip: Northbound

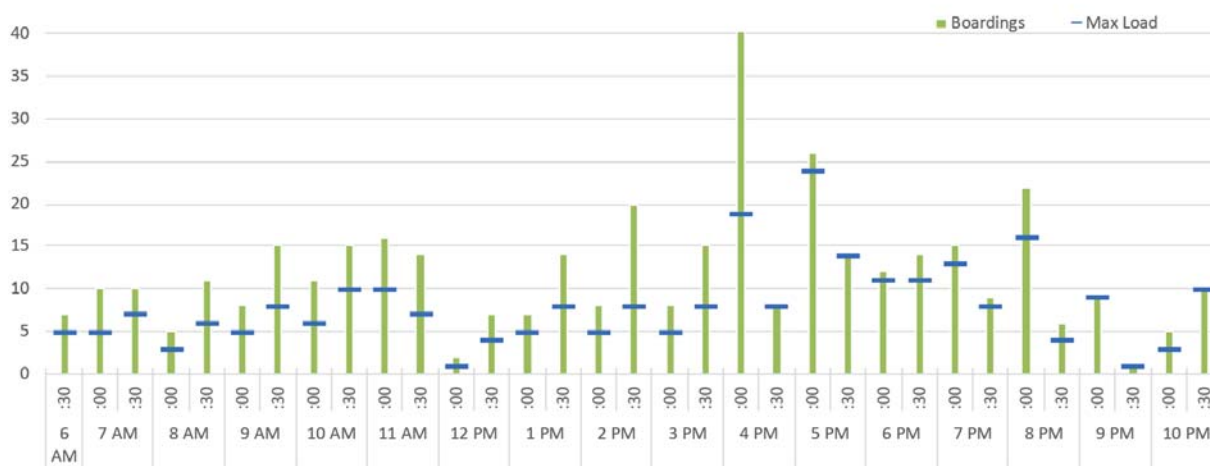
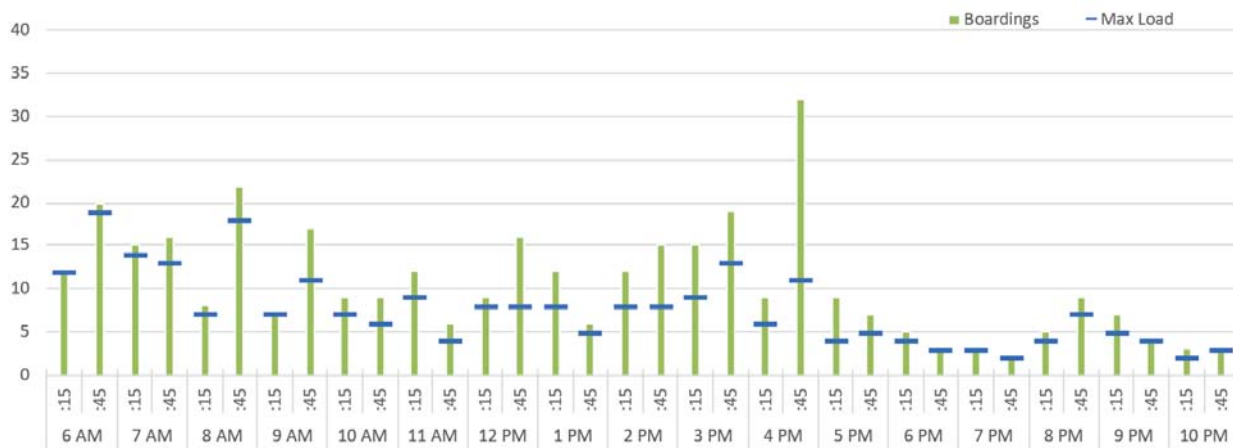


Figure 93 | Route 5 Weekday Ridership per Trip: Southbound



9.5.5. Summary of Observations

Strengths

- Provides access to several regionally-significant retail destinations
- Good mix of origins (high-density residential) and destinations (retail)
- Third-highest weekday ridership among CAT routes
- Extensive span of service (6:15 AM – 11:00 PM)
- Easy-to-remember clock-face frequency
- Relatively frequent service throughout the service day

Weaknesses

- Service to Fashion Square Mall and Walmart results in a circuitous alignment and significant out-of-direction deviations for some riders
- Very poor on-time performance
- Service slightly too far from Albemarle High School, a strong potential ridership generator

Opportunities

Potential opportunities to strengthen Route 5 are listed below. Some suggestions may be contradictory, as there is usually more than one approach to improving a route.

- **Eliminate service to Fashion Square Mall.** Route 5 has a relatively long and circuitous alignment which not only forces some riders to travel out-of-direction to reach their intended destination, but also results in poor on-time performance. Passenger can transfer between Route 5 and Route 7 at Barracks Road Shopping Center. If Route 5 service to Fashion Square Mall were eliminated, passengers would still be able to access the mall via a transfer. Streamlining Route 5 would make it simpler to understand and could also allow for better on-time performance.
- **Extend Route to YMCA.** Route 5 could be extended to the Brooks Family YMCA via Barracks Road and Rugby Avenue. This would make the YMCA more accessible to Albemarle High School (may require

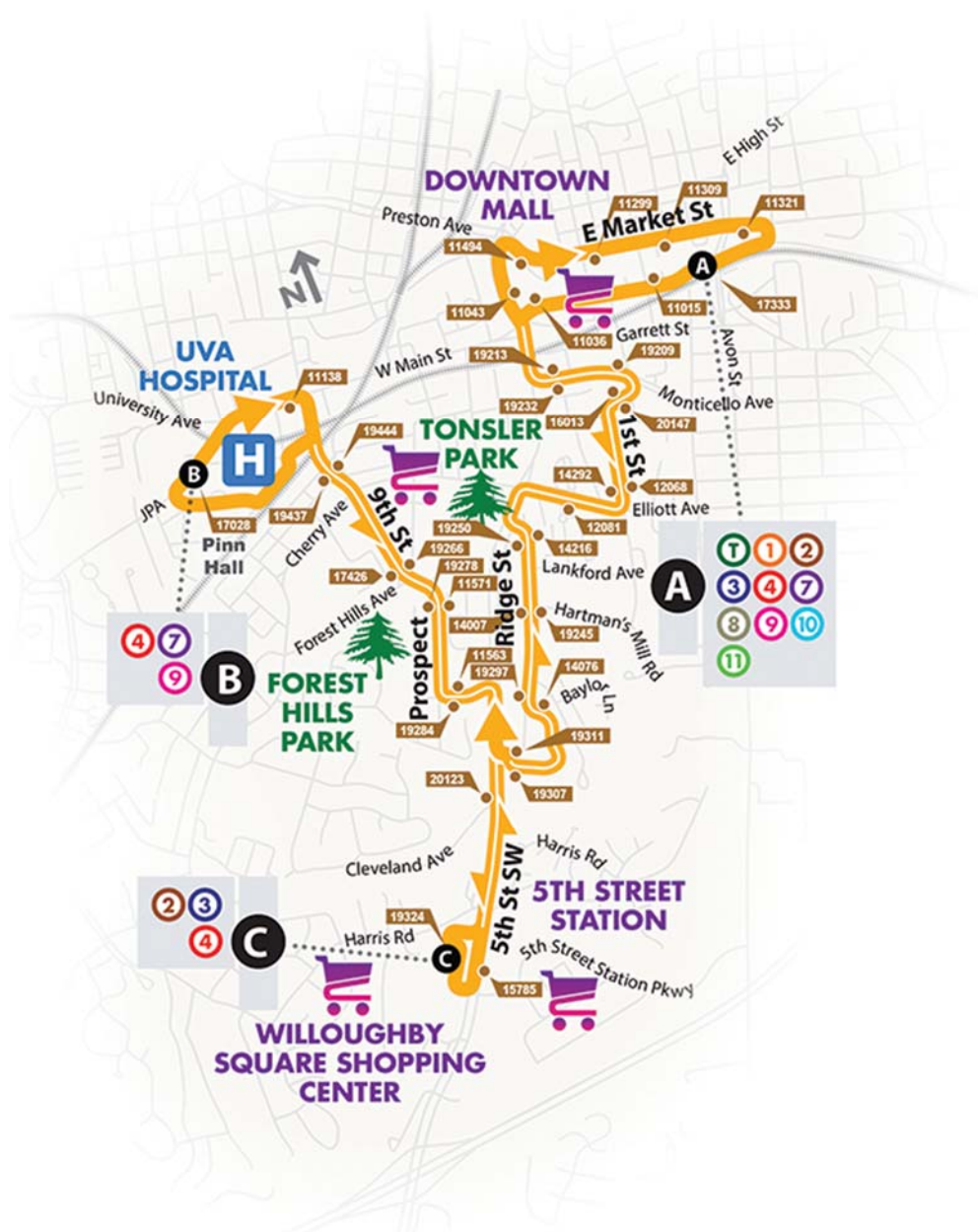
alignment adjustment near the high school) and UVA students (via a connection at BRSC), and could improve ridership to this key regional destination.

9.6. ROUTE 6: RIDGE STREET & PROSPECT AVENUE

9.6.1. Service Description

Route 6 (**Figure 94**) operates Monday through Saturday from downtown Charlottesville to Willoughby Square Shopping Center via the UVA Hospital. Return trips do not serve the hospital. The route travels primarily along 1st Street, Ridge Street, Prospect Avenue, 9th Street, and 5th Street SW. Passengers may transfer to other services at the Downtown Transit Station, UVA Hospital, and Willoughby Square Shopping Center. With the exception of the final trip of the day (11:30 PM), which terminates at Pinn Hall, all Route 6 trips operate along the route's full alignment.

Figure 94 | Route 6 Map



9.6.2. Operating Characteristics

Table 9-11 summarizes operating characteristics for Route 6. The route operates hourly throughout the day on weekdays and Saturdays. At \$382,230 per year, the route has the sixth-highest operating cost among CAT routes. Route 6 offers connections to all routes excluding Route 5 and 12, and serves several activity generators, including downtown Charlottesville, UVA Hospital, Willoughby Square Shopping Center, and Tonsler and Forest Hills Parks.

Table 9-11 | Route 6 Operating Characteristics

Destination	From		Downtown Transit Station
	To		Willoughby Square Shopping Center
Span	Weekday		6:30 AM – 12:00 AM
	Saturday		6:30 AM – 12:00 AM
	Sunday		--
Frequency	Weekday	Peak	60
		Off-Peak	60
	Saturday		60
	Sunday		--
Annual Operating Costs			\$382,230
Route Connections			1, 2, 3, 4, 7, 8, 9, 10, 11, Trolley
Key Destinations			Downtown Mall, Downtown Transit Station, UVA Hospital, Willoughby Square Shopping Center

9.6.3. Weekday Service Productivity

Route 6 ranks fifth in both weekday passengers per hour (17.5) and passengers per trip (8.3), falling below average in both categories. The route's on-time performance rate is 89 percent (seven percent early and four percent late), ranking fourth and above the weekday system average. At \$4.22 per passenger trip, Route 6 has the eighth-highest operating cost per passenger. **Table 9-12** summarizes weekday service productivity metrics for Route 6.

Table 9-12 | Route 6 Weekday Service Productivity Metrics: Weekday

Passengers per Hour	On-Time Performance
<p>Average 20.8</p> <p>17.5</p>	<p>Average 82%</p> <p>89%</p>
Passengers per Trip	Operating Cost per Passenger
<p>Average 11.5</p> <p>8.3</p>	<p>Average \$4.62</p> <p>\$4.22</p>

9.6.4. Ridership

Route 6 averages 292 passengers per weekday (ranking seventh) over 35 trips, and 172 passengers per Saturday (ranking sixth) over 35 trips. The route ranks seventh in annual ridership (76,212 riders).

Ridership by Stop

Figure 95 and **Figure 96** summarize weekday boardings and alightings by stop in the eastbound direction. Ridership activity is highest at the Downtown Transit Center, but is generally low at all stops.

Figure 97 and **Figure 98** summarize weekday ridership activity in the westbound direction. Westbound ridership is highest in downtown Charlottesville, at the UVA Hospital, and along Prospect Avenue. Westbound ridership is substantially higher than in the eastbound direction, which is a reflection of the fact that the UVA Hospital and Prospect Avenue are served in the westbound direction only. In addition, Route 6 offers faster westbound service between the hospital and Willoughby Square Shopping Center than Route 4.

Figure 95 | Route 6 Weekday Ridership by Stop: Eastbound



Figure 96 | Route 6 Weekday Boardings and Alightings, by Stop: Eastbound

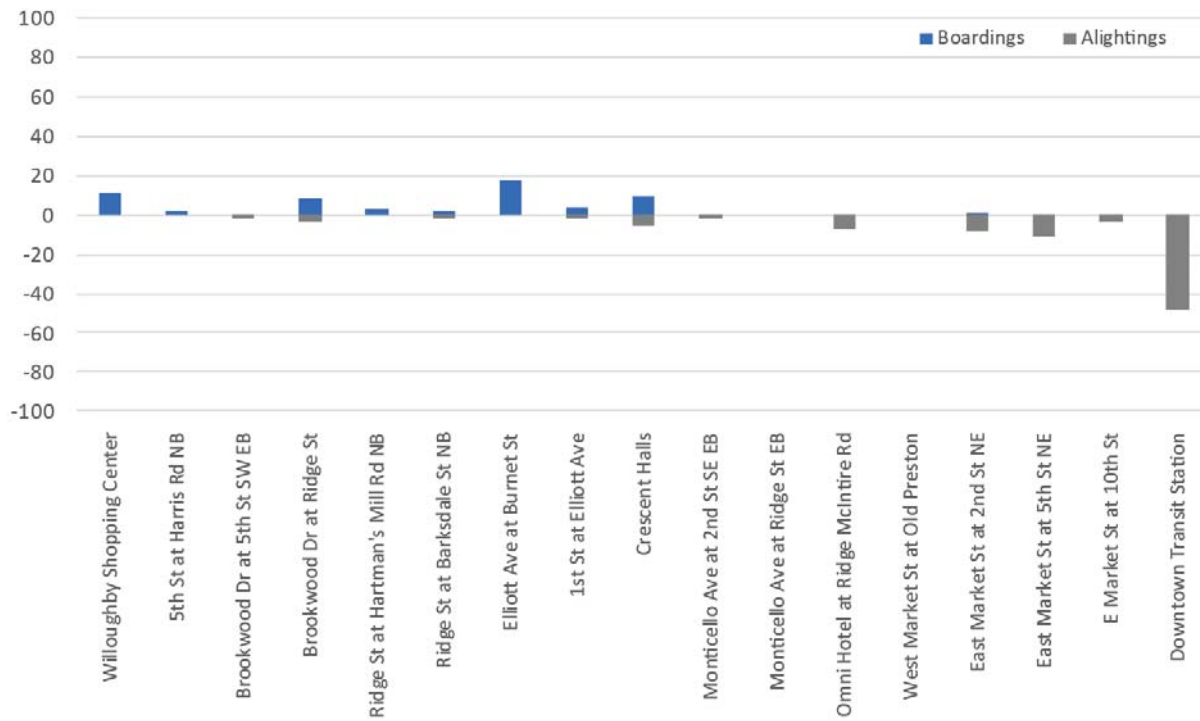
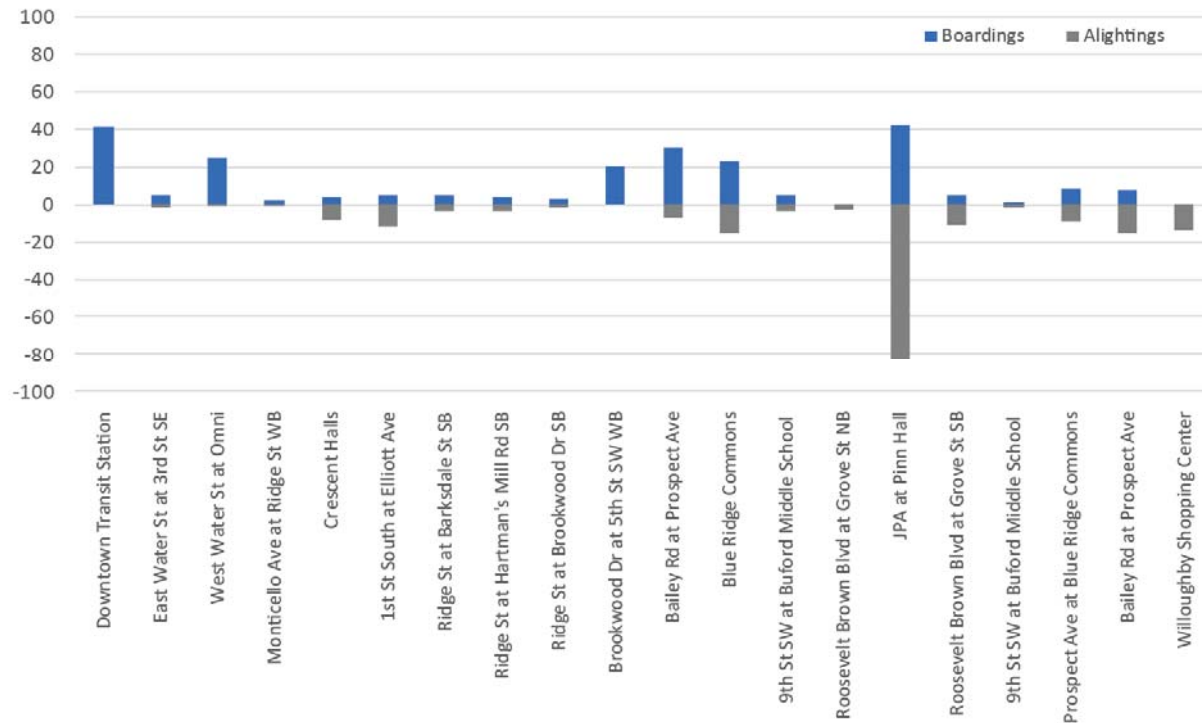


Figure 97 | Route 6 Weekday Ridership by Stop: Westbound



Figure 98 | Route 6 Weekday Boardings and Alightings by Stop: Westbound



Ridership by Trip

Figure 99 (eastbound) and **Figure 100** (westbound) show the boardings and maximum load for each trip per direction over the course of a typical weekday. No Route 6 trips exceed a maximum load of 32 passengers, the seating capacity for the 35ft. transit buses typically assigned to this route. Route activity is generally higher in the westbound direction, peaking between 6:00 AM and 9:00 AM and between 2:00 PM and 5:00 PM.

Figure 99 | Route 6 Weekday Ridership per Trip: Eastbound

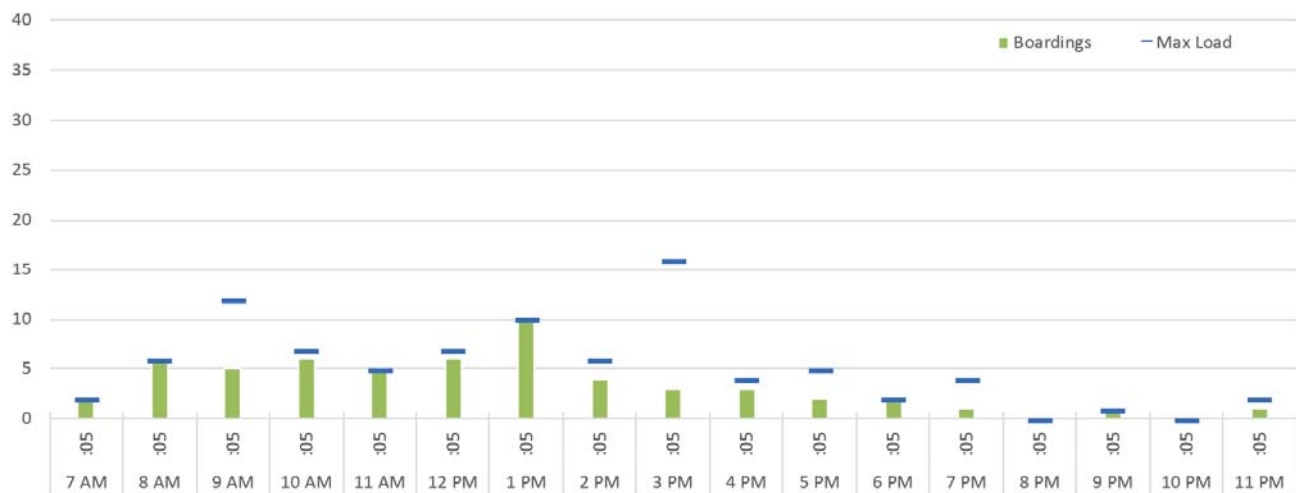
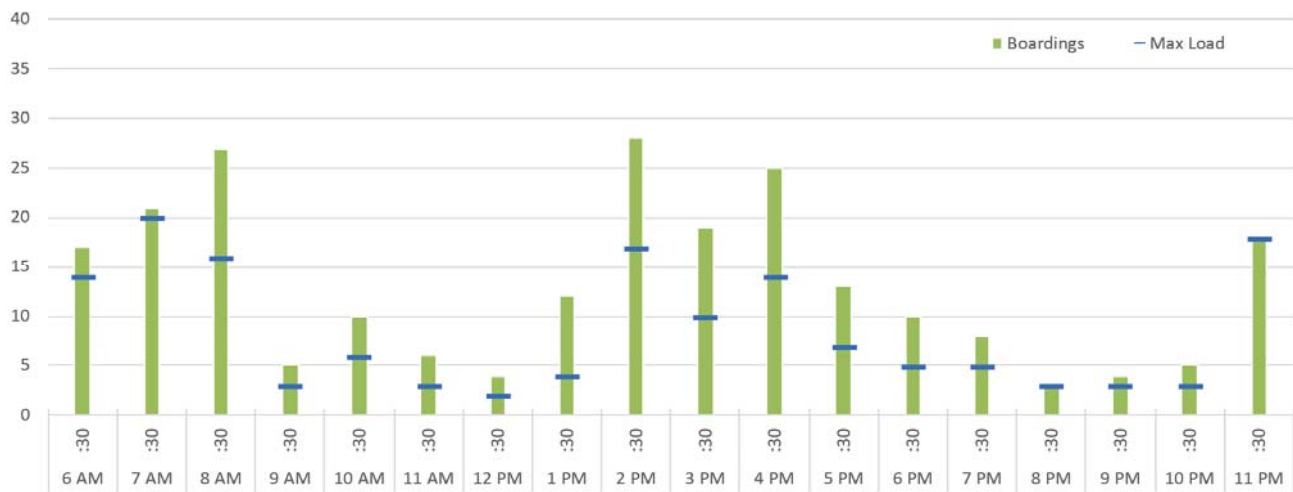


Figure 100 | Route 6 Weekday Ridership per Trip: Westbound



9.6.5. Summary of Observations

Strengths

- Includes three strong anchors: downtown, UVA Hospital, and Willoughby Square Shopping Center
- Strong on-time performance
- Extensive span of service (6:30 AM – 12:00 PM)
- Easy-to-remember clock-face frequency
- Multiple connection opportunities
- Strong ridership in the westbound direction

Weaknesses

- Service between UVA Hospital and Willoughby Square Shopping Center available in the westbound direction only, potentially confusing prospective riders
- Below-average productivity in terms of passengers per hour and passengers per trip
- Above-average cost per passenger trip
- Close, but not direct access to 5th Street Station, and major potential ridership generator

Opportunities

Potential opportunities to strengthen Route 6 are listed below. Some suggestions may be contradictory, as there is usually more than one approach to improving a route.

- Eliminate Route 6 and reinvest resources into other routes.** The highest ridership stops on Route 4 are all within walking distance of other routes. For example, stops along Prospect Avenue and Elliott Avenue with significant ridership are both one block from 5th Street SW. Eliminating Route 6 could allow its resources to be invested into more frequent service on Route 3 along 5th Street SW.
- Combine with Route 2.** Along 5th Street SW, Route 2 operates southbound only. Route 6 provides northbound service only, along much of the same corridor. Combining the hospital-to-Willoughby Square branch of Route 6 with the 5th Street Station and Avon Street segments of Route 2 would result in a U-

shaped bi-directional route with anchors at the UVA Hospital, 5th Street Station, and downtown Charlottesville. Ridge Street could still be served by Route 3.

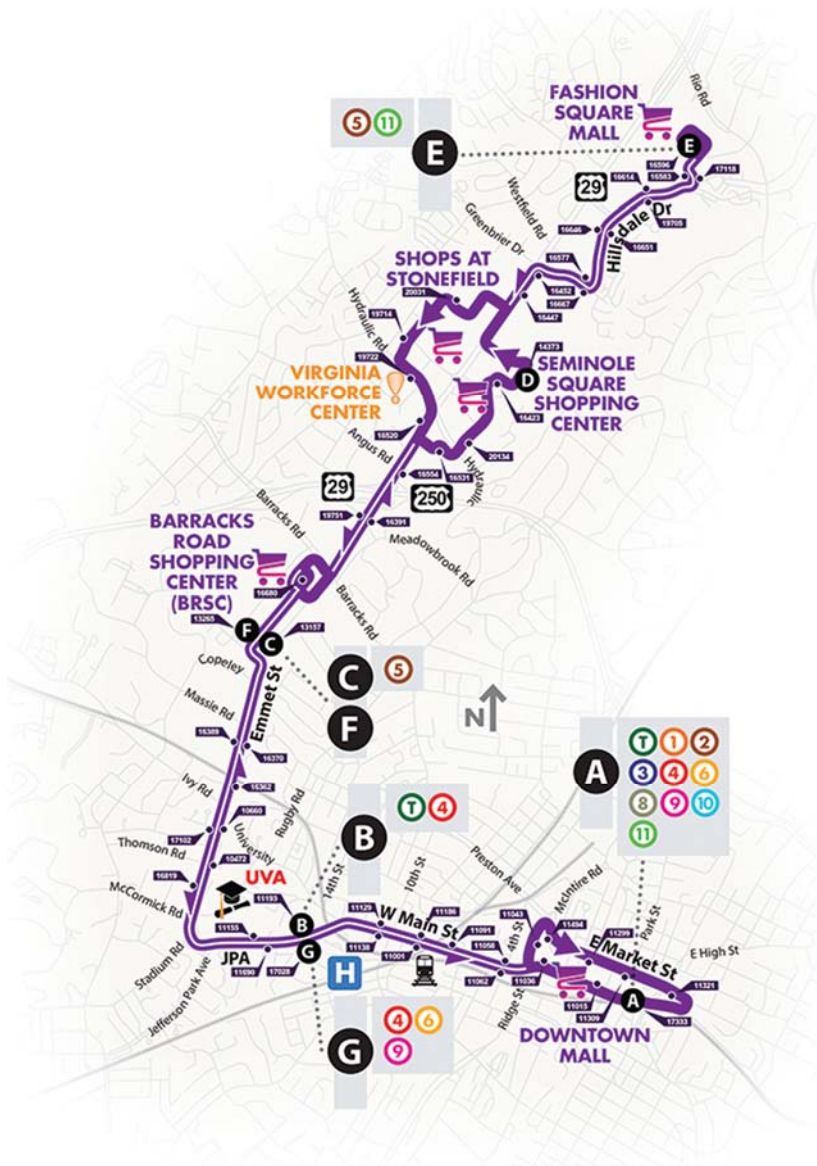
9.7. ROUTE 7: EMMET STREET & SEMINOLE TRAIL

9.7.1. Service Description

Route 7 (**Figure 101**) operates Monday through Saturday from Fashion Square Mall to the Downtown Transit Center. The route travels primarily along Hillsdale Drive, Emmet Street, Jefferson Park Avenue, and Main Street. Along the Seminole Trail corridor, Route 7 operates along different alignments in the northbound and southbound direction. Northbound, the route serves the Seminole Square Shopping Center, while southbound trips serve the Shops at Stonefield.

Passengers may transfer between Route 7 and several other routes at the Downtown Transit Station, UVA Hospital, Barracks Road Shopping Center, and Fashion Square Mall. While the majority of Route 7 trips operate along the route's full alignment, three morning trips operate shortened alignments.

Figure 101 | Route 7 Map



9.7.2. Operating Characteristics

Table 9-13 summarizes operating characteristics for Route 7. The route operates on a 20-minute frequency for most of the service day, but shifts to half-hourly service after the evening peak. At \$1,717,830 per year, Route 7 has the highest operating cost in the CAT system. Route 7 offers connections to all other weekday CAT routes and serves several activity generators, including the Downtown Transit Station, UVA Hospital, several regional shopping centers, and the Virginia Workforce Center.

Table 9-13 | Route 7 Operating Characteristics

Destination	From		Fashion Square Mall
	To		Downtown Transit Station
Span	Weekday		6:30 AM – 11:25 PM
	Saturday		6:30 AM – 11:25 PM
	Sunday		--
Frequency	Weekday	Peak	20
		Off-Peak	30
	Saturday		20/30
	Sunday		--
Annual Operating Costs			\$1,717,830
Route Connections			1, 2, 3, 4, 5, 6, 8, 9, 10, 11, Trolley
Key Destinations			Downtown Mall, UVA Hospital, Barracks Road Shopping Center, Seminole Square Shopping Center, Fashion Square Mall, Shops at Stonefield, Virginia Workforce Center

9.7.3. Weekday Service Productivity

With 30.9 weekday passengers per hour, Route 7 ranks second in the system and is above the system average for this metric. Route 7 also ranks second for passengers per trip (22.8), again exceeding the system average. However, the route's on-time performance rate is 66 percent (33 percent early and one percent late), ranking 12th and well below the weekday system average. At \$2.51 per passenger trip, Route 7 has the second-lowest operating cost per passenger among CAT routes. **Table 9-14** summarizes service productivity metrics for Route 7.

Table 9-14 | Route 7 Weekday Service Productivity Metrics

Passengers per Hour	On-Time Performance
<p>Average 20.8</p> <p>30.9</p>	<p>Average 82%</p> <p>66%</p>
Passengers per Trip	Operating Cost per Passenger
<p>Average 11.5</p> <p>22.8</p>	<p>Average \$4.62</p> <p>\$2.51</p>

9.7.4. Ridership

Route 7 averages 2,187 passengers per weekday (ranking second) over 96 trips, and 1,423 passengers per Saturday (ranking first) over 96 trips. The route ranks second in annual ridership (582,307riders).

Ridership by Stop

Figure 102 and **Figure 103** summarize weekday boardings and alightings by stop in the northbound direction. Northbound ridership activity is highest along W. Main Street, and at Barracks Road Shopping Center, Seminole Square Shopping Center, and Fashion Square Mall.

Figure 104 and **Figure 105** summarize total stop activity in the southbound direction. Southbound ridership nearly mirrors the northbound trend, except that Seminole Square ridership activity is replaced by activity at the Shops at Stonefield.

Figure 102 | Route 7 Weekday Ridership by Stop: Northbound

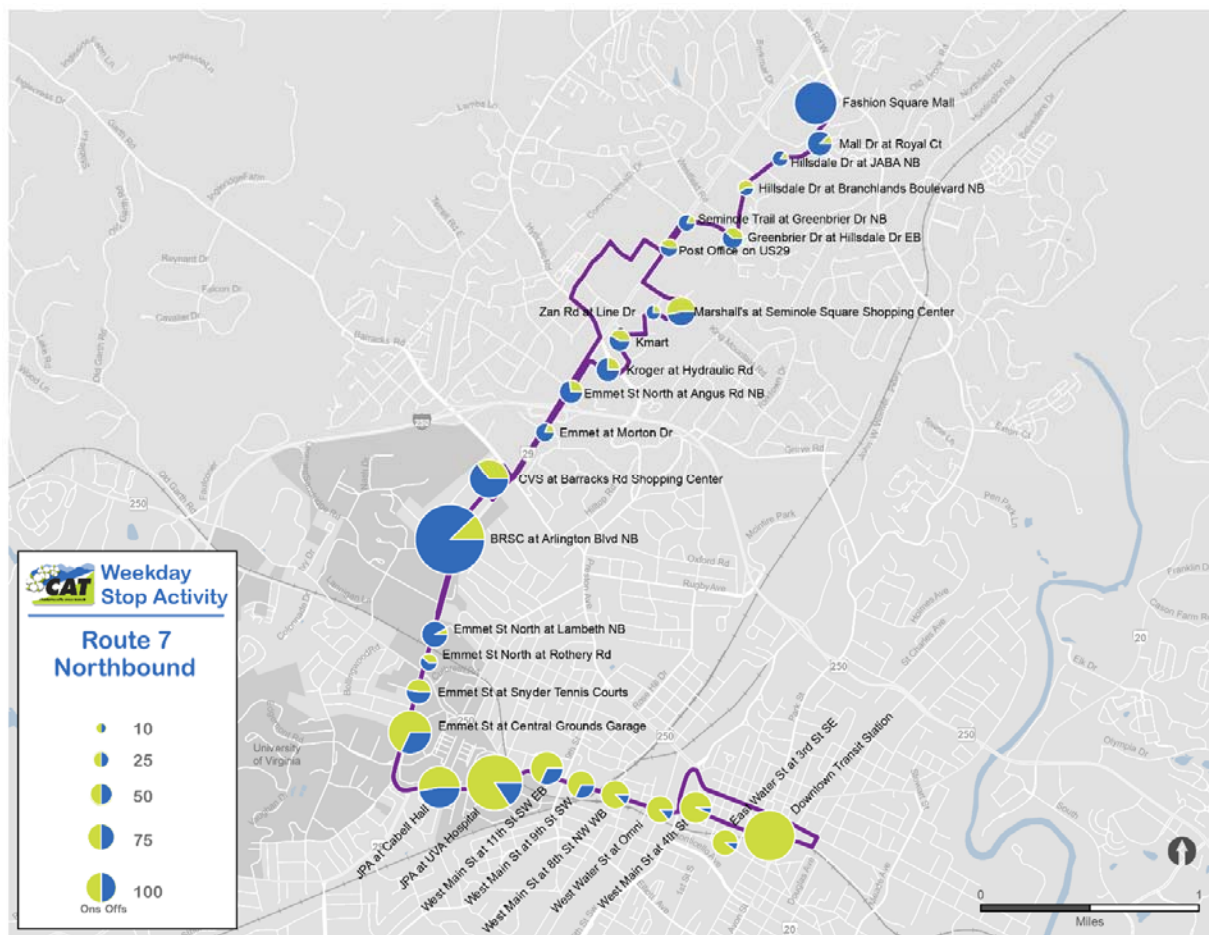


Figure 103 | Route 7 Weekday Boardings and Alightings, by Stop: Northbound

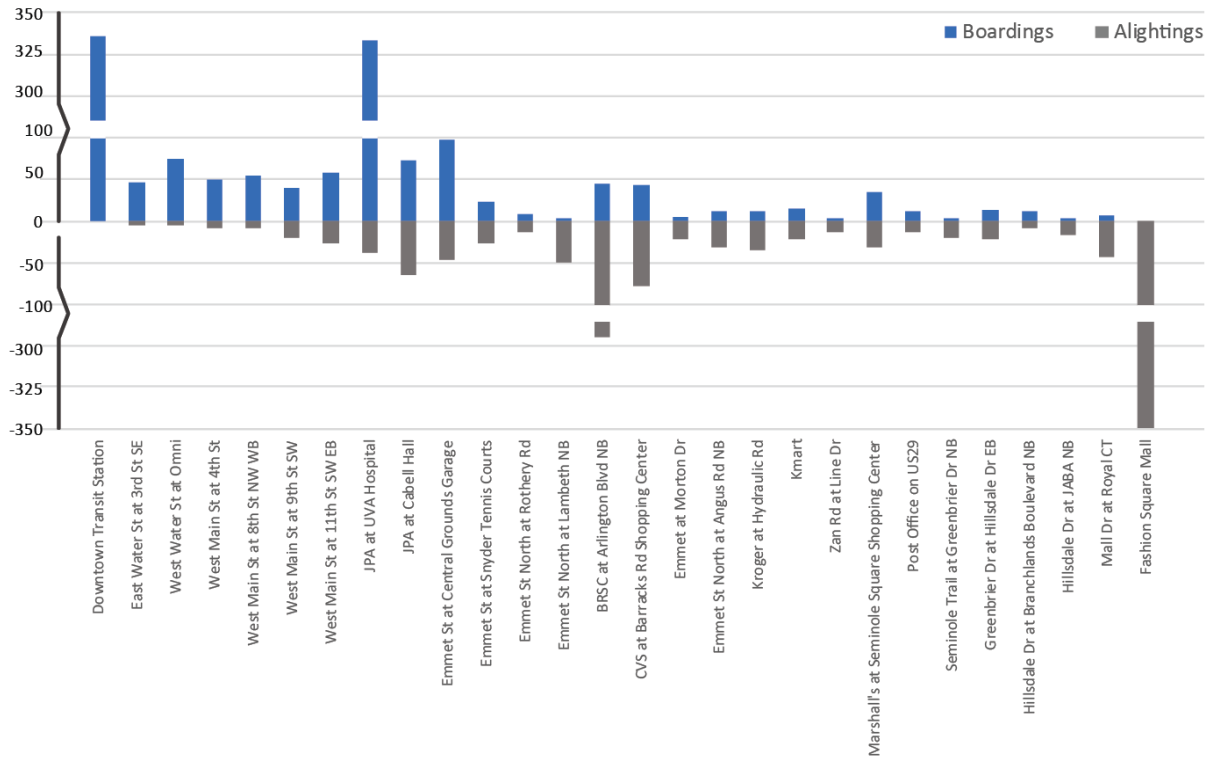


Figure 104 | Route 7 Weekday Ridership by Stop: Southbound

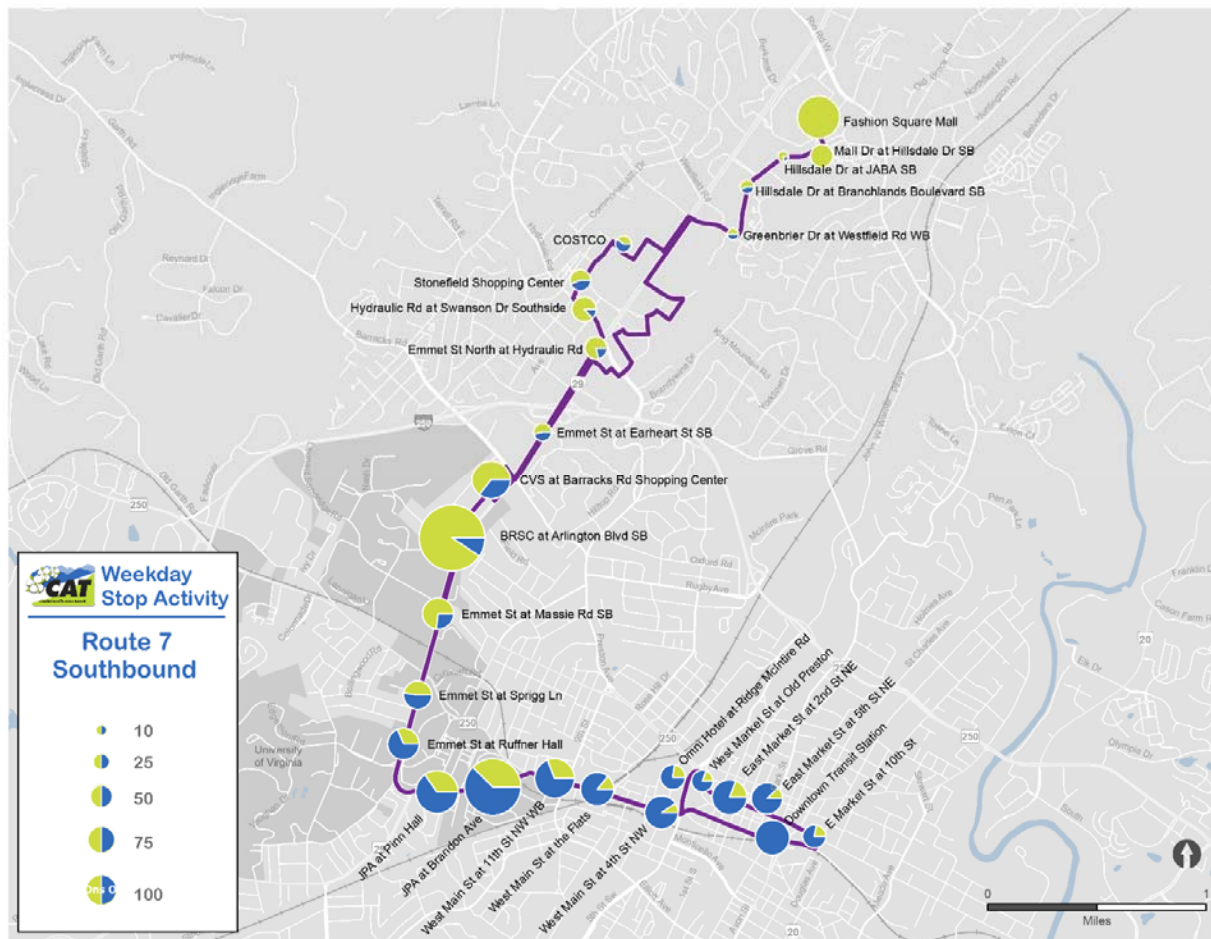
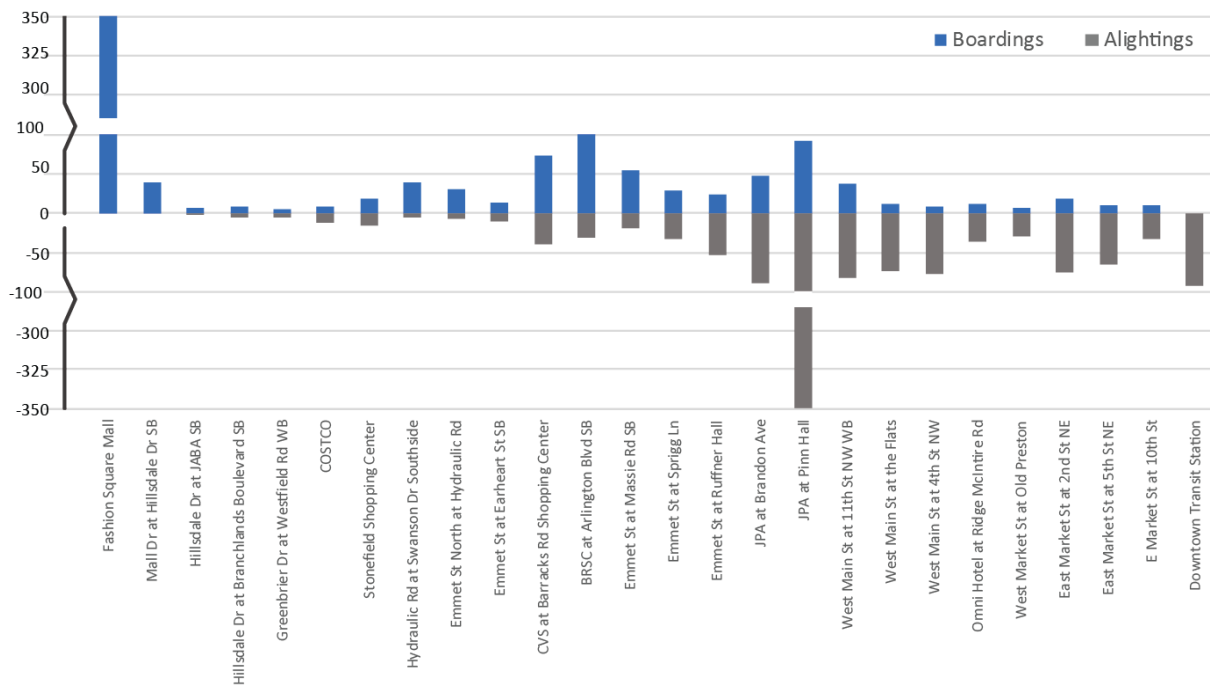


Figure 105 | Route 7 Weekday Boardings and Alightings by Stop: Southbound



Ridership by Trip

Figure 106 (northbound) and **Figure 107** (southbound) show the boardings and maximum load for each trip per direction over the course of a typical weekday. Three Route 7 trips in the northbound direction exceed a maximum load of 32 passengers, the seating capacity for the 35ft. transit buses typically assigned to this route. This suggests that standing loads are not uncommon on Route 7, especially in the late afternoon.

Figure 106 | Route 7 Weekday Ridership per Trip: Northbound

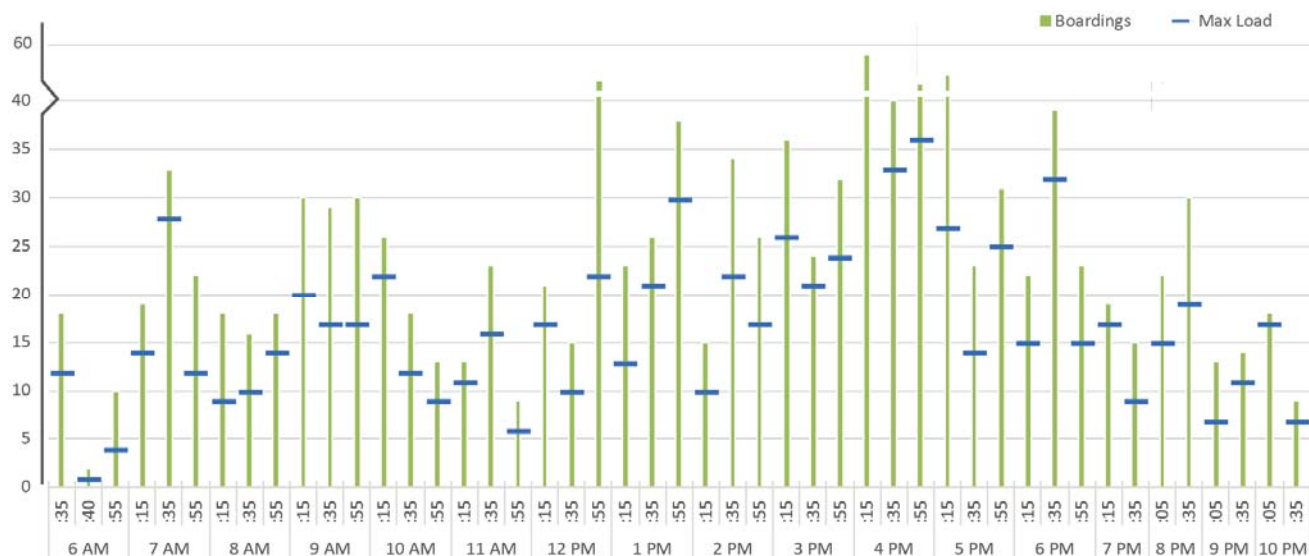
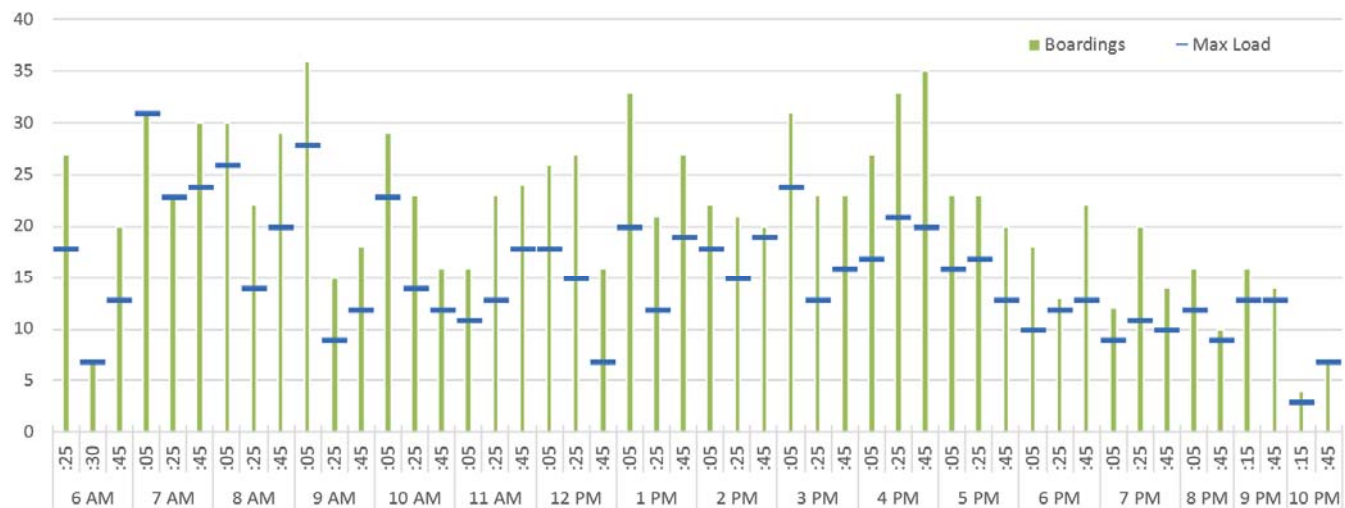


Figure 107 | Route 7 Weekday Ridership per Trip: Southbound



9.7.5. Summary of Observations

Strengths

- High ridership throughout the service day
- Several strong anchors including downtown, UVA, and multiple retail centers
- Extensive span of service (6:30 AM – 11:25 PM)
- High service frequency during most of the day
- Multiple connection opportunities in downtown Charlottesville
- Above-average ridership per hour and ridership per trip
- Below-average cost per passenger

Weaknesses

- Inconsistent northbound and southbound alignment along Seminole Trail corridor, forcing passengers to cross busy thoroughfare or ride out-of-direction on one leg of their trip
- Very poor on-time performance
- Standing loads on several trips

Opportunities

Potential opportunities to strengthen Route 7 are listed below. Some suggestions may be contradictory, as there is usually more than one approach to improving a route.

- **Coordinate with City and property owners to improve pedestrian amenities along Seminole Trail in order to streamline route.** Route 7 is a relatively long route with poor on-time performance. This is due in part to its front-door service to the retail centers it service along Seminole Court Trail. Improvements to sidewalks, crosswalks, pedestrian signals, and pedestrian access points to retail centers could allow Route 7 to provide faster, more streamlined service along the corridor.
- **Rebrand Route 7 as a BRT service.** To complement an investment in pedestrian amenities, CAT could also invest in enhanced passenger amenities in the corridor. While many destinations along the Seminole Court

Trail corridor are set a significant distance back from the thoroughfare, the presence of high-quality shelters, benches, real-time bus arrival information, etc. could provide a reasonable trade-off for passengers who would have to walk a bit farther to access the bus. These amenities could be elements of a comprehensive effort to rebrand Route 7 as a Bus Rapid Transit service providing fast, frequent, and high-quality service along CAT's top ridership corridors.

- **Extend route to Walmart.** If Route 7 is streamlined, and rebranded as a BRT service, it could also be extended to Walmart, one of the top ridership generators in the CAT service area. This would provide the route a very strong end-of-line anchor and could help establish Walmart as a secondary hub where transfers could be made to other routes (both CAT and JAUNT).
- **Increase peak-period service frequency.** Route 7 experiences heavy ridership throughout the day and has maximum loads exceeding seating capacity on several peak-period trips. Increasing service frequency from 20-minutes to 15-minutes would reduce overcrowding and also bring service levels up to what would be expected of a BRT service. Together with enhanced passenger amenities, high service frequency could make a slightly longer walk to retail destinations more palatable to riders.

9.8. ROUTE 8: PRESTON AVENUE & EMMET STREET

9.8.1. Service Description

Route 8 (**Figure 108**) operates Monday through Saturday between downtown Charlottesville and the Shops at Stonefield. The route travels primarily along Emmet Street, Barracks Road, and Preston Avenue.

Both ends of Route 8 include one-way loops. On the south end, buses circulate through downtown Charlottesville in the clockwise direction. On the north end, the route terminates with a counter-clockwise loop connecting Seminole Square Shopping Center on the east side of Seminole Trail with the Shops at Stonefield on the west side of the road.

Transfer opportunities to other routes are available at the Downtown Transit Station, and at Barracks Road, Seminole Square, and the Shops at Stonefield shopping centers.

Figure 108 | Route 8 Map



9.8.2. Operating Characteristics

Table 9-15 summarizes operating characteristics for Route 8. On weekdays, the route operates every 30 minutes during peak periods and hourly during the off-peak. Hourly service is also provided on Saturdays. At \$378,660 per year, the route has the seventh-highest operating cost among all CAT routes. Route 8 offers connections to all weekday routes except for Routes 5, and serves several activity generators, including the Downtown Mall, several shopping centers, and Washington Park.

Table 9-15 | Route 8 Operating Characteristics

Destination	From		Seminole Square Shopping Center
	To		Downtown Transit Station
Span	Weekday		6:30 AM – 6:57 PM
	Saturday		6:30 AM – 6:27 PM
	Sunday		--
Frequency	Weekday	Peak	30
		Off-Peak	60
	Saturday		60
	Sunday		--
Annual Operating Costs			\$378,660
Route Connections			1, 2, 3, 4, 6, 7, 9, 10, 11, Trolley
Key Destinations			Downtown Mall, Downtown Transit Station, Barracks Road Shopping Center, Seminole Square Shopping Center, Shops at Stonefield

9.8.3. Weekday Service Productivity

Route 8 is the third-highest performing route in terms of passengers per hour (18.9), and fourth-highest for passengers per trip (8.7). However, the route is below average for both metrics. At 83 percent on-time, Route 8 ranks third in on-time performance (four percent early and three percent late), and is substantially above the weekday system average. Finally, Route 8 has a better than average operating cost per passenger at \$3.96 per passenger trip.

Table 9-16 summarizes service productivity metrics for Route 8.

Table 9-16 | Route 8 Weekday Service Productivity Metrics

Passengers per Hour	On-Time Performance
<p>Average 20.8</p> <p>18.9</p>	<p>Average 82%</p> <p>93%</p>
Passengers per Trip	Operating Cost per Passenger
<p>Average 11.5</p> <p>8.7</p>	<p>Average \$4.62</p> <p>\$3.96</p>

9.8.4. Ridership

Route 8 averages 329 passengers per weekday (ranking sixth) over 38 trips, and 186 passengers per Saturday (ranking fifth) over 24 trips. The route ranks sixth in annual ridership (98,918 riders).

Ridership by Stop

Figure 109 and **Figure 110** summarize weekday boardings and alightings by stop in the northbound direction. Northbound ridership activity is heaviest in downtown Charlottesville, along Preston Avenue, and at Barracks Road Shopping Center.

Figure 111 and **Figure 112** show weekday ridership activity in the southbound direction. In this direction, ridership activity is highest along the route's northern terminal loop, at Barracks Road Shopping Center, along Preston Avenue, and in downtown Charlottesville.

Figure 109 | Route 8 Weekday Ridership by Stop: Northbound

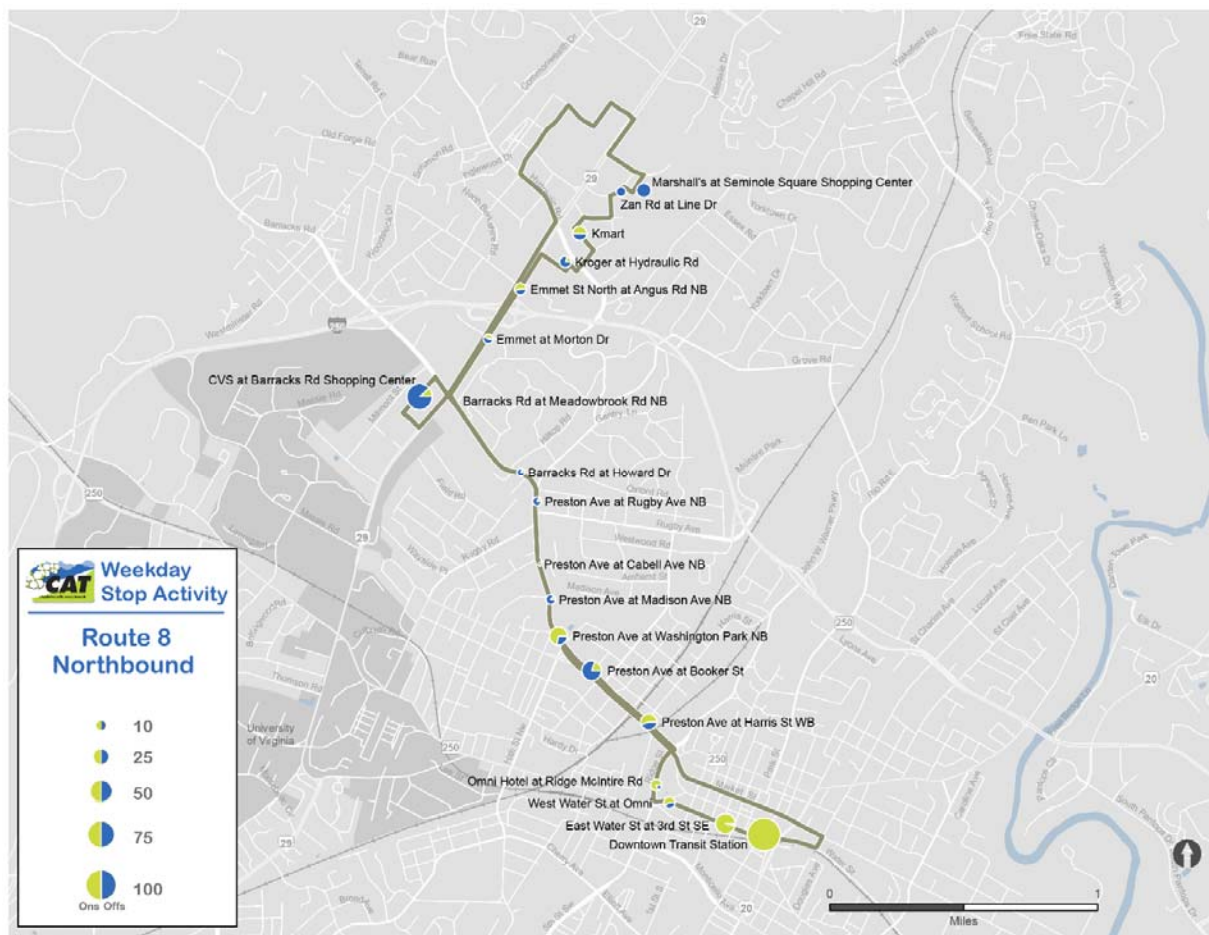


Figure 110 | Route 8 Weekday Boardings and Alightings, by Stop: Northbound

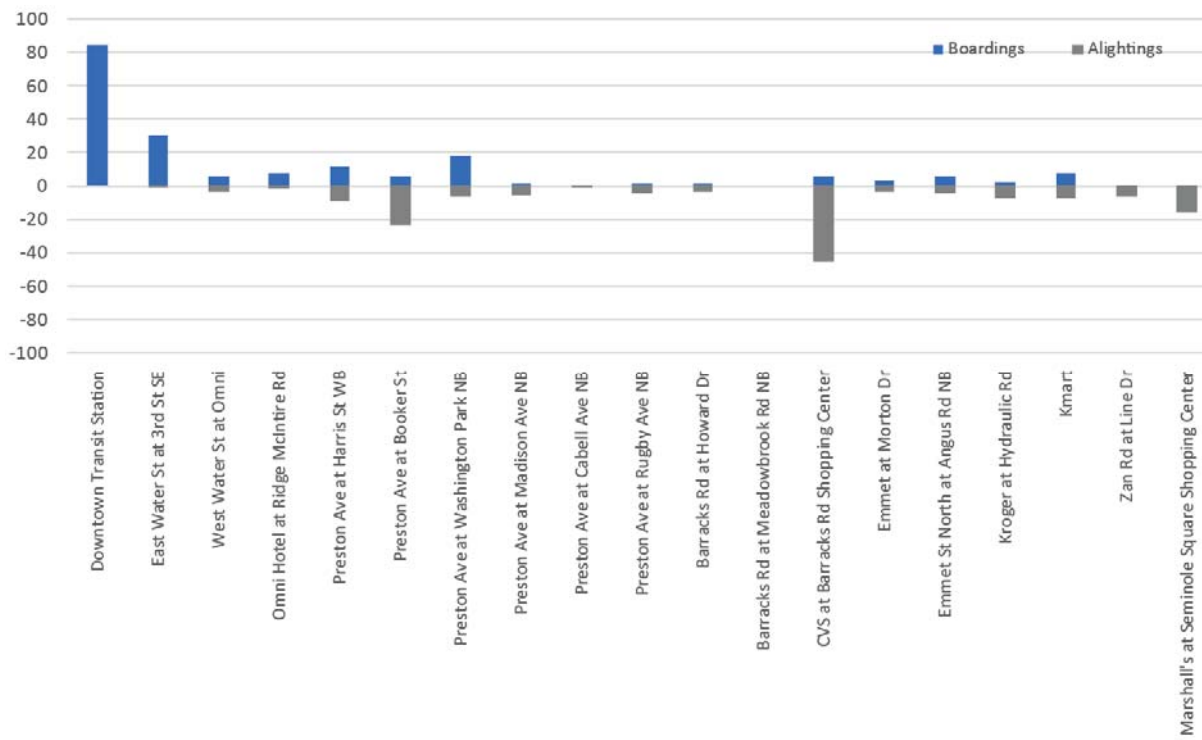


Figure 111 | Route 8 Weekday Ridership by Stop: Southbound

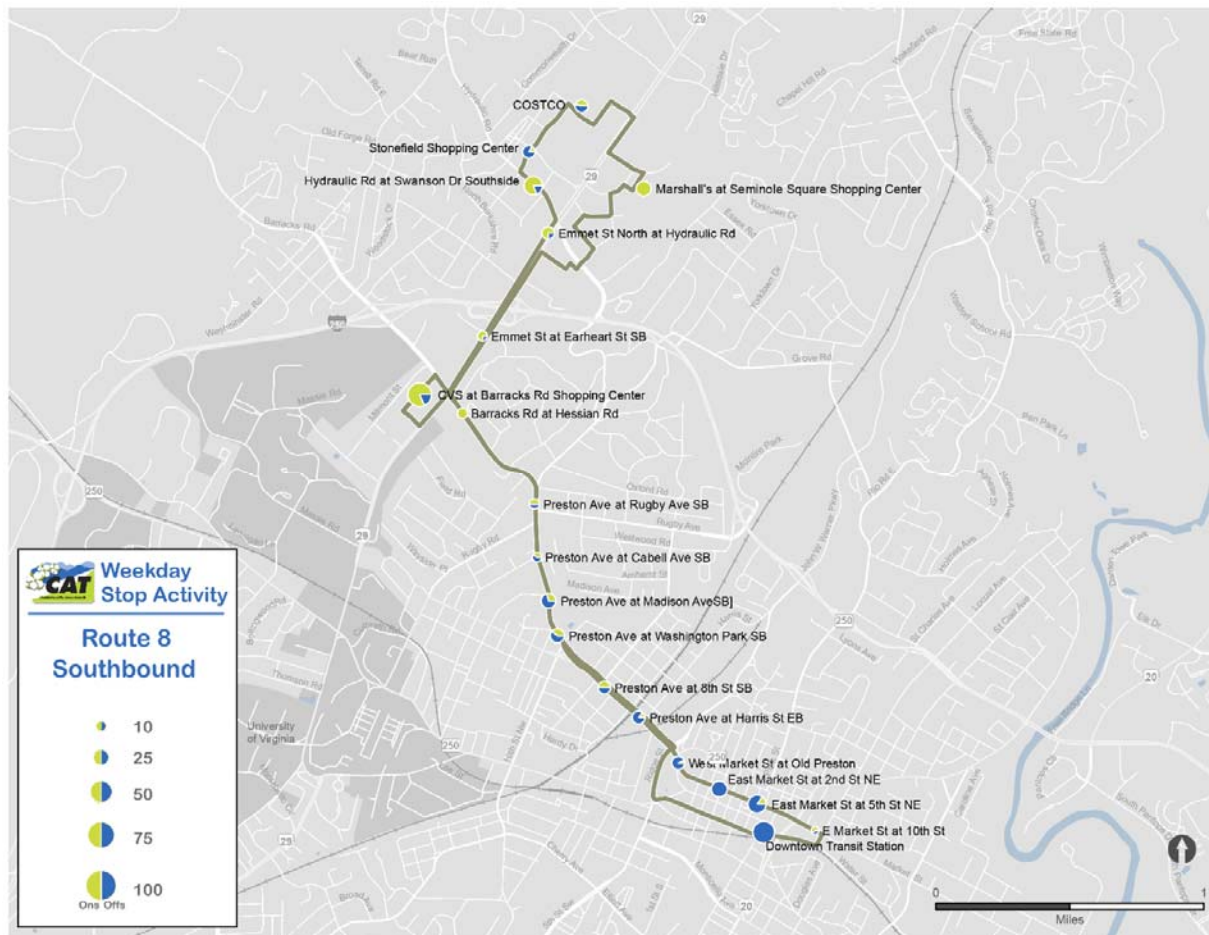
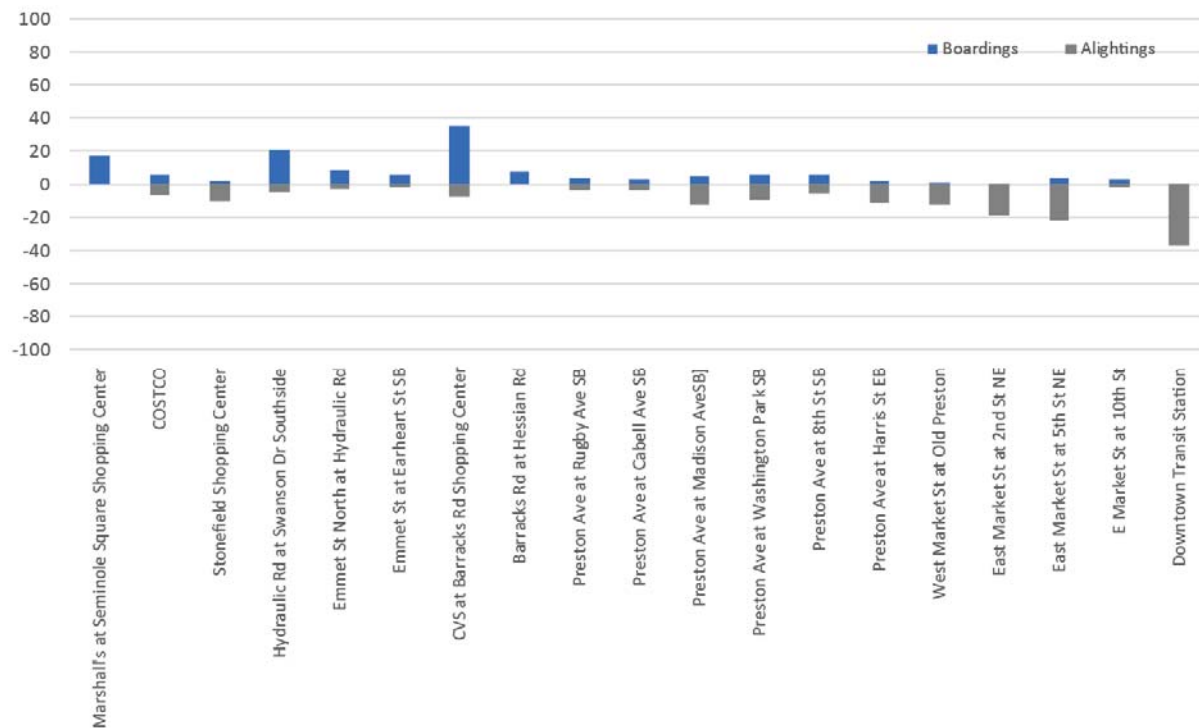


Figure 112 | Route 8 Weekday Boardings and Alightings by Stop: Southbound



Ridership by Trip

Figure 113 (northbound) and **Figure 114** (southbound) show the boardings and maximum load for each trip per direction over the course of a typical weekday. No Route 8 trips exceed a maximum load of 32 passengers, the seating capacity for the 35ft. transit buses typically assigned to this route. Ridership activity is generally higher during midday hours in the northbound direction and during late afternoon hours in the southbound direction.

Figure 113 | Route 8 Weekday Ridership per Trip: Northbound

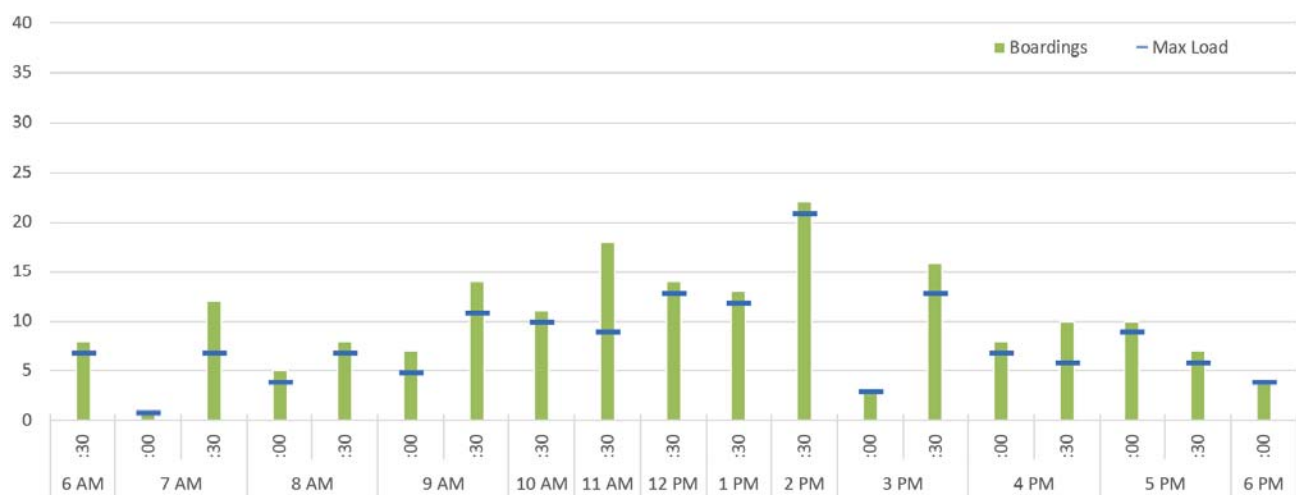
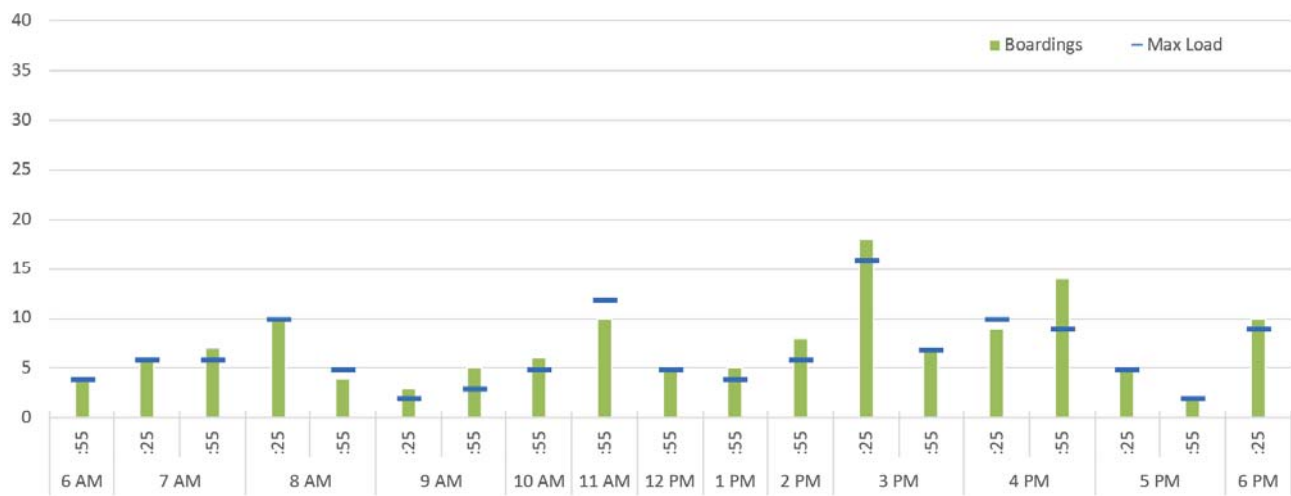


Figure 114 | Route 8 Weekday Ridership per Trip: Southbound



9.8.5. Summary of Observations

Strengths

- Serves several regional retail centers
- Relatively high frequency service during peak periods
- Easy-to-remember clock-face frequency
- Very strong on-time performance
- Below-average cost per passenger trip
- Multiple connection opportunities in downtown Charlottesville and at retail destinations

Weaknesses

- One-way terminal loop allows passengers to get from destinations on the east side of Seminole Trail to destinations on the west side, but not vice versa.
- Below-average productivity in terms of passengers per hour and passengers per trip
- Relatively limited span of service (6:30 AM – 6:57 PM)

Opportunities

Potential opportunities to strengthen Route 8 are listed below. Some suggestions may be contradictory, as there is usually more than one approach to improving a route.

- **Reverse circulation direction of terminal loop.** Route 8 and Route 7 both allow passengers to cross from retail destinations on the east side of Seminole Trail to destinations on the west side. However, neither allows passengers to travel in the opposite direction. Operating the terminal loop of Route 8 in a clockwise direction, while leaving Route 7 to operate counter-clockwise would facilitate bi-directional travel across Seminole Trail.
- **Reduce peak-period frequency.** Few peak-period trips on Route 8 exceed 10 passengers per trip. Reducing the route's peak period frequency to match its off-peak frequency would reduce the route's operating cost and improve its overall productivity.

- **Operate some trips to YMCA instead of Emmet Street/Seminole Train.** Both Route 8 and Route 7 provide service between downtown Charlottesville and retail destinations along Seminole Train. However, Route 8 ridership is significantly lower. Rather than serving the retail destinations on every trip, some trips could instead service the YMCA via Rugby Avenue. This could allow CAT to eliminate Route 9, the system's least productive route, and reinvest its resources elsewhere.

9.9. ROUTE 9: THE HEALTH DEPARTMENT & YMCA

9.9.1. Service Description

Route 9 (**Figure 115**) operates on weekdays, Saturdays, and Sundays between downtown Charlottesville and Charlottesville High School (CHS), via UVA Hospital and the Brooks Family YMCA. The route travels primarily along Rose Hill Drive, 10th Street NW, and Main Street. Passengers may transfer to other services at the Downtown Transit Station and UVA Hospital. All Route 9 trips operate along the route's full alignment.

Figure 115 | Route 9 Map



9.9.2. Operating Characteristics

Table 9-17 summarizes operating characteristics for Route 9. The route operates on a 70-minute frequency during all service periods. Sunday service begins significantly later and ends significantly earlier than weekday and Saturday service. At \$254,820 per year, Route 9 has the second-lowest operating cost among all CAT routes. Route 9 offers connections to all other weekday routes excluding Route 5. The route serves several activity generators, including downtown Charlottesville, UVA Hospital, the Charlottesville Health Department, YMCA, CHS, and McIntire and Washington Parks.

Table 9-17 | Route 9 Operating Characteristics

Destination	From		Charlottesville High School
	To		Downtown Transit Station
Span	Weekday		6:00 AM – 11:00 PM
	Saturday		6:00 AM – 11:00 PM
	Sunday		10:40 AM – 5:40 PM
Frequency	Weekday	Peak	70
		Off-Peak	70
	Saturday		70
	Sunday		70
Annual Operating Costs			\$254,820
Route Connections			1, 2, 3, 4, 6, 7, 8, 10, 11, 12, Trolley
Key Destinations			Downtown Mall, Downtown Transit Station, UVA Hospital, Charlottesville Health Department, YMCA, CHS

9.9.3. Weekday Service Productivity

With 10.8 weekday passengers per hour, Route 9 ranks 11th among CAT routes, and is significantly below the system average for this metric. At 4.3 passengers per trip, Route 9 is last among CAT routes for this metric. The route's on-time performance rate is 68 percent (32 percent early and zero percent late), ranking 10th and well below the weekday system average for on-time performance. Finally, Route 9 has the second-highest operating cost per passenger at \$6.52 per passenger trip. **Table 9-18** summarizes weekday service productivity metrics for Route 9.

Table 9-18 | Route 9 Weekday Service Productivity Metrics

Passengers per Hour	On-Time Performance
<p>Average 20.8</p> <p>10.8</p>	<p>Average 82%</p> <p>68%</p>
Passengers per Trip	Operating Cost per Passenger
<p>Average 11.5</p> <p>4.3</p>	<p>Average \$4.62</p> <p>\$6.52</p>



9.9.4. Ridership

Route 9 averages 126 passengers per weekday (ranking 12th) over 29 trips; 59 passengers per Saturday (ranking 11th) over 29 trips; and 18 passengers per Sunday (ranking fourth) over 12 trips. The route ranks 11th in annual ridership (29,220 riders).

Ridership by Stop

Figure 116 and **Figure 117** summarize weekday boardings and alightings by stop in the northbound direction. In this direction, ridership activity is highest at the Downtown Transit Station and UVA Hospital. All other stops are very lightly used.

Figure 118 and **Figure 119** summarize total stop activity in the southbound direction. Ridership is generally low outside of downtown and the UVA Hospital.

Figure 116 | Route 9 Weekday Ridership by Stop: Northbound

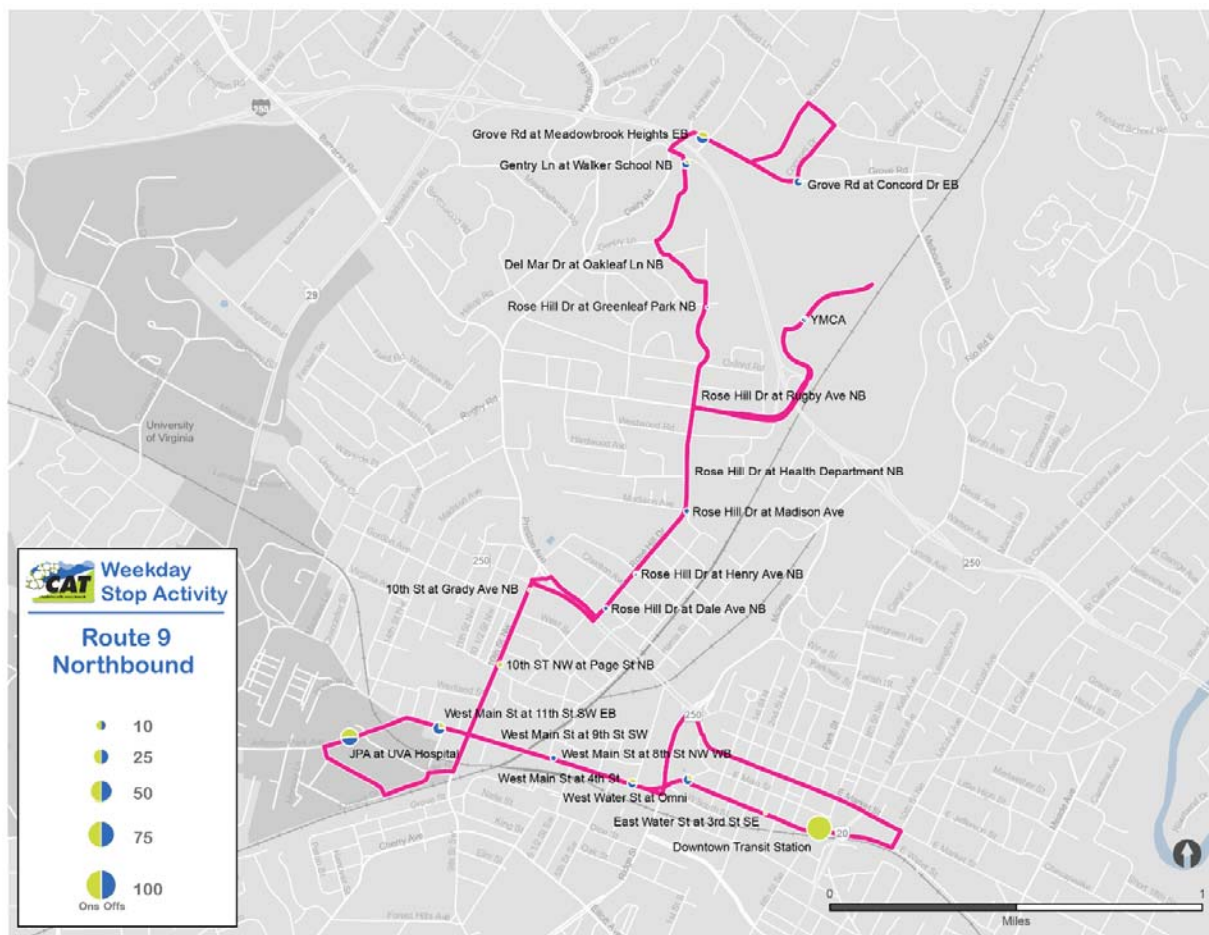


Figure 117 | Route 9 Weekday Boardings and Alightings, by Stop: Northbound

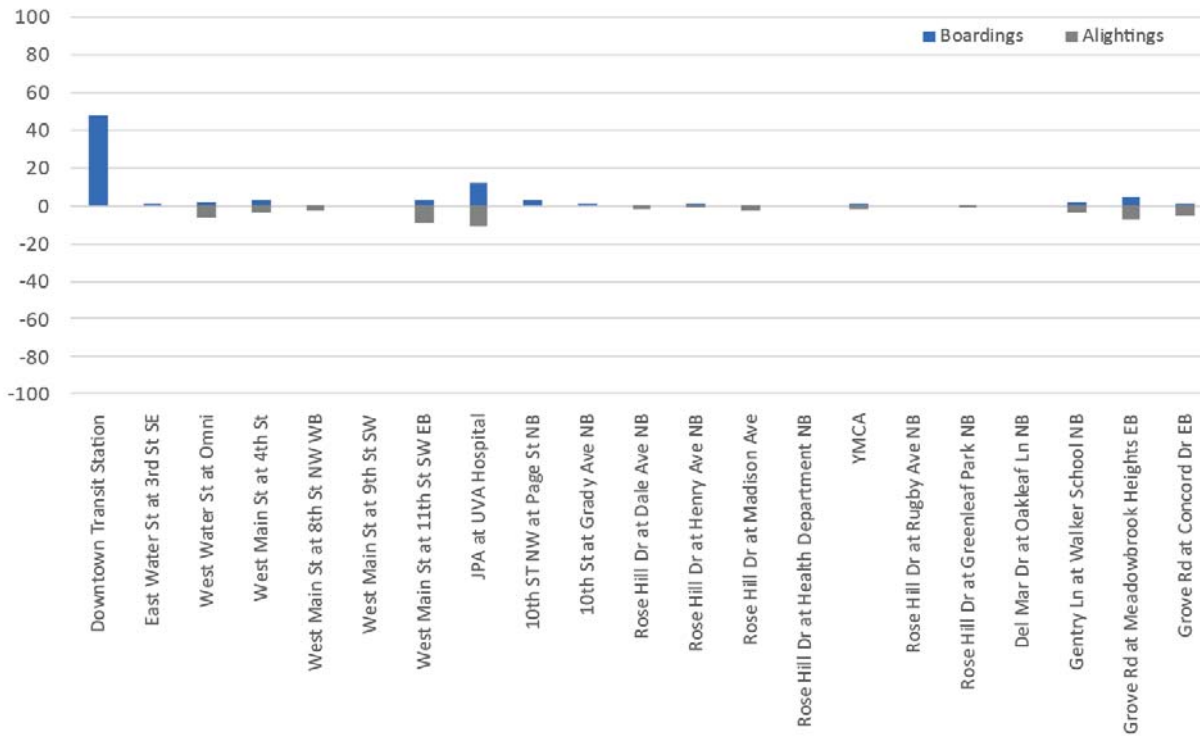


Figure 118 | Route 9 Ridership by Stop: Southbound

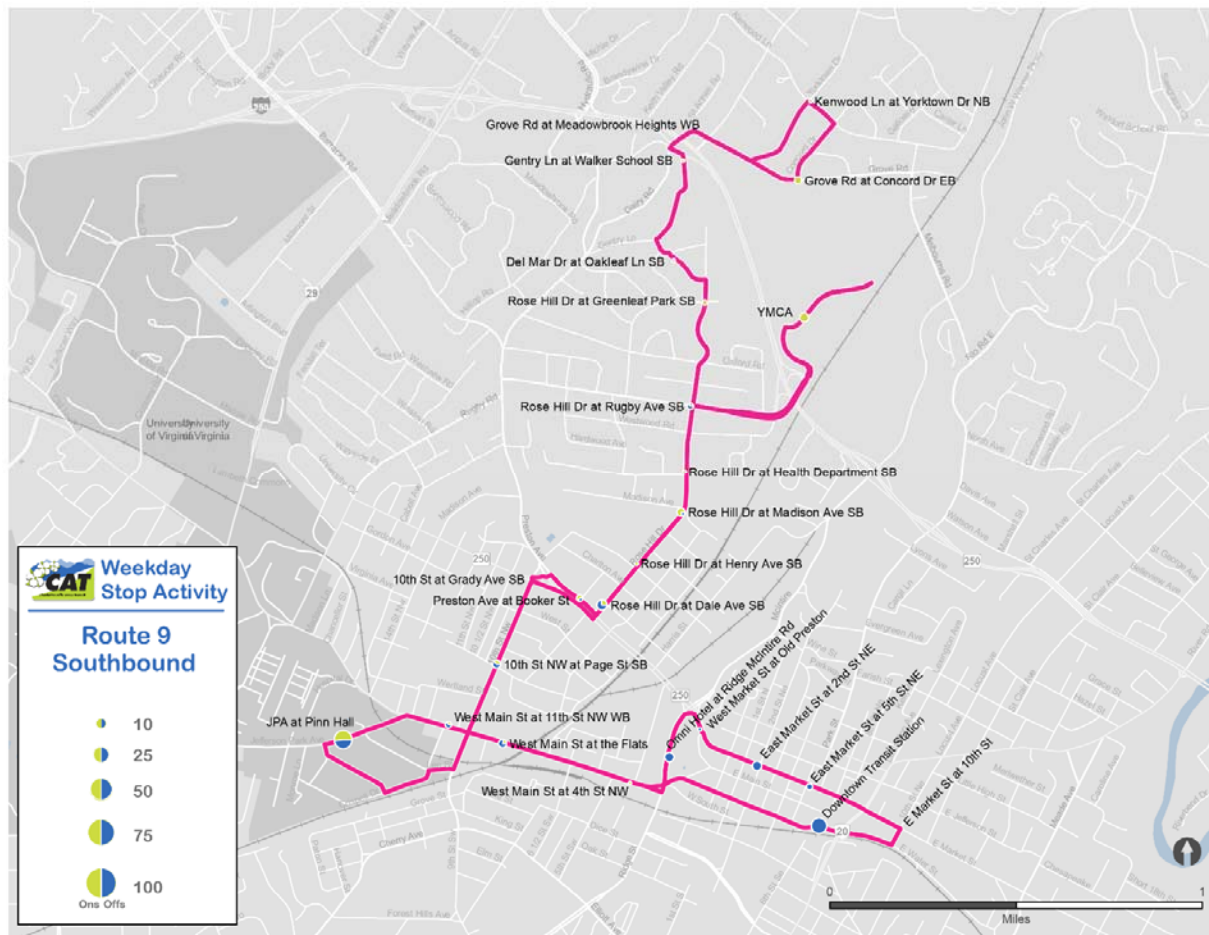
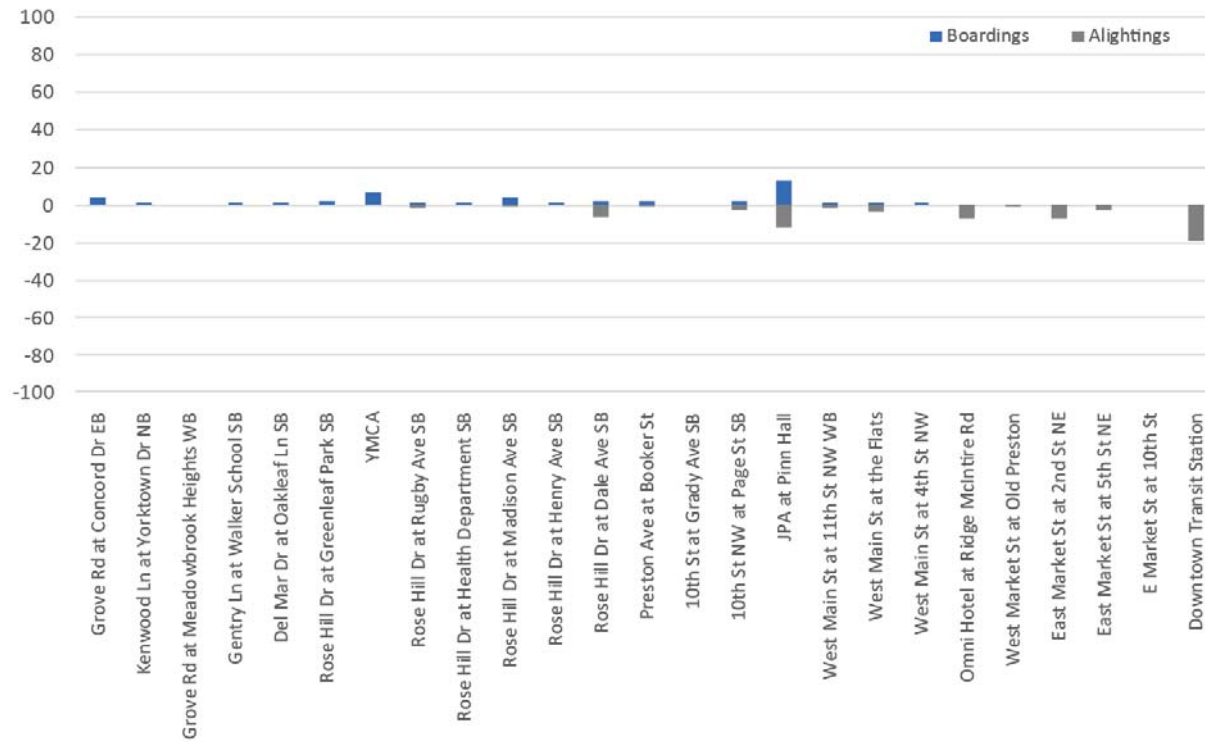


Figure 119 | Route 9 Weekday Boardings and Alightings by Stop: Southbound



Ridership by Trip

Figure 120 (northbound) and **Figure 121** (southbound) show the boardings and maximum load for each trip per direction over the course of a typical weekday. No Route 9 trips exceed a maximum load of 32 passengers, the seating capacity for the 35ft. transit buses typically assigned to this route. Ridership activity is highest in the northbound direction, in the late afternoon and early evening.

Figure 120 | Route 9 Weekday Ridership per Trip: Northbound

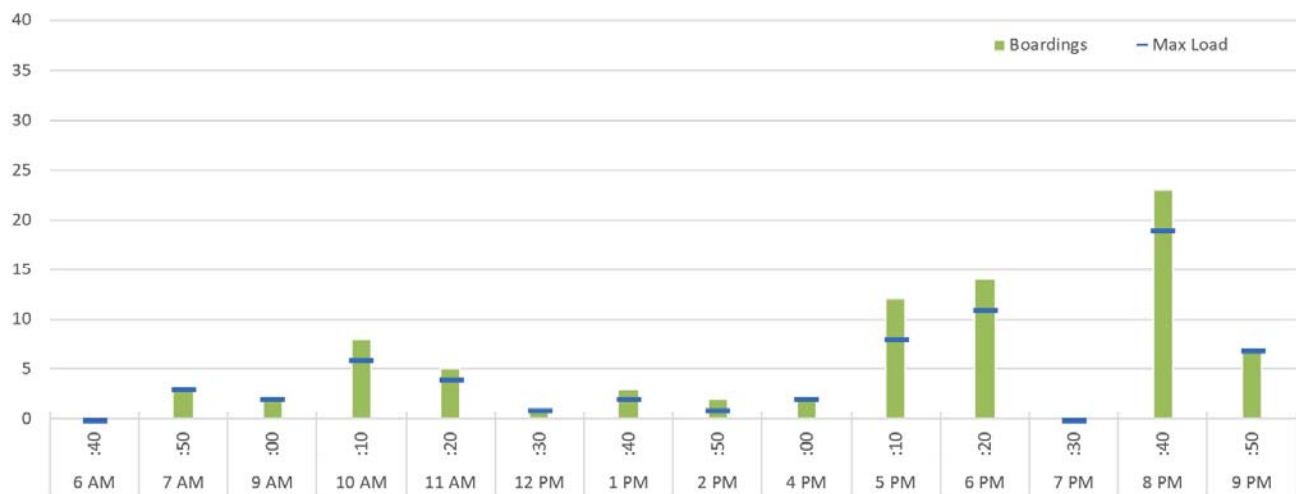
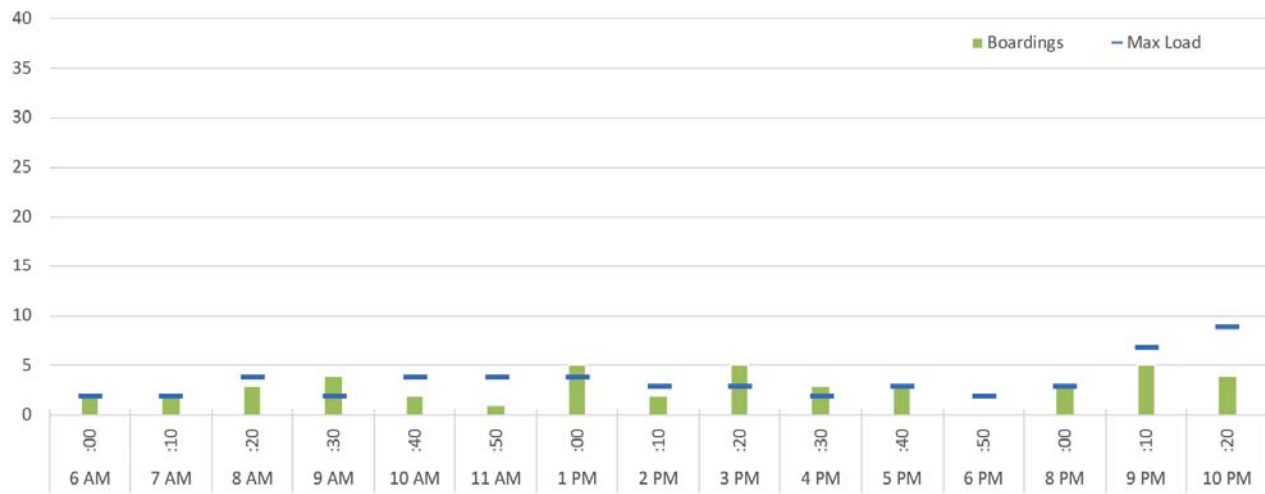


Figure 121 | Route 9 Weekday Ridership per Trip: Southbound



9.9.5. Summary of Observations

Strengths

- Only route with direct service to Charlottesville High School and the YMCA, key regional destinations
- Extensive weekday and Saturday span of service (6:00 AM – 11:00 PM)
- Multiple connection opportunities in downtown Charlottesville and at the UVA Hospital

Weaknesses

- Generally low ridership
- Service to YMCA results in a significant out-of-direction deviation for passengers that have to ride through
- Very low service productivity in terms of passengers per hour and passengers per trip
- Above-average cost per passenger trip
- Poor on-time performance
- No recovery time built into schedule
- No direct access to major grocery stores

Opportunities

Potential opportunities to strengthen Route 9 are listed below. Some suggestions may be contradictory, as there is usually more than one approach to improving a route.

- Eliminate service to UVA Hospital.** Route 9 is one of several CAT routes connecting downtown Charlottesville to the UVA Hospital. However, it is the only route serving CHS and the YMCA. Providing more direct service between downtown, the high school, and YMCA would cut significant travel time off the route and potentially allow for a more manageable 60-minute cycle time. In addition, the shorter route would likely improve the route's poor on-time performance.
- Replace Route 9 with two routes anchored at the YMCA.** Given the limited alignment options for serving the YMCA, the destination would service best as an end-of-line terminus. Route 9 could be split into two separate, but interlined, routes: the first would link downtown Charlottesville to the YMCA; the second would

link the YMCA to Albemarle High School and retail destinations along the Seminole Trail Corridor such as Fashion Square Mall. Given that there is a pedestrian path between the YMCA and Charlottesville High School, both destinations could be served with a single stop at the YMCA. From downtown Charlottesville, buses would operate under one route number up to the YMCA. At the YMCA, buses would change headsigns and proceed to Barracks Road Shopping Center, Albemarle High School, and Fashion Square Mall. This route would give students from both high schools improved access to after-school activities at the YMCA as well as employment opportunities at Fashion Square Mall and other retail destinations.

9.10. ROUTE 10: PANTOPS

9.10.1. Service Description

Route 10 (**Figure 122**) operates Monday through Saturday between downtown Charlottesville and the Sentara Martha Jefferson Hospital, via Pantops Shopping Center. The route travels primarily along Peter Jefferson Parkway, Richmond Road, Stony Point Road, and E. High Street. On southbound trips only, the route also serves Stony Point Road and the Avemore Apartments.

Passengers may transfer between Route 10 and most other CAT routes at the Downtown Transit Station.

Figure 122 | Route 10 Map



9.10.2. Operating Characteristics

Table 9-19 summarizes operating characteristics for Route 10. The route operates hourly on weekdays and Saturdays. At \$361,150 per year, Route 10 has the eighth-highest operating cost among all CAT routes. Route 10 offers connections to all other weekday routes except for Route 5. It serves several key activity generators, including downtown Charlottesville, Pantops Shopping Center, the Avemore Apartments, the Social Security Administration, the VA Medical Center, and Sentara Martha Jefferson Hospital.

Table 9-19 | Route 10 Operating Characteristics

Destination	From		Martha Jefferson Hospital
	To		Downtown Transit Station
Span	Weekday		6:30 AM – 11:27 PM
	Saturday		6:30 AM – 11:27 PM
	Sunday		--
Frequency	Weekday	Peak	60
		Off-Peak	60
	Saturday		60
	Sunday		--
Annual Operating Costs			\$361,150
Route Connections			1, 2, 3, 4, 6, 7, 8, 9, 11, Trolley
Key Destinations			Downtown Mall, Downtown Transit Station, Pantops Shopping Center, Avemore Apartments, Social Security Administration, VA Medical Center, Martha Jefferson Hospital

9.10.3. Weekday Service Productivity

Route 10 is below-average and ranks ninth in both passengers per hour (14.3) and passengers per trip (6.8). The route's on-time performance rate is 88 percent (12 percent early and zero percent late), ranking fifth and above the weekday system average. At \$5.07 per passenger trip, Route 10 has the fifth-highest operating cost per passenger. **Table 9-20** summarizes service productivity metrics for Route 10.

Table 9-20 | Route 10 Weekday Service Productivity Metrics

Passengers per Hour	On-Time Performance
<p>Average 20.8</p> <p>14.3</p>	<p>Average 82%</p> <p>88%</p>
Passengers per Trip	Operating Cost per Passenger
<p>Average 11.5</p> <p>6.8</p>	<p>Average \$4.62</p> <p>\$5.07</p>

9.10.4. Ridership

Route 10 averages 230 passengers per weekday (ranking eighth) over 34 trips, and 154 passengers per Saturday (ranking ninth) over 34 trips. The route ranks eighth in annual ridership (64,766 riders).

Ridership by Stop

Figure 123 and **Figure 124** summarize weekday boardings and alightings by stop in the eastbound direction. Ridership activity is heaviest at the Downtown Transit Station, Pantops Shopping Center and along Abbey Road. All other stops are lightly used.

Figure 125 and **Figure 126** summarize weekday ridership activity in the westbound direction. Westbound ridership is generally lighter than in the eastbound direction. This is likely a function of the routes large one-way terminal loop. Many passengers likely board the bus at the same stop where they alighted previously and ride out of direction until the bus begins its return trip.

Figure 123 | Route 10 Weekday Ridership by Stop: Eastbound

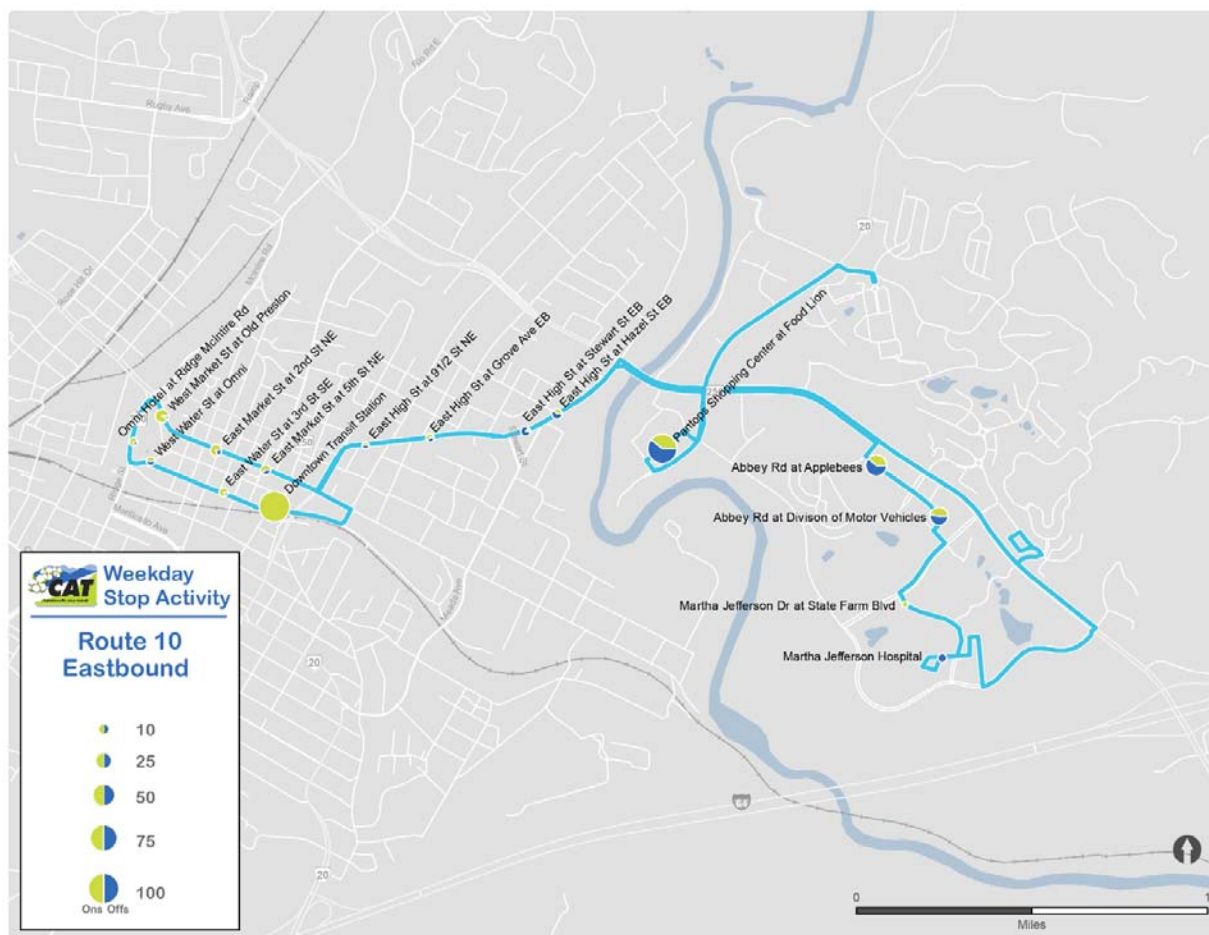


Figure 124 | Route 10 Weekday Boardings and Alightings, by Stop: Eastbound

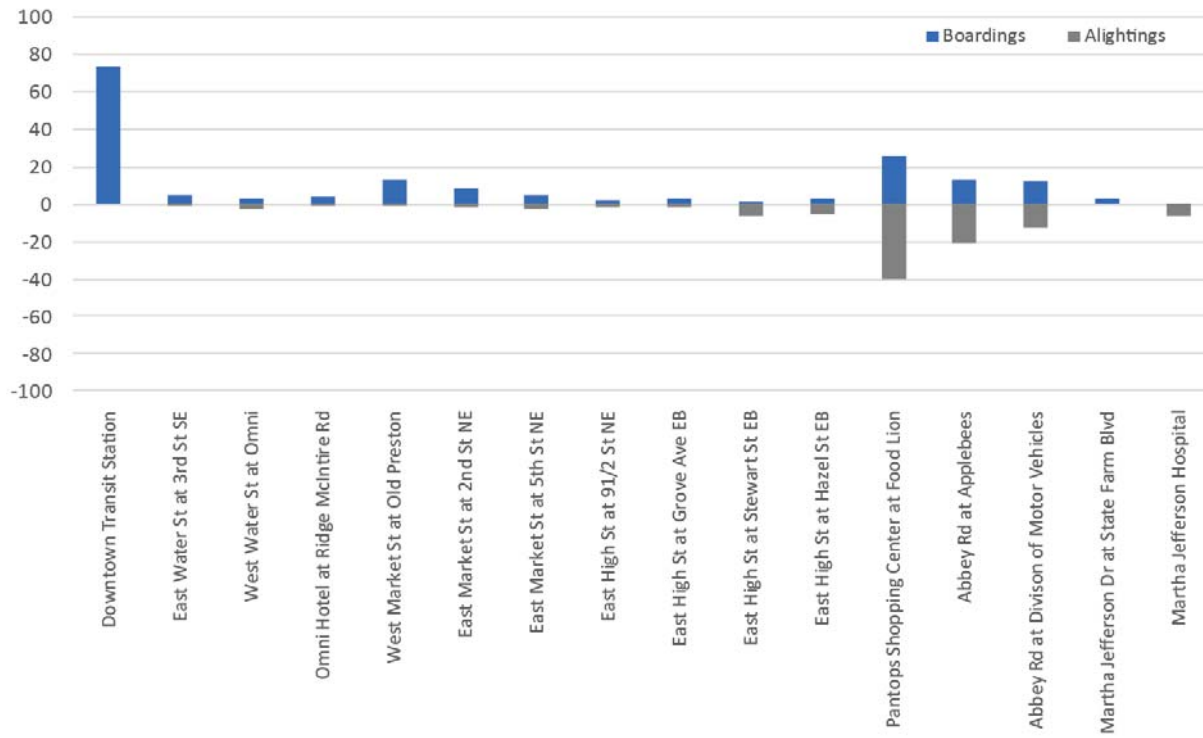


Figure 125 | Route 10 Weekday Ridership by Stop: Westbound

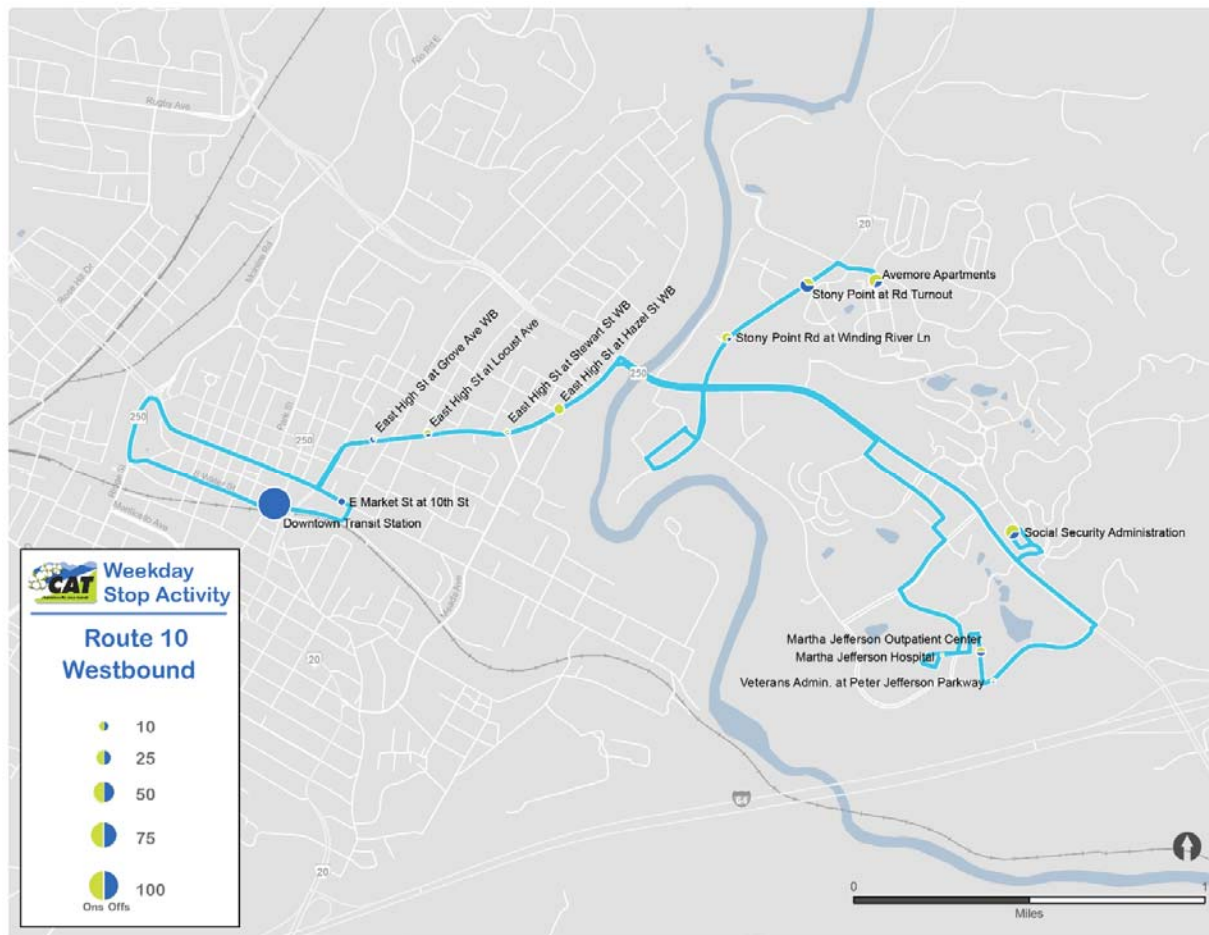
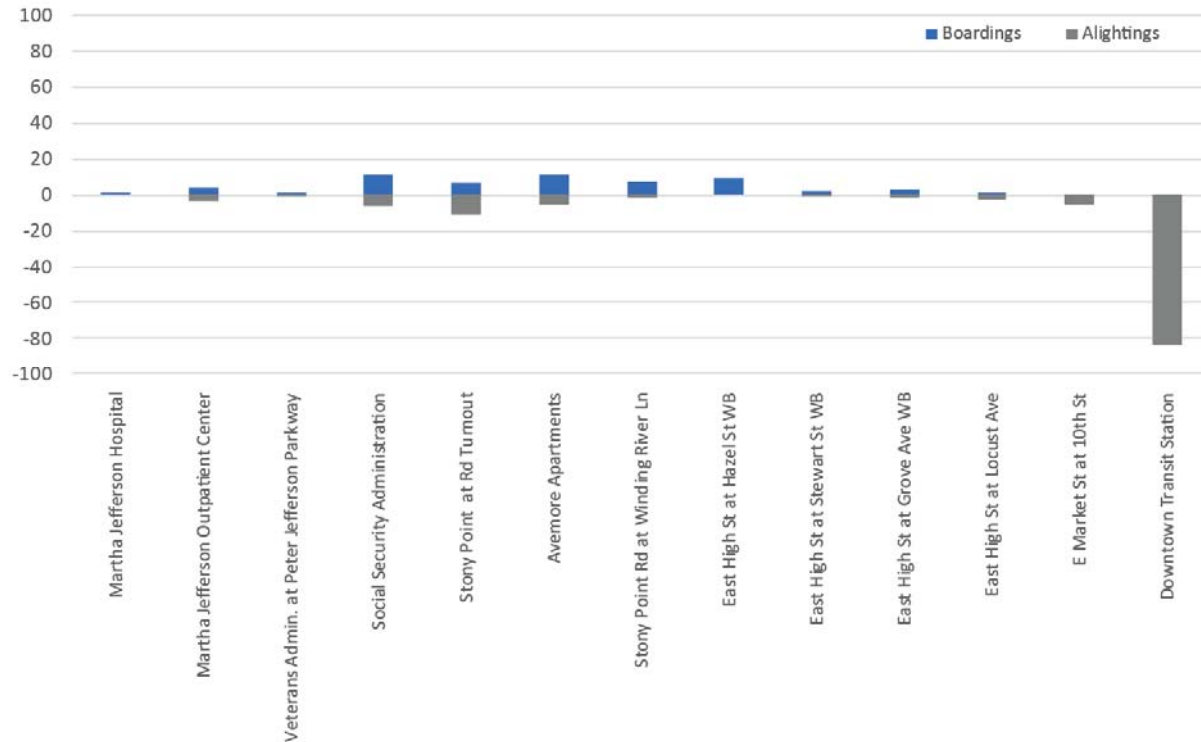


Figure 126 | Route 10 Weekday Boardings and Alightings by Stop: Westbound



Ridership by Trip

Figure 127 (eastbound) and **Figure 128** (westbound) show the boardings and maximum load for each trip per direction over the course of a typical weekday. No Route 10 trips exceed a maximum load of 32 passengers, the seating capacity for the 35ft. transit buses typically assigned to this route. Ridership activity is generally higher in the eastbound direction, especially during the midday period. Maximum loads exceed boardings in westbound direction as many westbound passengers board on the previous eastbound trip and stay on the bus as it returns westbound.

Figure 127 | Route 10 Weekday Ridership per Trip: Eastbound

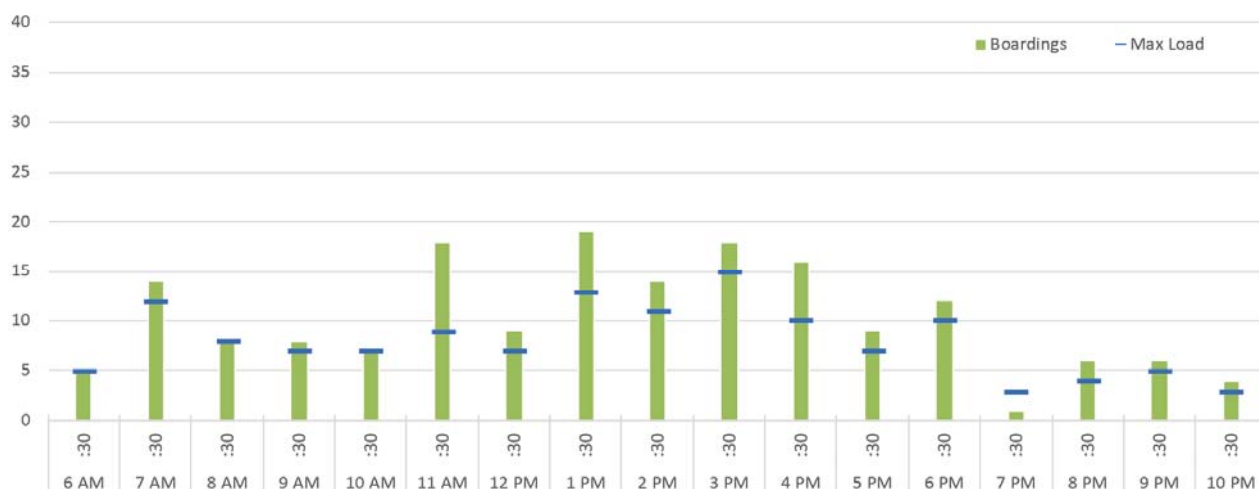
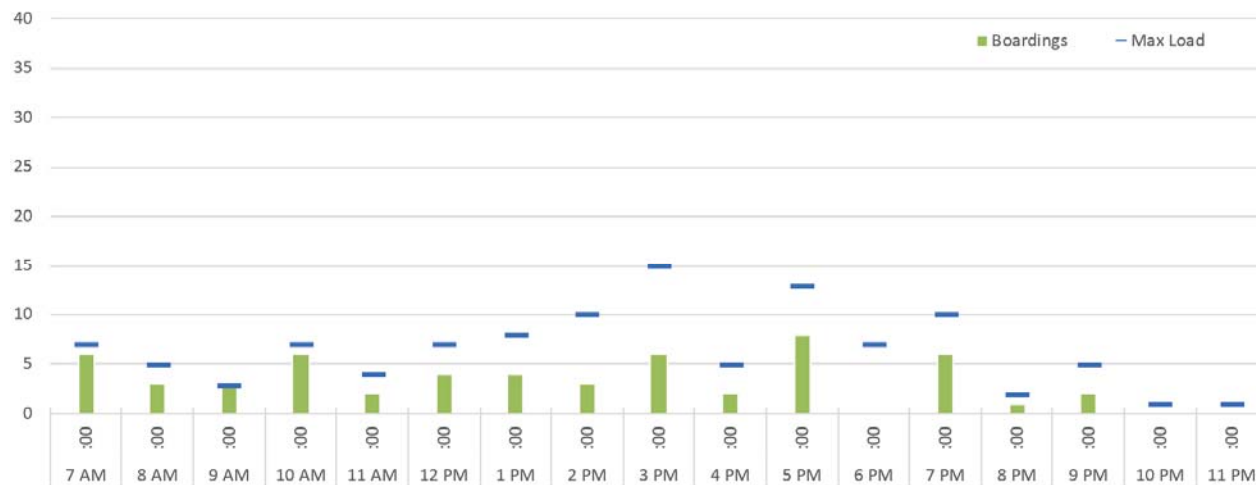


Figure 128 | Route 10 Weekday Ridership per Trip: Westbound



9.10.5. Summary of Observations

Strengths

- Only route with direct service to several key regional destinations, including Sentara Martha Jefferson Hospital, the VA Medical Center, and Social Security Administration
- Strong on-time performance
- Easy-to-remember clock-face frequency
- Extensive weekday span of service (6:30 AM – 11:27 PM)
- Multiple connection opportunities in downtown Charlottesville

Weaknesses

- Service along Stoney Point Road available in the westbound direction only, requiring out-of-direction travel for residents of the Avemore Apartments and potentially confusing prospective riders
- Above-average cost per passenger trip
- Very low ridership after 10:00 PM
- Difficult operating environment for transit due to heavily automobile-oriented land-use

Opportunities

Potential opportunities to strengthen Route 10 are listed below. Some suggestions may be contradictory, as there is usually more than one approach to improving a route.

- **Establish secondary hub at Pantops Shopping Center.** While west Charlottesville is a destination-rich environment, its land-use and roadway network makes it very difficult to effectively connect all the destinations with a single route. Establishing a secondary or mini-hub at Pantops Shopping Center could allow CAT to develop a network of shorter routes offering bi-directional service to and from the hub. For example, one route could serve Stoney Point Road and the Avemore Apartments; one could serve Pantops Drive, Sentara Martha Jefferson Hospital, and the VA Medical Center; and one could serve Rivanna Ridge Shopping Center, the DMV, and the Social Security Administration office. Relatively frequent service

between the Pantops Shopping Center and downtown would minimize the inconvenience of a transfers at a potential mini-hub at the shopping center.

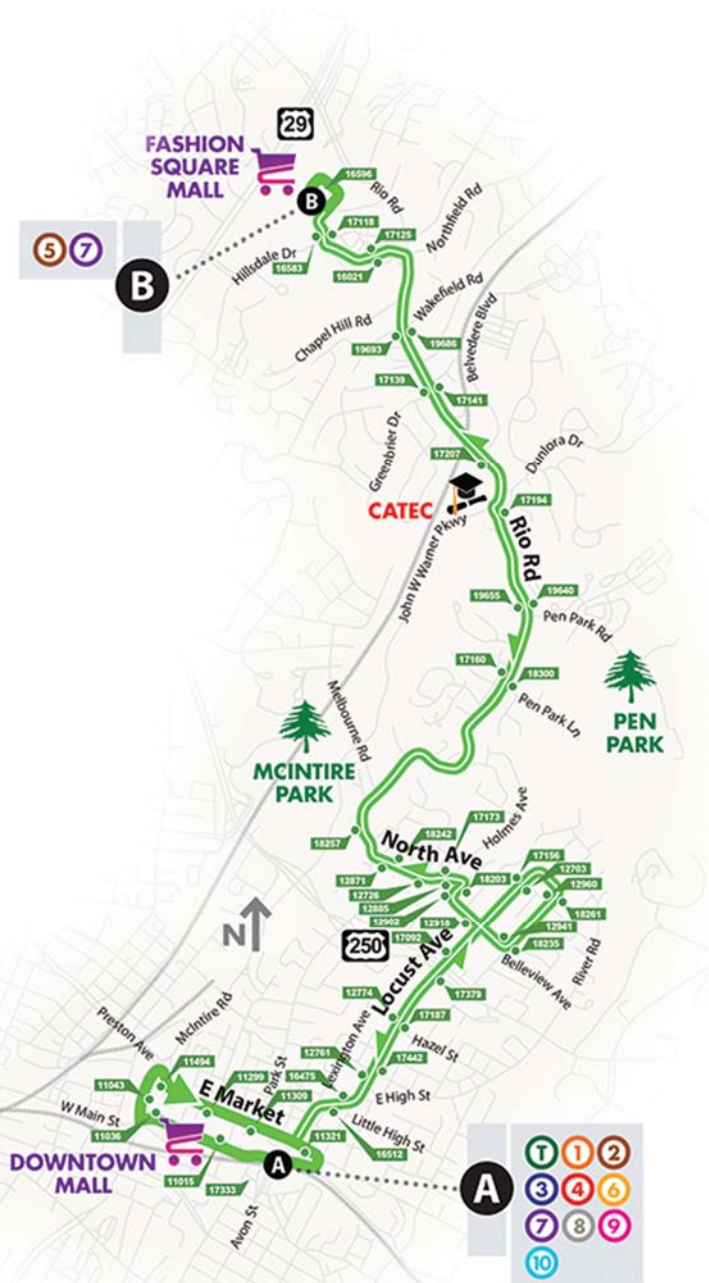
- **End service earlier.** Route 10 ridership drops off after 10:00 PM. Ending service earlier would improve the route's over-all productivity. Stopping service in the 10:00 hour would eliminate several unproductive trips while still maintaining an extensive span of service.

9.11. ROUTE 11: LOCUST AVENUE & RIO ROAD

9.11.1. Service Description

Route 11 (**Figure 129**) operates Monday through Saturday between Fashion Square Mall and downtown Charlottesville, via the Charlottesville- Albemarle Technical Education Center (CATEC). The route travels primarily along Rio Road, North Avenue, and Locust Avenue. Passengers may transfer to other CAT routes at the Downtown Transit Station and Fashion Square Mall. All Route 11 trips operate along the route's full alignment.

Figure 129 | Route 11 Map



9.11.2. Operating Characteristics

Table 9-21 summarizes operating characteristics for Route 11. The route operates hourly on weekdays and Saturdays. At \$314,972 per year, Route 11 has the ninth-highest operating cost among all CAT routes. Route 11 offers connections to all other weekday CAT routes, and serves several activity generators, including downtown Charlottesville, the Charlottesville-Albemarle Technical Education Center, McIntire and Pen Parks, and Fashion Square Mall.

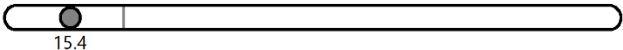
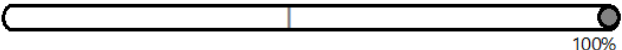
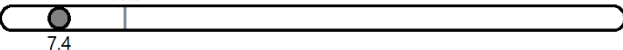
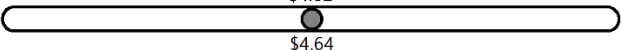
Table 9-21 | Route 11 Operating Characteristics

Destination	From		Fashion Square Mall
	To		Downtown Transit Station
Span	Weekday		6:00 AM – 9:27 PM
	Saturday		6:00 AM – 6:27 PM
	Sunday		--
Frequency	Weekday	Peak	60
		Off-Peak	60
	Saturday		60
	Sunday		--
Annual Operating Costs			\$314,972
Route Connections			1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, Trolley
Key Destinations			Downtown Mall, Downtown Transit Station, CATEC, Fashion Square Mall

9.11.3. Weekday Service Productivity

Route 11 ranks seventh in terms of passengers per hour (15.4) and eighth in passengers per trip (7.4). Notably, Route 11 was the only CAT route with a 100 percent on-time performance rate during the survey period. At \$4.64 per passenger trip, Route 11 has the system's sixth-highest operating cost per passenger. **Table 9-22** summarizes service productivity metrics for Route 11.

Table 9-22 | Route 11 Weekday Service Productivity Metrics

Passengers per Hour	On-Time Performance
<p>Average 20.8</p>  <p>15.4</p>	<p>Average 82%</p>  <p>100%</p>
Passengers per Trip	Operating Cost per Passenger
<p>Average 11.5</p>  <p>7.4</p>	<p>Average \$4.62</p>  <p>\$4.64</p>



9.11.4. Ridership

Route 11 averages 229 passengers per weekday (ranking ninth) over 31 trips, and 162 passengers per Saturday (ranking seventh) over 25 trips. The route ranks ninth in annual ridership (61,170 riders).

Ridership by Stop

Figure 130 and **Figure 131** summarize weekday boardings and alightings by stop in the northbound direction. Ridership activity is highest in downtown Charlottesville, at Fashion Square Mall and near the Treesdale Apartments on Rio Road. All other stops are very lightly used.

Figure 132 and **Figure 133** summarize weekday ridership activity in the southbound direction. Ridership activity in this direction essentially mirrors the northbound trend.

Figure 130 | Route 11 Weekday Ridership by Stop: Northbound

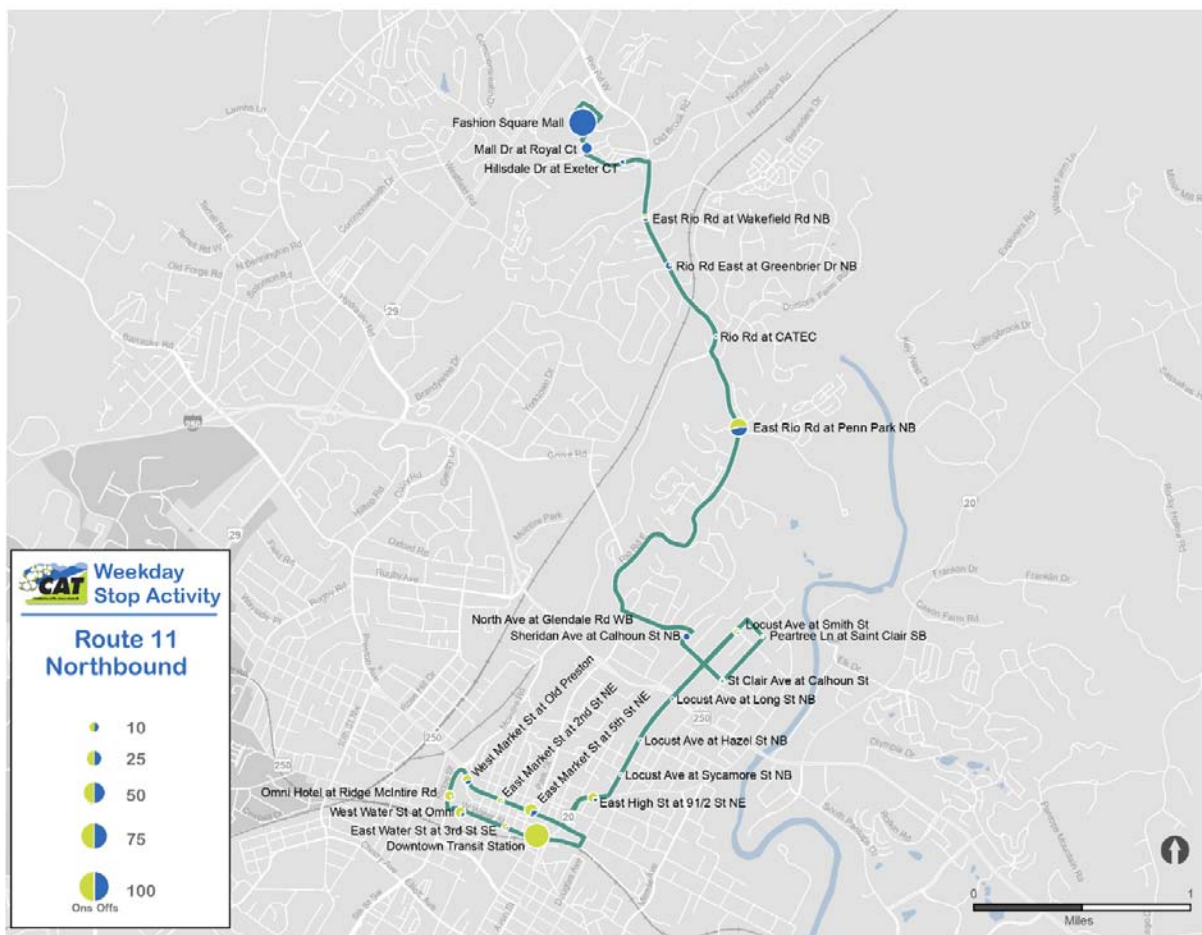


Figure 131 | Route 11 Weekday Boardings and Alightings, by Stop: Northbound

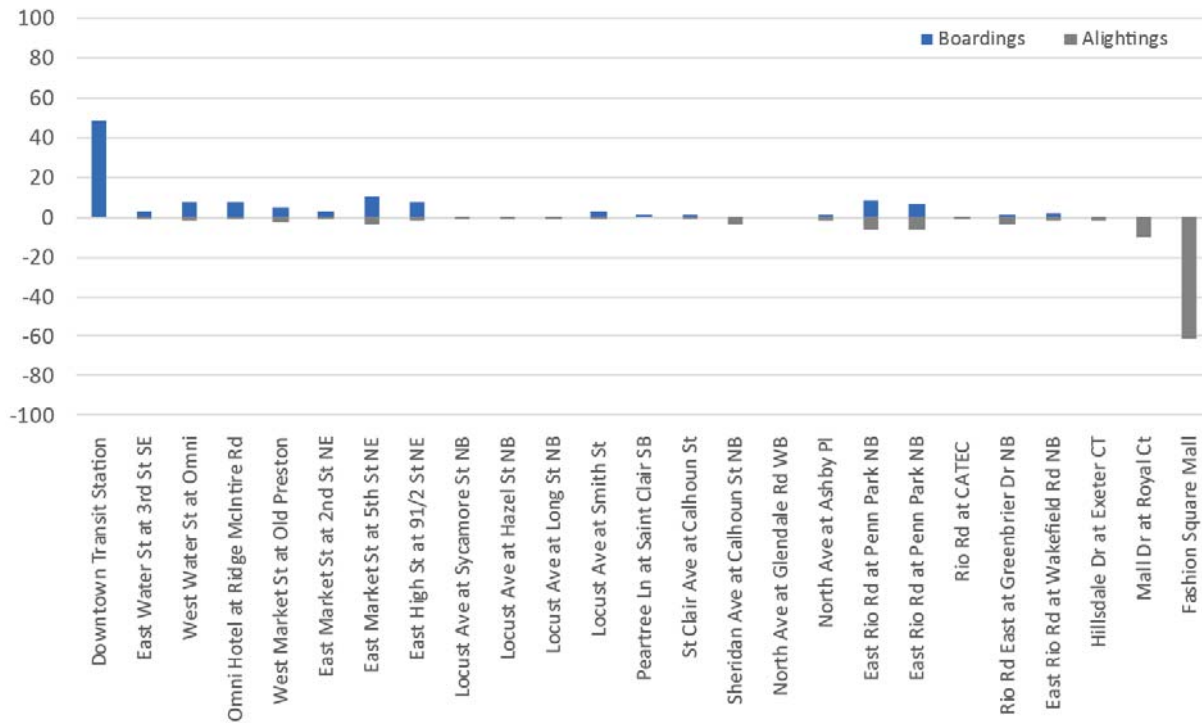


Figure 132 | Route 11 Weekday Ridership by Stop: Southbound

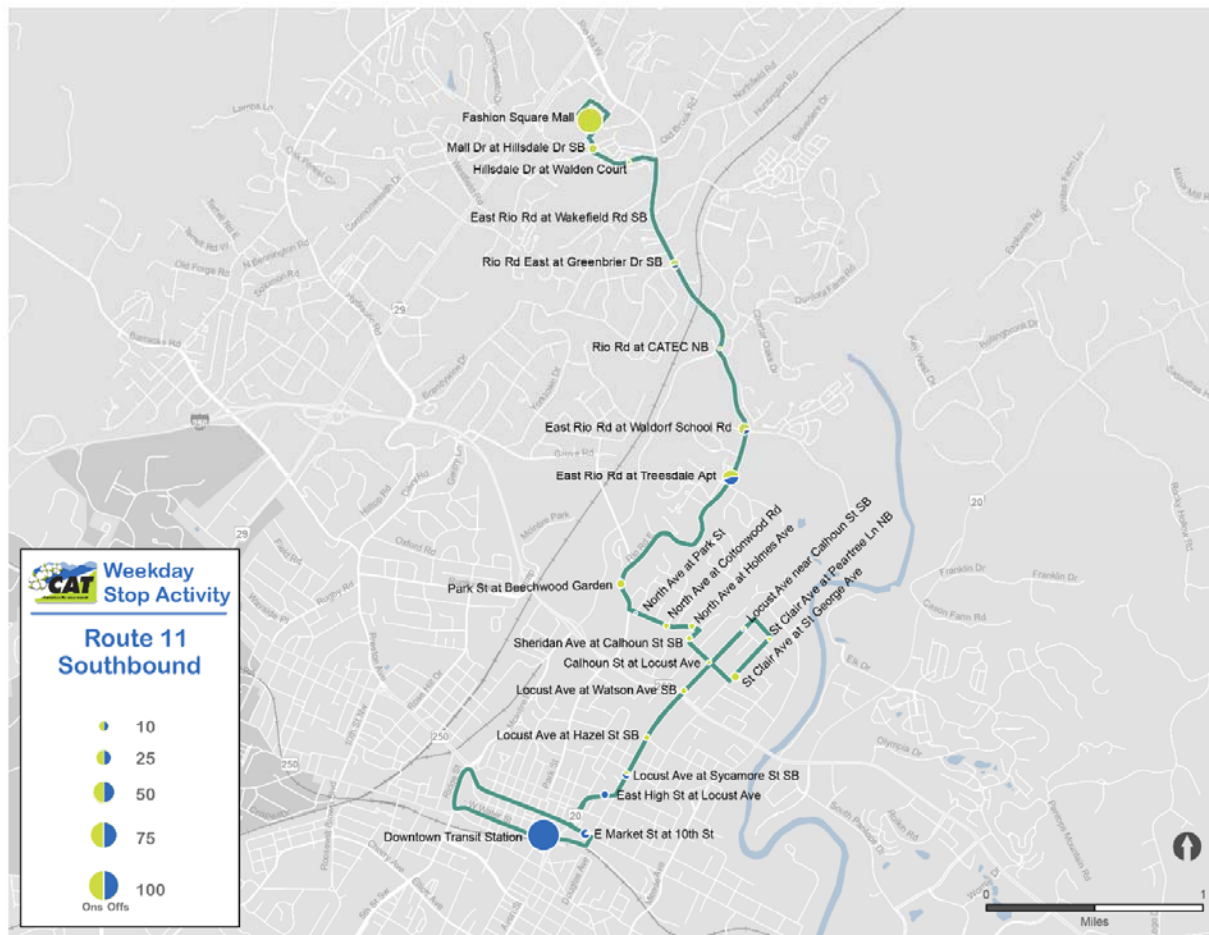
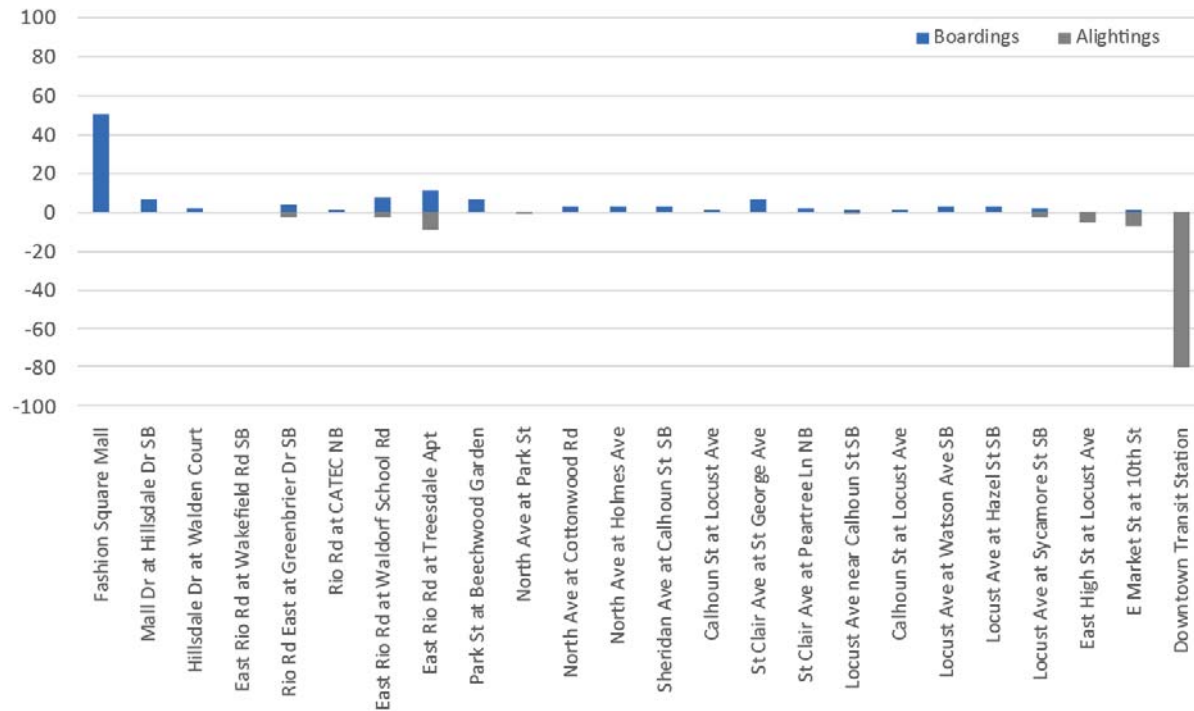


Figure 133 | Route 11 Weekday Boardings and Alightings by Stop: Southbound



Ridership by Trip

Figure 134 (northbound) and **Figure 135** (southbound) show the boardings and maximum load for each trip per direction over the course of a typical weekday. No Route 11 trips exceed a maximum load of 26 passengers, the seated capacity of the 30ft. coaches typically operated on this route. Route activity is fairly evenly split in both directions, reaching a peak during the 5:00 PM hour (northbound) and 8:00 AM hour (southbound).

Figure 134 | Route 11 Weekday Ridership per Trip: Northbound

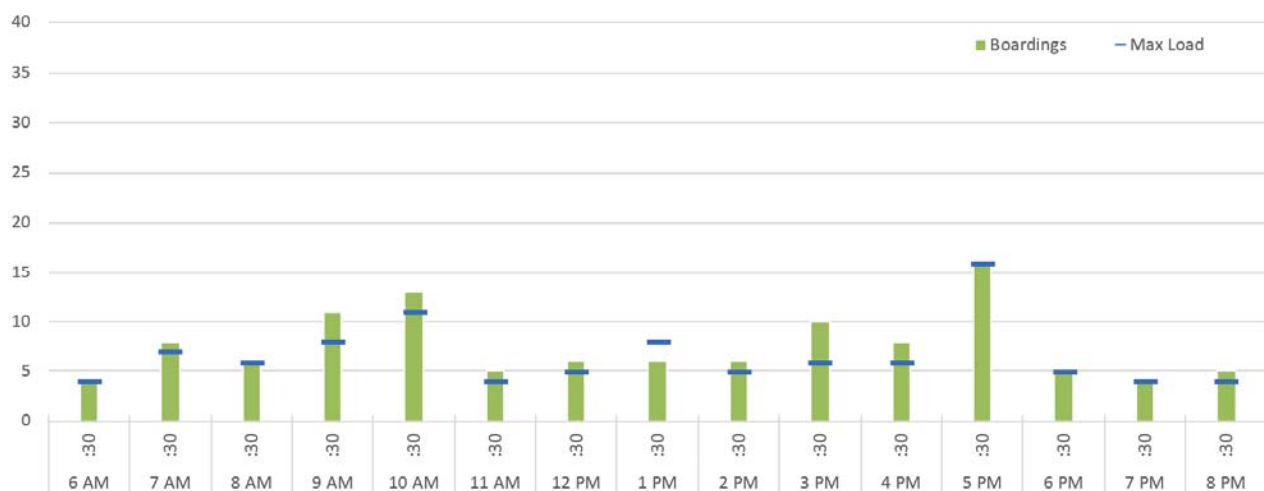
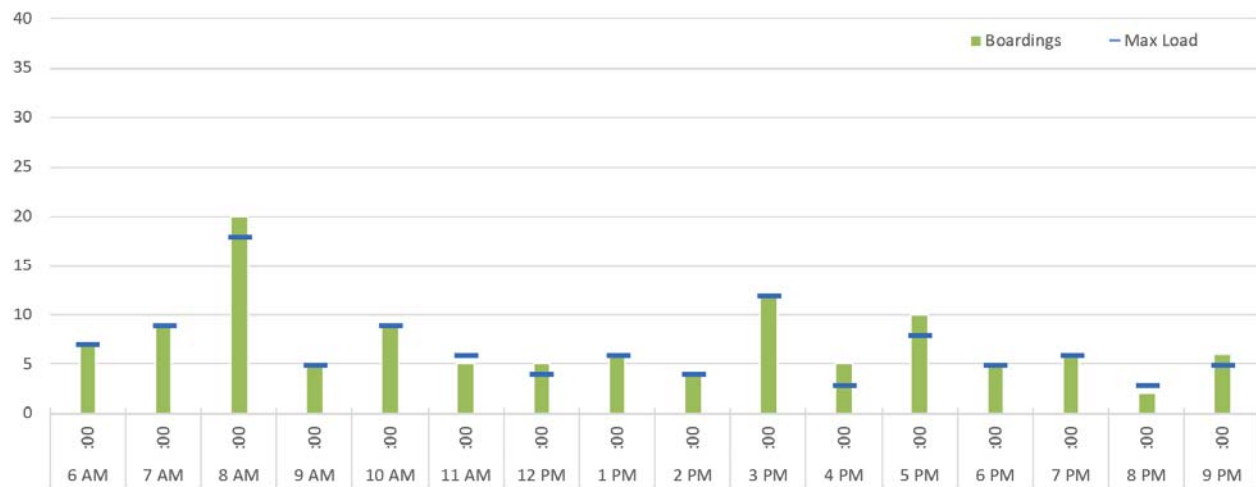


Figure 135 | Route 11 Weekday Ridership per Trip: Southbound



9.11.5. Summary of Observations

Strengths

- Only route with direct service to CATEC
- Very strong on-time performance
- Easy-to-remember clock-face frequency
- Multiple connection opportunities in downtown Charlottesville and at Fashion Square Mall

Weaknesses

- No direct access to grocery stores
- Relatively low overall ridership
- Below-average productivity in terms of passengers per trip and passengers per revenue hour

Opportunities

Potential opportunities to strengthen Route 11 are listed below. Some suggestions may be contradictory, as there is usually more than one approach to improving a route.

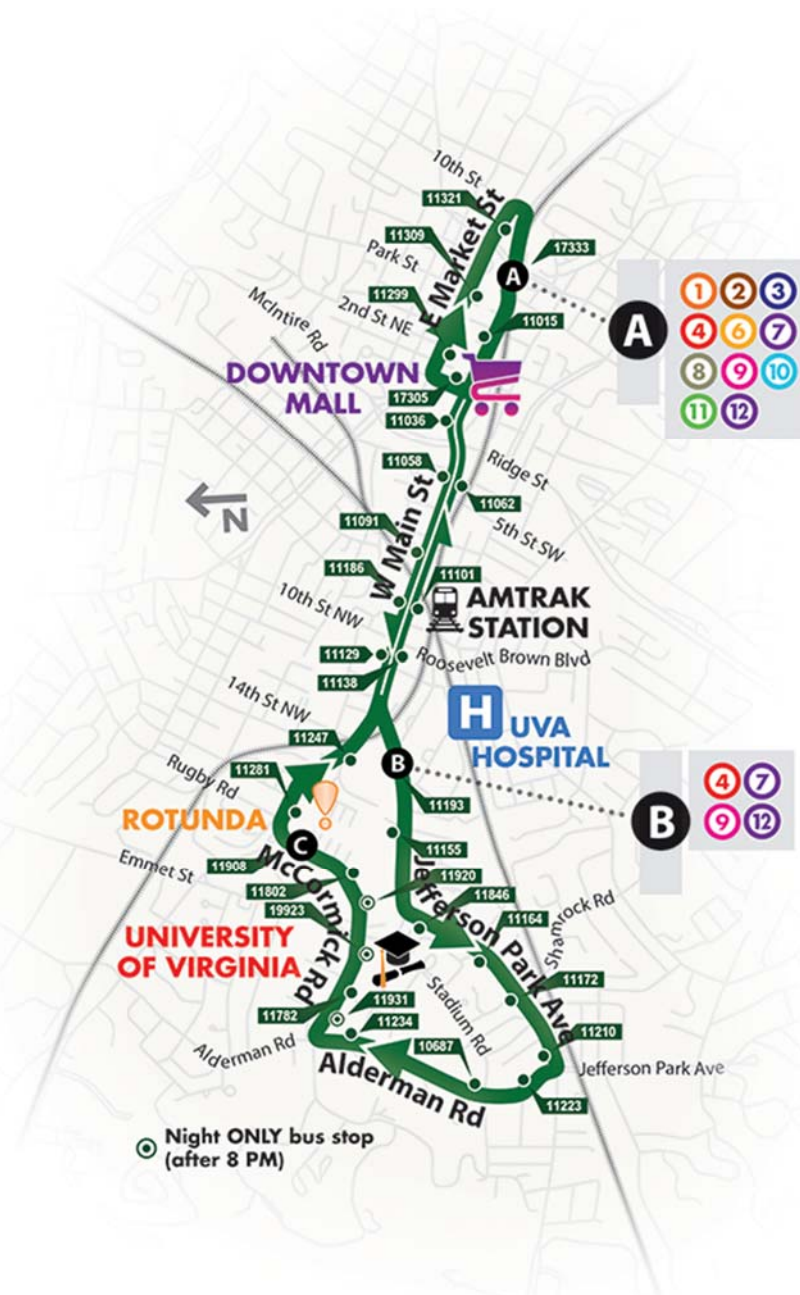
- **Extend route to Walmart.** Route 11 serves a number of apartment complexes and other residential communities along its alignment. It does not however provide these residents with convenient access to grocery stores. It does serve Fashion Square Mall, but non-grocery retail trips tend to occur less often than grocery shopping and thus account for fewer transit trips. Extending Route 11 to Walmart (as well as Kroger on Berkmar Drive) will give the route a better mix of origins and destinations and will likely result in higher ridership.
- **Streamline route.** Route 11 includes a mid-route loop serving Locust Avenue, Peartree Lane, St. Clair Avenue, and Calhoun Street. This loop adds travel time to the route but generates very little ridership. Eliminating the loop could make the route more attractive to most current and prospective riders by making the route more direct to key destinations.

9.12. FREE TROLLEY: W MAIN STREET & UVA

9.12.1. Service Description

CAT's Free Trolley (**Figure 136**) connects downtown Charlottesville with the University of Virginia seven days a week. The route travels primarily along W. Main Street, Jefferson Park Avenue, Alderman Road, and McCormick Road. Passengers may transfer to other services at the Downtown Transit Station and UVA Hospital. Excluding the final weekday and Saturday trip, which run from the Downtown Transit Station to UVA Hospital only, all Trolley trips operate along the route's full alignment. As shown in **Figure 136** several trolley stops are provided only after 8:00 PM.

Figure 136 | Trolley Map



9.12.2. Operating Characteristics

Table 9-23 summarizes operating characteristics for the Free Trolley. On weekdays and Saturdays, the route operates on a 15-minute frequency. On Sundays, service is provided every 20 to 25 minutes. At \$1,337,695 per year, the Free Trolley has the second-highest operating cost among all CAT routes. The Trolley offers connections to all other CAT routes except for Route 5.

Table 9-23 | Trolley Operating Characteristics

Destination	From		Downtown Transit Station
	To		UVA
Span	Weekday		6:35 AM – 11:30 PM
	Saturday		6:35 AM – 11:30 PM
	Sunday		8:00 AM – 5:47 PM
Frequency	Weekday	Peak	15
		Off-Peak	15
	Saturday		15
	Sunday		20/25
Annual Operating Costs			\$1,337,695
Route Connections			1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12
Key Destinations			Downtown Mall, Downtown Transit Station, UVA Hospital, UVA Campus

9.12.3. Weekday Service Productivity

The Trolley is CAT's highest ridership service. It ranks first in passengers per hour (70.5) and passengers per trip (41.7). However, the Trolley's on-time performance rate is 70 percent (23 percent early and seven percent late), ranking ninth and well below the weekday system average. Finally, at \$1.46 per passenger trip, the Trolley is the least expensive service per rider that CAT operates.

Table 9-8 summarizes the weekday service productivity metrics for the Free Trolley.

Table 9-24 | Weekday Trolley Service Productivity Metrics

Passengers per Hour	On-Time Performance
<p>Average 20.8</p> <p>70.5</p>	<p>Average 82%</p> <p>70%</p>
Passengers per Trip	Operating Cost per Passenger
<p>Average 11.5</p> <p>41.7</p>	<p>Average \$4.62</p> <p>\$1.46</p>

9.12.4. Ridership

The Trolley averages 2,838 passengers per weekday (ranking first) over 68 trips; 1,297 passengers per Saturday (ranking second) over 68 trips; and 707 passengers per Sunday (ranking first) over 24 trips. The route ranks first in annual ridership (737,714 riders).

Ridership by Stop

Figure 137 and **Figure 138** summarize weekday boardings and alightings by stop. Ridership activity on the Trolley is very strong at virtually every stop.

Transit Development Plan

FY 2019 – FY 2028

Figure 137 | Trolley Ridership by Stop

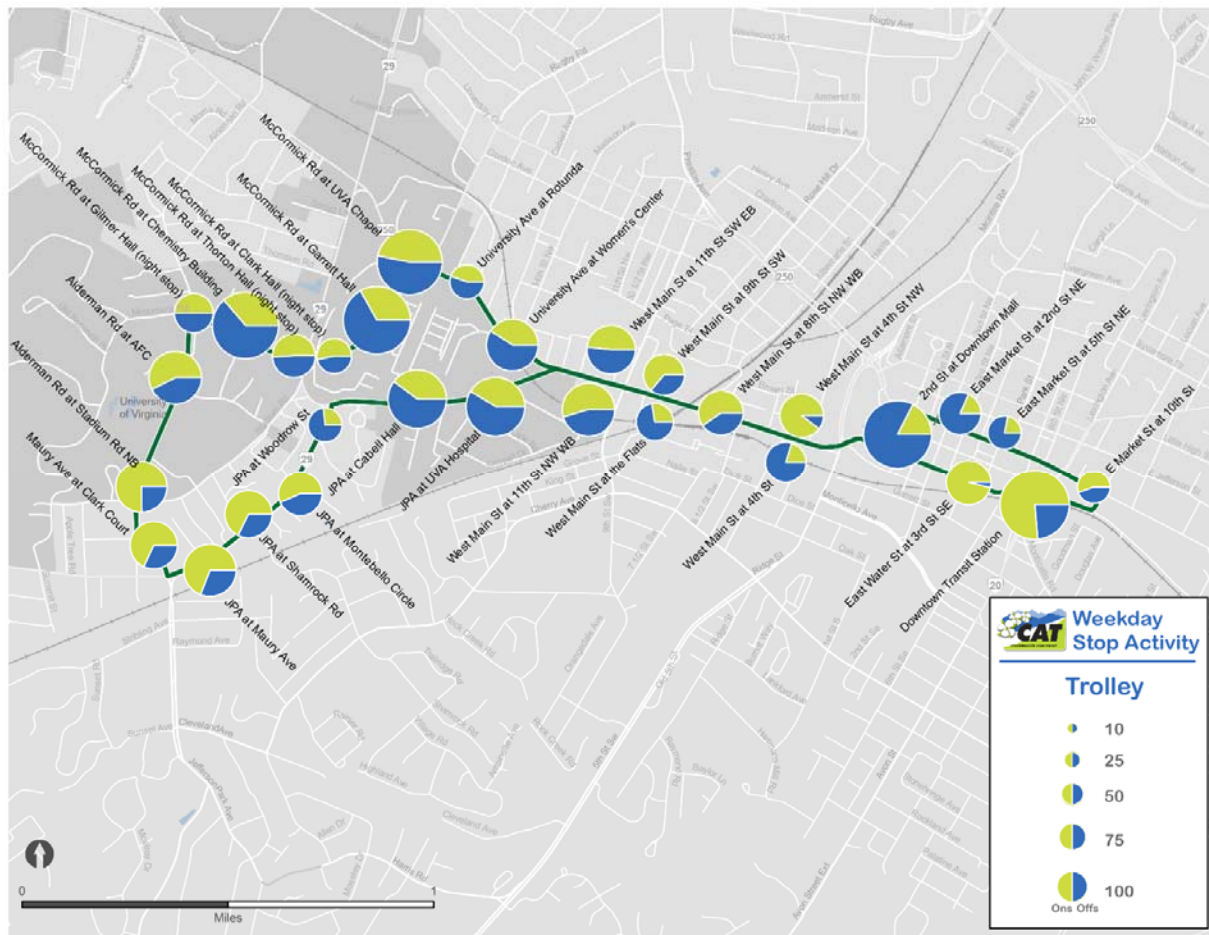
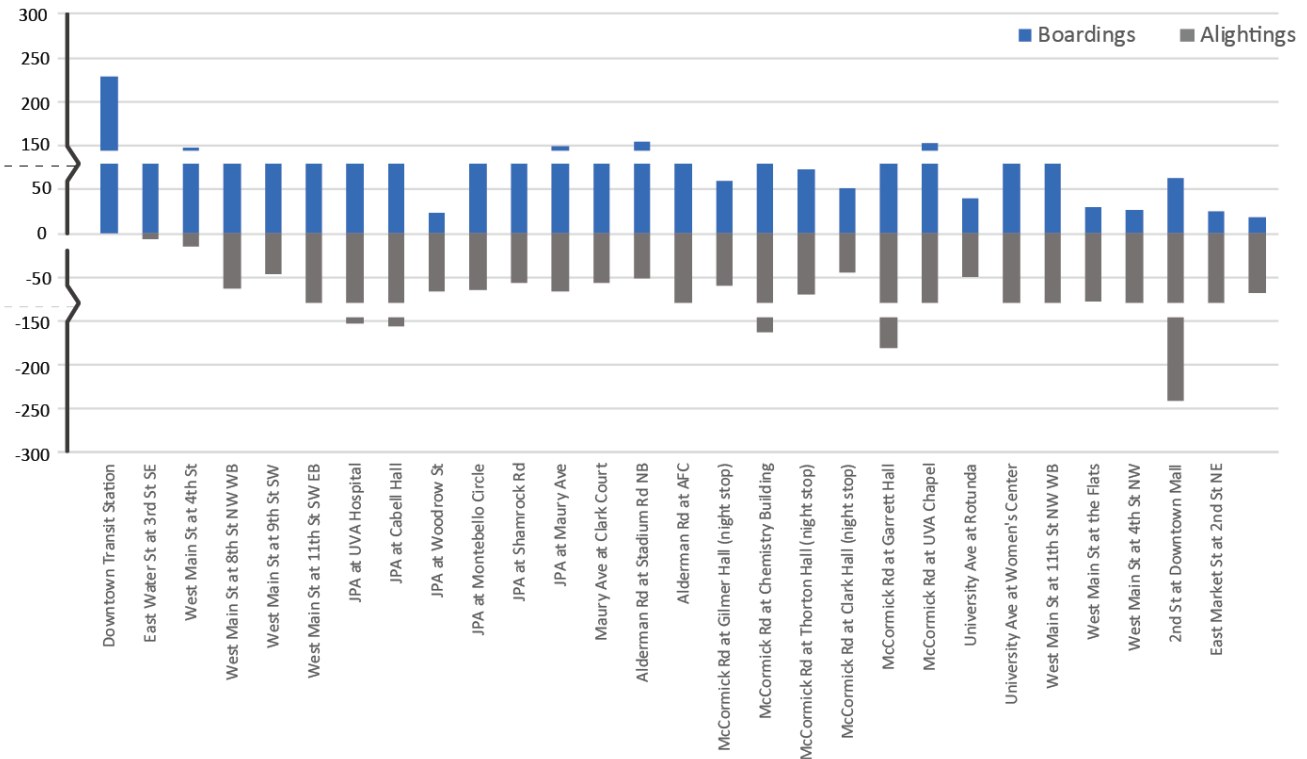


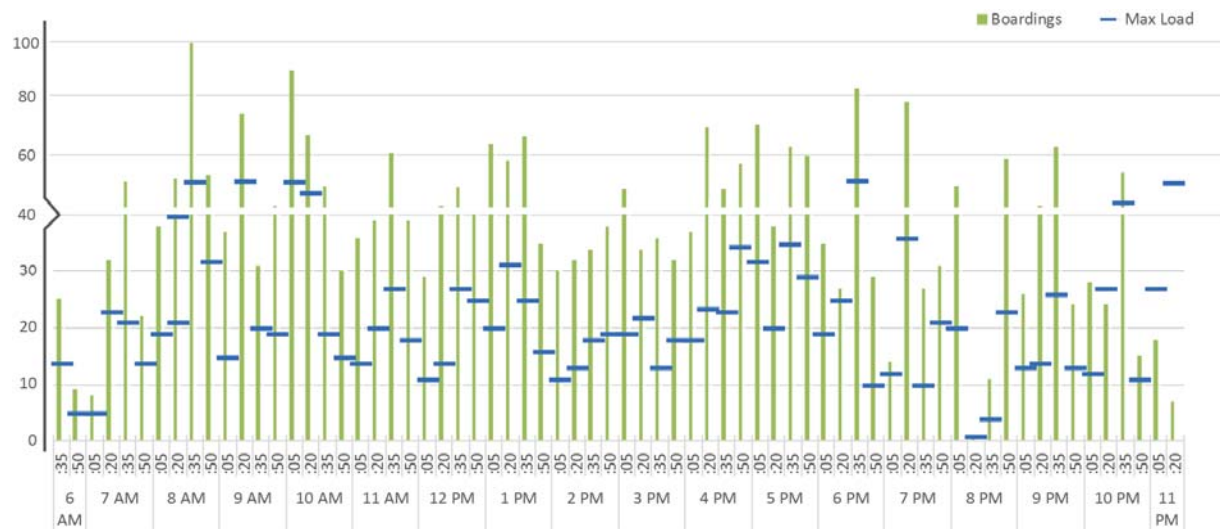
Figure 138 | Trolley Boardings and Alightings, by Stop



Ridership by Trip

Figure 139 summarizes the weekday boardings and maximum load for each trip per direction over the course of a service day. Both 35- and 30ft. vehicles are assigned to the Trolley route. During the survey period, Trolley trips exceed a maximum load of 32 passengers on 11 occasions. One trip reached a maximum load of 75 passengers. This suggests that standing loads occur on a regular basis on this route.

Figure 139 | Trolley Ridership per Trip



9.12.5. Summary of Observations

Strengths

- Provides fast and frequent connections between the system's main ridership generators.
- Very high ridership and productivity
- Easy-to-remember clock-face frequency
- Extensive weekday and Saturday span of service (6:35 AM – 11:30 PM)
- Seven-day-a-week service
- Multiple connection opportunities in downtown Charlottesville and at UVA Hospital

Weaknesses

- Poor on-time performance
- Frequent standing loads and overcrowded trips

Opportunities

Potential opportunities to strengthen the Free Trolley are listed below. Some suggestions may be contradictory, as there is usually more than one approach to improving a route.

- **Add one more peak vehicle to the service.** CAT's Free Trolley is a popular route with frequent service. However, the combination of a congested operating environment and high ridership activity results in poor on-time performance. The addition of one more peak vehicle could both increase the route's peak frequency and allow for more recovery time to ensure that on-time performance issues on one trip do not impact subsequent trips.
- **Coordinate with City and property owners to implement transit-priority treatments along W. Main Street.** The W. Main Street corridor links together Charlottesville's two primary economic and activity hubs. CAT's two busiest routes carry over a million passengers a year through the corridor and contribute greatly to its vitality. However, both routes have poor on-time performance, in part because of competition with other vehicles in the corridor. A number of transit priority treatments could be considered to improve the speed and reliability of transit service along the corridor. This includes signal prioritization at intersections and dedicated lanes for transit vehicles. While it is likely not possible to include a dedicated transit lane along the entire length of W. Main Street, between downtown and UVA, much of the corridor does have on-street parking. If on-street parking is removed entirely from W. Main Street, or staggered so that it is allowed on one side of the street for one block and then then the other side of the street for the next bloc, enough space could likely be freed up to install a transit-only lane. A dedicated transit lane would not only improve on-time performance for the Trolley, it could also contribute to the rebranding of Route 7 as a BRT service, as discussed previously.

10

Appendix

x C: Impact Calculation Factors

10.1. SHORT-TERM IMPACT FACTORS

Table 10-1 | Weekday Ridership Estimate Impact Factors: Short-Term

	Impact Factor & Original Coefficient				
	Increase Frequency	Straighten Route/More Direct	Establish Repeating Headways	Establish Clock-Face Headways	Decrease Frequency
	0.5	0.1	0.02	0.03	-0.5
Proposed Route	Multiplier:				
1A	--	1	--	--	--
1B	--	1	--	--	--
2	--	2	--	--	0.5
3	--	--	--	--	--
4	0.5	--	--	1	0.5
5	--	--	--	--	--
6	--	--	--	--	--
7	--	2	--	--	0.5
9	1	1	--	1	--
10	0.5	2	--	--	--
11	--	1	--	--	--
T	--	--	--	--	--

Table 10-2 | Saturday Ridership Estimate Impact Factors: Short-Term

	Impact Factor & Original Coefficient				
	Increase Frequency	Straighten Route/More Direct	Establish Repeating Headways	Establish Clock-Face Headways	Decrease Frequency
	0.5	0.1	0.02	0.03	-0.5
Proposed Route	Multiplier:				
1A	2	--	--	--	--
1B	2	--	--	--	--
2	--	2	--	--	1
3	--	--	--	--	--
4	1	--	--	1	--
5	--	--	--	--	--
6	--	--	--	--	--
7	--	2	1	--	--
9	1	1	--	1	--
10	--	2	--	--	--



11	--	1	--	--	--
T	--	--	--	--	--

Table 10-3 | Sunday Ridership Estimate Impact Factors: Short-Term

	Impact Factor & Original Coefficient				
	<i>Increase Frequency</i>	<i>Straighten Route/More Direct</i>	<i>Establish Repeating Headways</i>	<i>Establish Clock-Face Headways</i>	<i>Decrease Frequency</i>
	0.5	0.1	0.02	0.03	-0.5
Proposed Route	<i>Multiplier:</i>				
2	--	2	--	--	1
7	1	1	--	--	--
10	2	--	--	--	--
T	--	--	1	1	--

10.2. MID-TERM IMPACT FACTORS

Table 10-4 | Weekday Ridership Estimate Impact Factors: Mid-Term

	Impact Factor & Original Coefficient				
	<i>Increase Frequency</i>	<i>Straighten Route/More Direct</i>	<i>Establish Repeating Headways</i>	<i>Establish Clock-Face Headways</i>	<i>Decrease Frequency</i>
	0.5	0.1	0.02	0.03	-0.5
Proposed Route	<i>Multiplier:</i>				
1A	0.5	--	--	--	--
1B	0.5	--	--	--	--
2	--	--	--	--	--
3	--	--	--	--	--
4	0.5	--	--	--	--
5	0.5	--	--	--	--
6	--	--	--	--	--
7	--	--	--	--	--
9	0.5	--	--	--	--
10	--	--	--	--	--
11	0.5	--	--	--	--
T	0.5	--	--	--	--