2022 TRANSIT DEVELOPMENT PLAN

RAPID CITY

Draft Date: November 30, 2021

RTS RAPID TRANSIT SYSTEM

RAPID CITY AREA Metropolitan Planning Organization

SRF

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PART 1: INTRODUCTION

Introduction

Rapid Transit System

As a department of the City of Rapid City, Rapid Transit System (RTS) offers fixed route bus service and Americans with Disabilities Act (ADA) complementary paratransit within city limits. Fixed-route service has been branded as Rapid Ride and paratransit as Dial-a-Ride. In 2019, RapidRide provided more than 400,000 passenger trips and Dial-a-Ride approximately 78,000 trips, using a fleet of 37 buses. Since the initiation of the Youth Ride Free Campaign in 2016, a substantial number of trips have served youth under 18 – amounting to more than 340,000 in total.

Project Purpose and Scope

RTS and the Rapid City Area Metropolitan Planning Organization (RCAMPO) developed this Transit Development Plan (TDP) to provide strategic guidance for a sustainable transit system to serve the community. The TDP will also serve as the basis for the transit element of the regional transportation plan.

The overall desired outcome for the TDP is to provide a public transit system that offers travel options to residents, employees and visitors who cannot or choose not to drive. Other outcomes for the TDP are to:

- Improve the efficiency of the existing service
- Assess opportunities to serve areas where requests for service have been received through other public involvement programs
- Meet needs expected from future regional growth
- Develop operating and capital cost estimates to serve future growth areas

The project scope includes the following:

- Identification of issues
- Service evaluation, including performance indicator evaluation and comparison with peer agencies
- Development of recommended fixed-route service plans
- Exploration of additional service concepts as warranted
- Development of a capital asset plan

Project Team

The TDP project team was led by the Long-Range Planner at RCAMPO and by the Transit Manager at RTS. Staff from SRF Consulting provided technical expertise and content creation. A Study Advisory Team (SAT) met periodically over the course of the project to provide input and oversight. The SAT included representatives from Rapid City Schools, City of Rapid City, Rapid City Common Council, South Dakota Department of Transportation (SDDOT), and the Federal Transit Administration (FTA).

Transit System Overview

Fixed-Route Service

Rapid Transit System operates six regular fixed routes on weekdays and Saturdays. Each of the six routes consists of two alternating loops, described below and illustrated in Figure 2 (page 6).

Each loop begins and ends at the Milo Barber Transportation Center (MBTC) in downtown Rapid City. RTS uses a pulse system, with all six buses scheduled to depart together at 35-minute intervals. The agency term for a run beginning at a given time is a "lap." On weekdays, the first lap departs at 6:20 AM and the last lap departs at 5:25 PM. On Saturdays, the first lap departs at 9:50 AM and the last lap departs at 4:15 PM. Upon return to MBTC, there is a layover time of 7 to 10 minutes between laps.

Routes

The Borglum route serves Rapid City's Westside, including Oyate Health Center, West Middle School, Canyon Lake Senior Citizens Center, and West Family Fare. The West Main Street loop runs along West Main and Canyon Lake Drive, while the Jackson Boulevard loop travels primarily on Canyon Lake Drive and Jackson Boulevard. Stevens High School and Black Hills Works are served via a scheduled deviation twice a day.

The Coolidge route has two generally non-overlapping loops. The Northbound loop serves Wal-mart North, Rushmore Crossing, multiple schools, and (on request) the Community Health Center. The Southbound loop travels along 5th Street, Parkview Drive, Elm Avenue, Fairmont Boulevard, and Mount Rushmore Road. It is the only route serving Wal-Mart South (on request).

The Jefferson route's Southeast loop runs along St. Patrick Street, Cambell Street, and East North Street, with service to the South Dakota School of Mines. The Northeast Loop provides opposite-direction service on Cambell and portions of East North, but travels along St. Joseph Street rather than 5th and St. Patrick. It also extends further north to Knollwood Drive, serving Oglala Lakota College and Knollwood Heights Elementary.

The Lincoln route has two non-overlapping loops. The Northbound loop travels north on 5th Street to Disk Drive, North LaCrosse Street, and Mount Rushmore Road, serving Rushmore Mall, the Social Security Administration, and Central High School. The Southbound loop travels south on Mount Rushmore Road and serves Monument Health, the VA clinic, South Middle School, and Robbinsdale Elementary School.

The Roosevelt route provides service that largely overlaps with at least one other route. Its Northeast loop serves the Roosevelt Park Ice Arena, several schools, and the Rushmore Mall. Its Southeast loop serves the YMCA, Monument Health, and the Star Village apartment complex.

The Washington route provides entirely overlapping service with other routes, via its Southbound loop on 5th Street, East Minnesota Street, and Elm Avenue, and via its Northbound loop on North Lacrosse Street, Disk Drive, and Haines Avenue. Key destinations include Monument Health and Rushmore Mall.

Until recently, RTS provided tripper service. For the past several years, St. Elizabeth Seton Elementary School and Southwest Middle School have been served by morning and afternoon runs roughly following the Borglum route. A pre-pandemic shopping tripper made two Friday runs between low-income housing and Wal-Mart South, roughly following the Coolidge route. As of autumn 2021, all trippers were suspended due to operator shortages.

Figure 1: Waiting to Board at Milo Barber Transportation Center

Dial-A-Ride

Door-to-door paratransit service is available to residents of Rapid City whose disability prevents them from using the fixed-route bus system. This ADA complementary paratransit service is available from 6:20 AM to 5:30 PM on weekdays and from 8:00 AM to 5:40 PM on Saturdays. Trips can be scheduled from 14 days before the trip to 3:30 PM on the preceding day. The service is available anywhere within city limits, although there is an extra charge for trips starting or ending more than three-quarters of a mile away from fixed routes.

City View Trolley

In the summer months, a tourist-oriented trolley service offers narrated tours of local points of interest. It operates Monday through Saturday, June through August, with the first hourly run departing MBTC at 10:00 AM and the last at 4:00 PM. The route includes museums, parks, and other sites of interest, primarily in downtown Rapid City and the Westside.

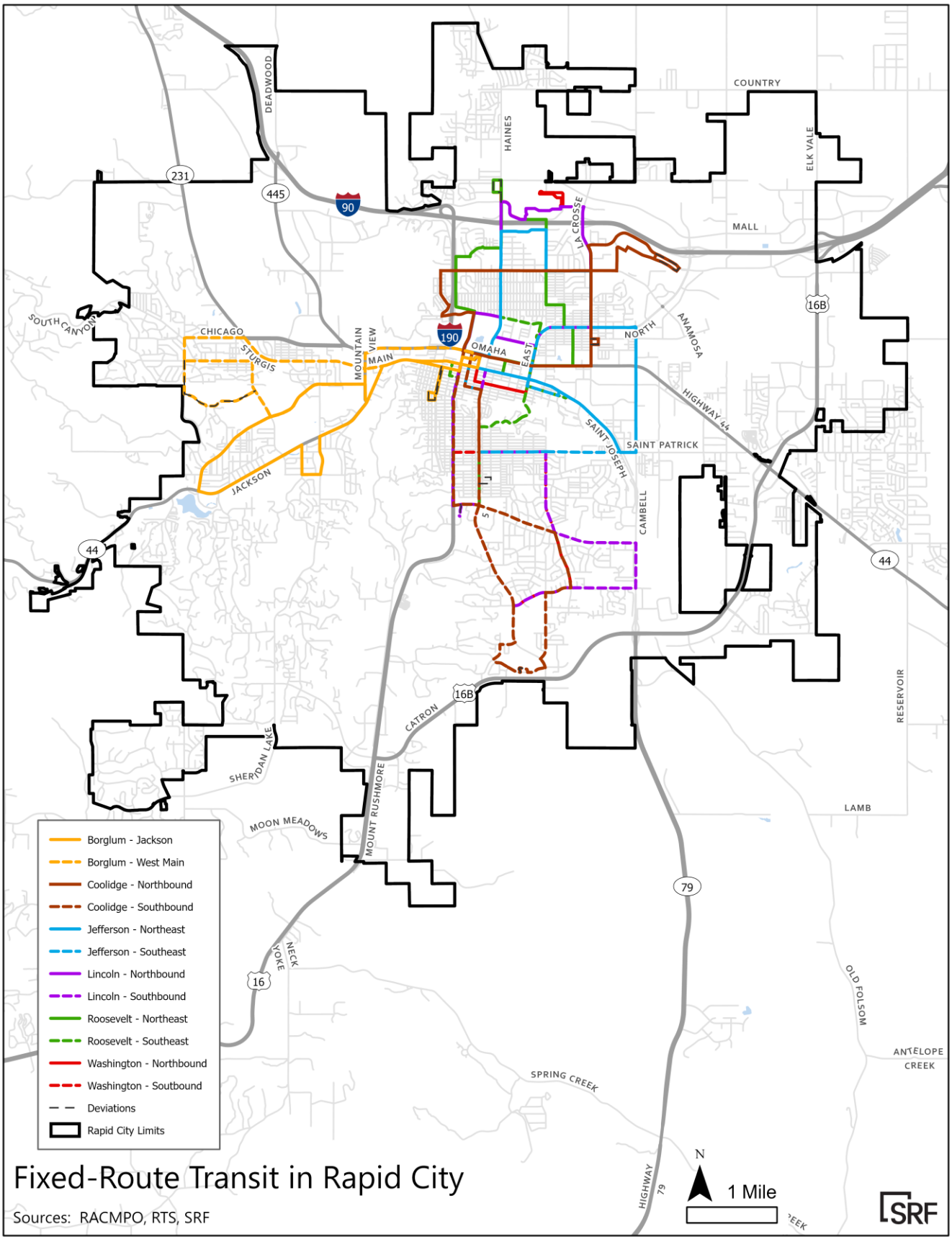
Staff

In addition to the Manager (Megan Gould) and Transit Operations Coordinator (Kendra Magelky), RTS functions with two route supervisors, two dispatchers, one custodian, and 27 bus operators. Three operators are temporary employees; there are also four other temporary employees in various positions at the agency. Buses are cleaned in-house, but mechanical maintenance and repairs are contracted out.

Operator availability has been a limiting factor in the level of service that RTS is able to deliver. A shortage in 2021 forced RTS to shorten the City View Trolley season and to end school trippers in the 2021-2022 academic year. This was despite a union contract raising driver pay to $17.79 per hour. Although competitive with other transportation jobs, this is lower than the average wage in the metropolitan area ($21.47 as of May 2020[1]).

[1] U.S. Bureau of Labor Statistics, "Occupational Employment and Wages in Rapid City — May 2020." https://www.bls.gov/regions/midwest/news-release/occupationalemploymentandwages_rapidcity.htm

Figure 2: Existing Fixed-Route System



Fares

The most striking feature in RTS's fixed-route fare system is that it offers free rides to all youth 18 and under. The "Youth Ride Free" program began in 2016.

The regular adult fare is $1.50 cash and $13.50 for a book of 10 ride coupons. Honored Citizens – seniors 60 and over or people with disabilities – can pay cash or buy a book of coupons for half-price. Each fare covers a one-way trip, including one free transfer onto a different route. Unlimited rides are also available with a $30 monthly pass. All of these fare types can be purchased directly from the driver on board the bus (with exact change) or at the MBTC.

Dial-A-Ride has a two-tier fare system. For trips that begin and end within three-quarters of a mile from a fixed-route bus stop, the cash fare is set at twice the regular adult fare. This is the minimum service area and maximum fare allowed under DOT ADA regulations. For trips outside this service area but still within Rapid City limits, the fare is slightly higher. Passengers can also purchase a zone-specific book of 10 coupons for the price of nine trips or a monthly pass that includes unlimited trips in both zones.

Table 1: Fares

Group/Service	Cash	Monthly Pass	Book of 10 Coupons	Transfers
Adult (19-59)	$1.50	$30.00	$13.50	Free
Honored Citizen (60 and over, disabled and Medicare card holders)	$0.75	-	$6.75	Free
Youth Ride Free	Free			
Paratransit Zone 1	$3.00	$90.00	$27.00	-
Paratransit Zone 2	$3.50		$31.50	

Source: RTS

The two-zone fare structure for paratransit was recommended in the 2009-2013 TDP. At that time, service was available for twice the regular fare everywhere inside city limits. The TDP also recommended raising the fares to their current rates, as they had remained at $1 regular adult, $.50 Honored Citizen, and $25 for a month pass for several years.

Fleet

RTS directly owns and operates the bus fleet for both fixed-route and paratransit service. Like other RTS capital assets, these vehicles are inventoried in the SDDOT Transit Asset Management Plan. Most of the fixed-route fleet is nearing the end of its useful life.

All but the two oldest vehicles in the fixed-route fleet have ratings of 3 in SDDOT's five-point scale, indicating they have vehicle repairs exceeding $1,500 in the most recent year but only minor damages. The vehicles acquired in 2006 have ratings of 2, indicating they have had a major repair in the most recent year and exceed either the mileage-based or year-based useful life standard.

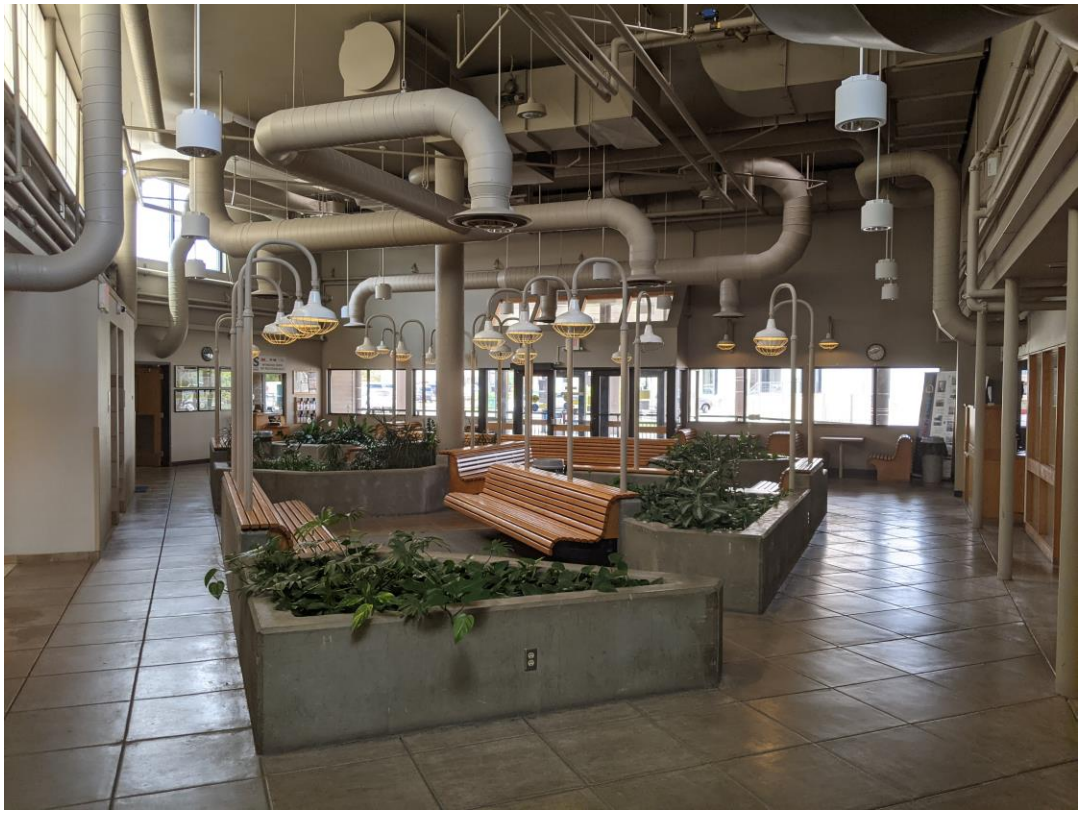
Paratransit buses have a shorter useful life of five to seven years, are replaced more frequently, and show more variation in overall condition. RTS makes purchases about every two years using FTA 5307 Urbanized Area Formula Grants and City of Rapid City general funds. A planned 2020 order of replacement vehicles has been delayed by pandemic-related scarcity on the supplier end.

A full list of fleet vehicles, as well as a schedule and budget for replacing them as they age, is in the Capital Plan section of this document).

Facilities

All fixed routes depart from and return to the MBTC at 333 Sixth Street. In addition to RTS and city planning offices, the building includes a sheltered waiting area with benches, maps, route information, and ticket purchases during office hours. RTS stores buses at a garage and maintenance facility located at 760 Centre Street. Constructed in 1980 and 2016 respectively, these facilities are both in good condition.

Figure 3: Waiting Area at Milo Barber Transportation Center

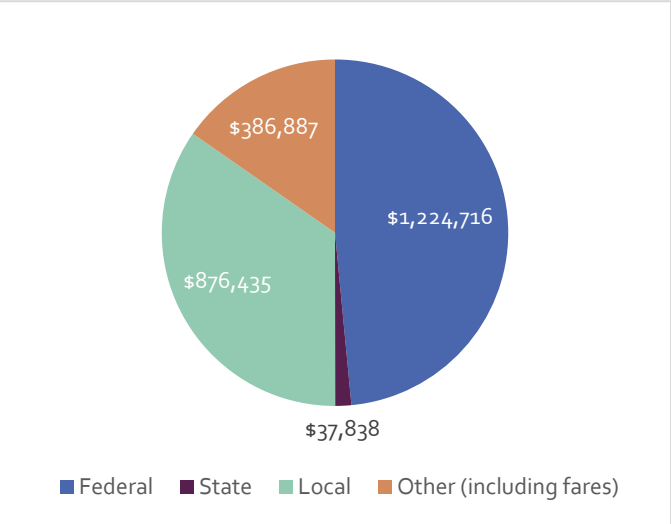


Funding

RTS is a direct recipient of FTA section 5307 funds. In 2019, federal funding composed nearly half of RTS operating and capital expenditures. The remainder included 35 percent local funding – including fare

revenue, advertising revenue, and allocations from the city's general fund – with only one percent in state contributions (Figure 4).

Figure 4: RTS Funding Sources 2019



Source: National Transit Database

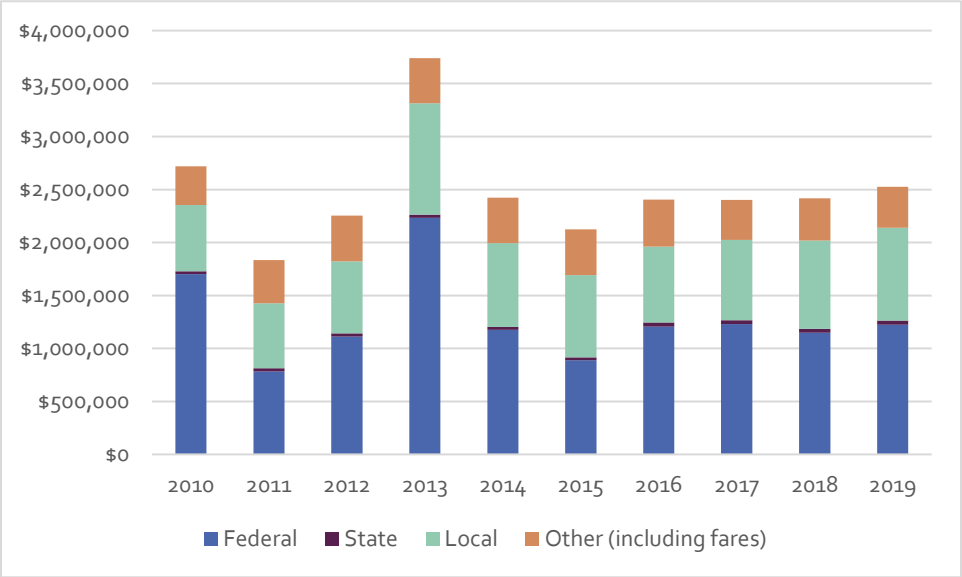
Over the last ten years, the dollar amount of state, local, and fare revenue has remained largely consistent. Federal funding has fluctuated from year to year; it was particularly large in 2013, when RTS replaced most of its fixed-route fleet at once using an 80 percent federal match. Funding levels over time are shown in greater detail in Table 2 and Figure 5.

Table 2: RTS Funding Sources, 2010-2019

Source	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Fed.	$1,700,511	$784,378	$1,112,889	$2,233,490	$1,175,745	$887,403	$1,207,183	$1,229,427	$1,148,180	$1,224,716
State	$28,425	$28,425	$28,425	$28,425	$28,425	$28,425	$37,838	$37,838	$37,838	$37,838
Local	$624,677	$613,112	$680,664	$1,051,826	$790,799	$775,038	$717,174	$756,662	$831,043	$876,435
Other	$366,107	$406,993	$431,582	$426,590	$427,909	$433,946	$443,926	$377,934	$398,538	$386,887
Total (rounded)	$2.7 million	$1.8 million	$2.3 million	$3.7 million	$2.4 million	$2.2 million	$2.4 million	$2.4 million	$2.4 million	$2.5 million

Source: National Transit Database

Figure 5: RTS Funding Sources, 2010-2019



Source: National Transit Database

Non-RTS Services in Region

Prairie Hills Transit provides a combination of deviated fixed-route and demand-response service to communities surrounding Rapid City, including the I-90 corridor to Spearfish. Prairie Hills Transit serves jurisdictions that have reached out with a request for help and a budget for service provision. The organization works with Monument Health and other organizations to offer rides for medical appointments as available. Although open to all riders, this service is primarily used by seniors and people with disabilities.

Nonprofits such as Black Hills Works, the YMCA, and Youth and Family Services also provide program-specific transportation services.

Policy Guidance

Transit service in the Rapid City area is informed by preceding policies and plans created by the City and RCAMPO. Table 3 lists plans that are relevant to this TDP update.

Table 3: Guiding Plans that Inform the Transit Development Plan

Policy Document	Description	Themes & Connection to Transit
2009-2015 TDP	This plan describes the RTS system, its history, and national trends affecting transit; analyzes the system's performance and compares it to similar transit systems; addresses stakeholder input; and outlines recommendations to improve system performance within its budgetary and other constraints.	The plan provides useful history on previous conditions at RTS. The principles embedded in its recommendations are consistent with good transit planning practices, and it shows thematic continuity from one TDP to the next.
2018 Transit Feasibility Study	This study explored possible improvements to transit service on a regional level, based on the needs of communities in two counties and a peer comparison with other regional transit systems.	The study identifies challenges using transit that include limited hours/locations and affordability. It identifies opportunities for carpooling, vanpooling, subsidized voucher programs, group trips, lifeline services, expanded demand-response service, and commuter express bus routes. As of the end of 2021, these opportunities had not been pursued, largely because they rely on partners, such as Pennington and Meade counties, uninterested in providing transit.
Coordinated Public Transit Human Services Plan (2019)	This plan identified gaps in service for human services clients, including seniors, people with disabilities, and low-income people. A survey asked Rapid City residents about their travel behavior. Stakeholder organizations were also surveyed.	About 15 percent of survey respondents relied on transit or taxi service to get around, and about 30 percent used these services occasionally. Challenges included coverage limitations, limited hours, low frequency, late shifts, childcare pickup, social trips, and afterschool activities or evening classes. Other challenges included stop spacing, affordability, and cold weather. Expanding to new destinations was popular among survey respondents and the desired locations included doctors' offices, supermarkets, and schools. More than half of stakeholder organizations provide transportation, but the resources to do so are perceived as very limited. The plan makes 20 distinct recommendations. Those relevant to RTS include adding regular fixed routes to hubs in need of service; analyzing stop safety and accessibility; systematically adding service early mornings and evenings; adding service to high-need areas on Sundays; adding demand-response service to underserved communities; working with the city and developers early to plan for transit in new communities; and examining the use of low-income reduced fares. The bus stop analysis is currently underway.

Rapid City Comprehensive Plan (2014)	This plan provides an overarching framework for planning in Rapid City; it defines a community vision and values, goals, policies, future land use plans, and implementation pathways.	Planning Goal TI-2.5 aims to expand transit participation, service, and coordination as part of a safe and efficient multimodal transportation network. Specific objectives include better bus stop amenities, connections with other modes, access to activity centers and services, coordination between different transit service providers, and service expansion, especially for the underserved and transit dependent.
Rapid City Metropolitan Area Bike and Pedestrian Master Plan Update (2020)	This plan identifies and prioritizes improvements to the Rapid City bicycle and pedestrian network. It also provides guidance on policies and strategies that encourage biking and walking.	The plan recommends promoting the use of bicycle racks on RapidRide buses and enhancing the bike-ped connections around transit stops. The plan recommends pedestrian improvements at specific locations, which may enhance the accessibility of transit service to those locations. The appendices to this document contain public comments gathered in 2019-2020 as part of the overarching long-range plan transportation plan update. Many of these comments were related to transit; they have been extracted and summarized in Appendix X of this TDP update.
Rapid Trip 2045: Rapid City Metropolitan Transportation Plan (2020)	This plan is RCAMPO's long-range plan for the regional transportation system. It incorporates the 2018 Transit Feasibility Study and the 2020 Bike and Pedestrian Master Plan Update into a less detailed, but more comprehensive plan that also includes auto traffic. It updates the regional travel demand model and uses the results to identify future deficiencies and mitigation strategies.	Public input gathered in 2019-2020 included many comments related to transit (extracted and summarized in Appendix X).

PART 2: EXISTING CONDITIONS + NEEDS ASSESSMENT

Market and Needs

Analyzing trends and patterns in Rapid City is a critical task in assessing the community's transportation needs. The following section uses socioeconomic data to develop a baseline understanding of community demographics. Cumulatively, this information is used to:

- Identify locations that can potentially generate the highest levels of transit use
- Identify areas to which transit services should be expanded or introduced
- Inform what type of transit service is best suited for an area

Activity Patterns

Several factors are often correlated with and suggest the need for public transit service. Among the most important are job locations, density of job locations, and density of housing.

Figure 6 displays the number of jobs per census block. To create this map, jobs were identified using the Longitudinal Emplower-Household Dynamics database available from the US Census Bureau. This represents the best publicly available information. One of its limitations is that place of work is defined by the physical or mailing address reported by employers in the Quarterly Census of Employment and Wages (QCEW) or Multiple Worksite Reports, so that the address from administrative data may or may or may not be the actual location that a worker reports to most often.

With that caveat, the map shows large numbers of jobs in downtown Rapid City, with additional job centers outside the city center. Monument Health on East Fairmont Boulevard stands out as a large employer. High job counts are also visible in Rapid Valley, in the industrial park located just west of Elk Vale Road.

Figure 7 shows not the absolute number of jobs, but the density of jobs by census block. Monument Health and Rapid Valley stand out by this metric as well, as do downtown Rapid City; Walgreens on North Lacrosse Street; and the businesses surrounding Rushmore Mall, in particular Lowes, Best Buy, Phase Technologies, and the Best Western Ramkota Hotel.

The overall trend is toward distinct islands separated by areas of low density. Current fixed-route service is able to reach the more central islands, but if development continues in this pattern, it will become less productive to run service through low-density areas in order to reach higher-density employment centers.

Figure 6: Employment Counts by Block

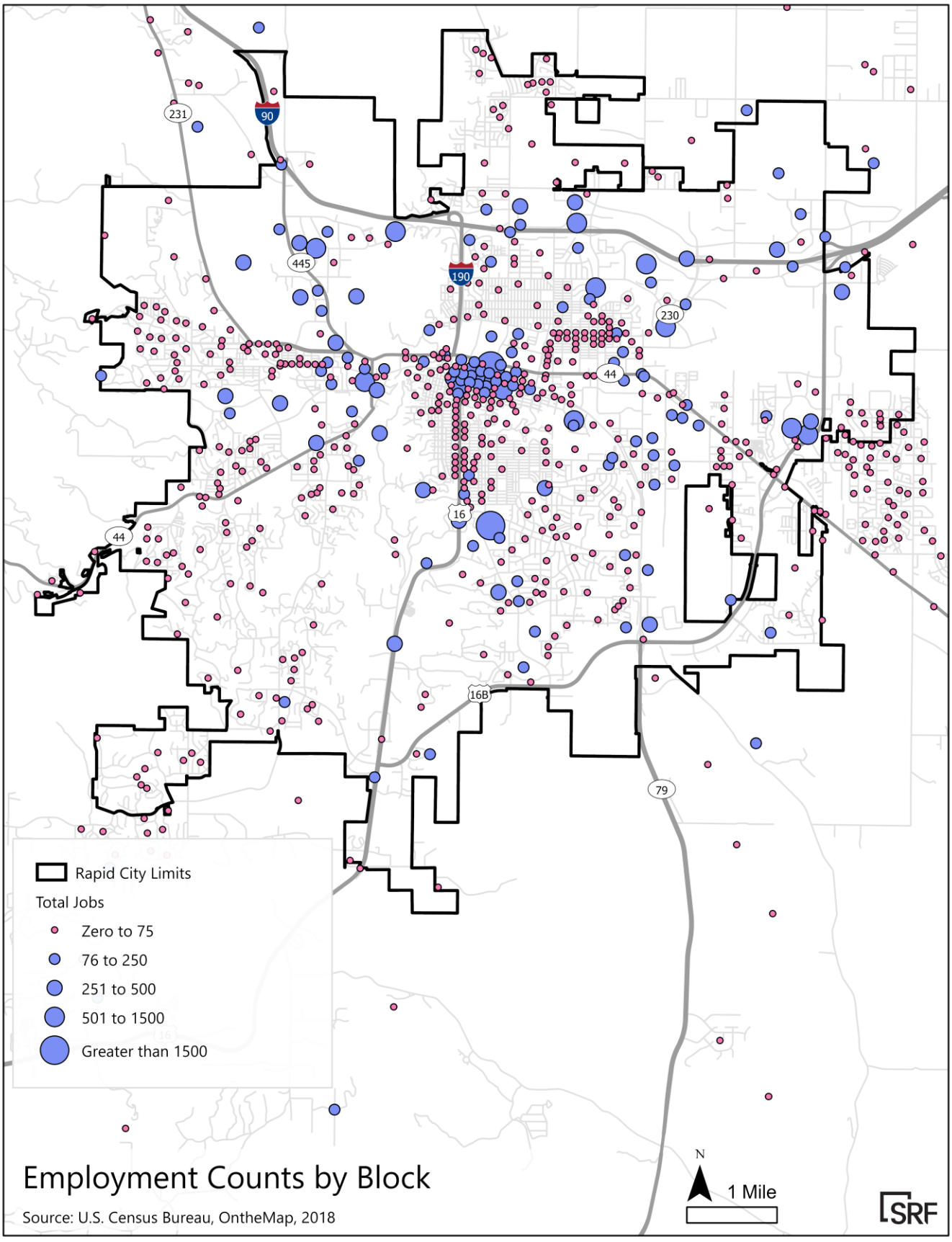
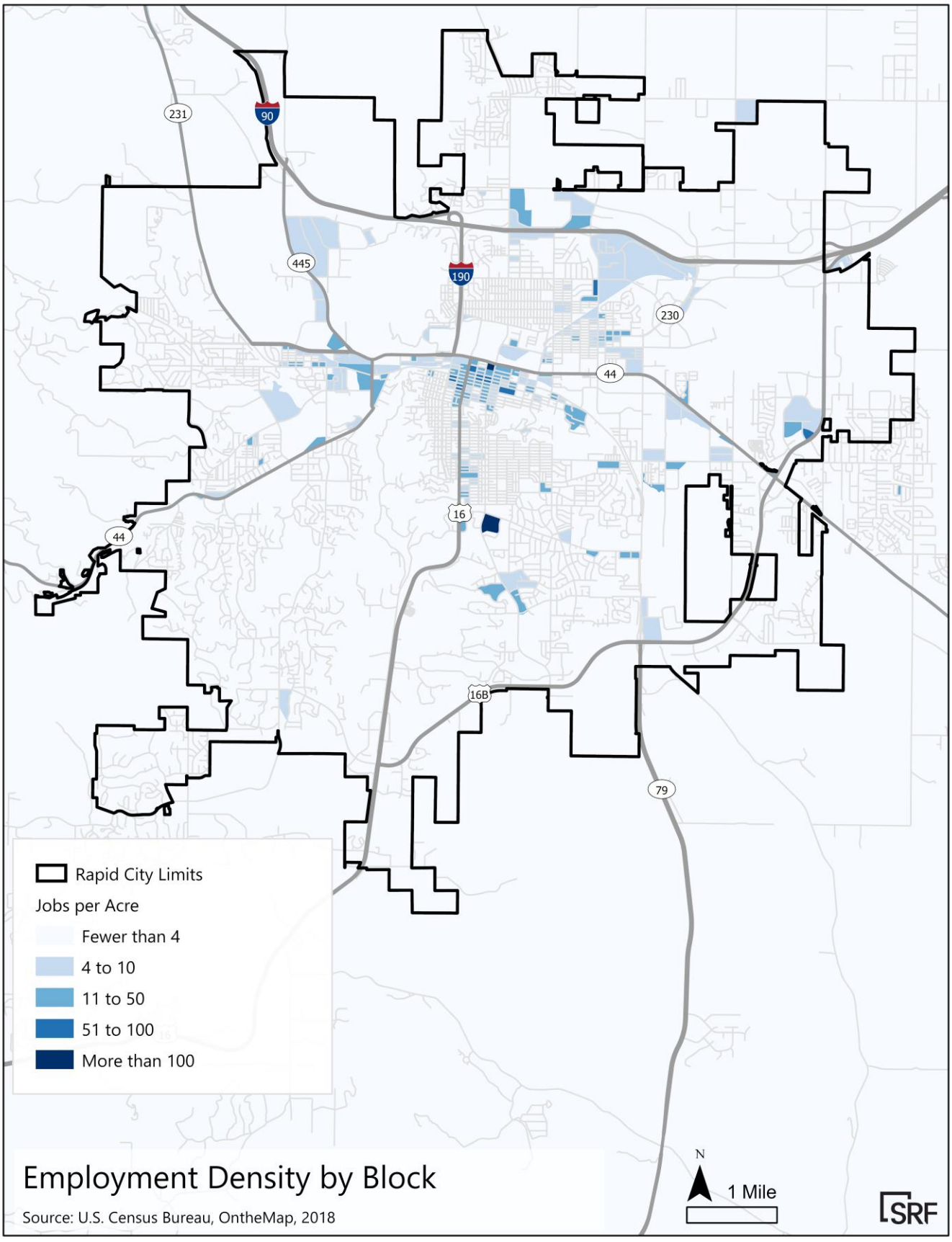


Figure 7: Employment Density



The most recent data on population density, in terms of people per acre, is shown in Figure 8. This map suggests that RTS fixed-route service is currently reaching most higher-density block groups within city limits.

However, block groups are a very limited scale at which to understand population density. Transit planners typically assume that passengers will walk up to a quarter-mile to reach local bus service. A more fine-grained look at density offers a more realistic map of neighborhoods that can, and cannot, generate enough ridership to justify fixed-route transit service.

Figure 9 identifies census blocks that are transit-supportive (Transit-Supportive Areas, or TSAs) on the basis of their housing density, their job density, or both. For this purpose, a TSA is defined as having residential density of at least three households per acre or employment density of at least four jobs per acre. This service planning rule of thumb assumes low service frequency (approximately 60 minutes) and partial farebox recovery.[2]

Figure 10Figure 10 shows the TSAs in the Rapid City region, based on the same block-level data as Figure 9. If the centroid of any given block is within a quarter-mile of a bus route, it is considered served by existing transit. Most of the transit-supportive areas in the city do fall into this category; of the remaining unserved areas (shown in orange), many are separated from the existing system by large tracts of low-density development or undevelopable land. Property owners submitting a permit application are asked about their transit needs but are not required to, and typically do not, plan for transit when siting their developments.

[2]For more detailed discussion, see TCRP Report 165, Transit Capacity and Quality of Service Manual, Third Edition, pp. 3-19 to 3-20.

Figure 8: Population Density

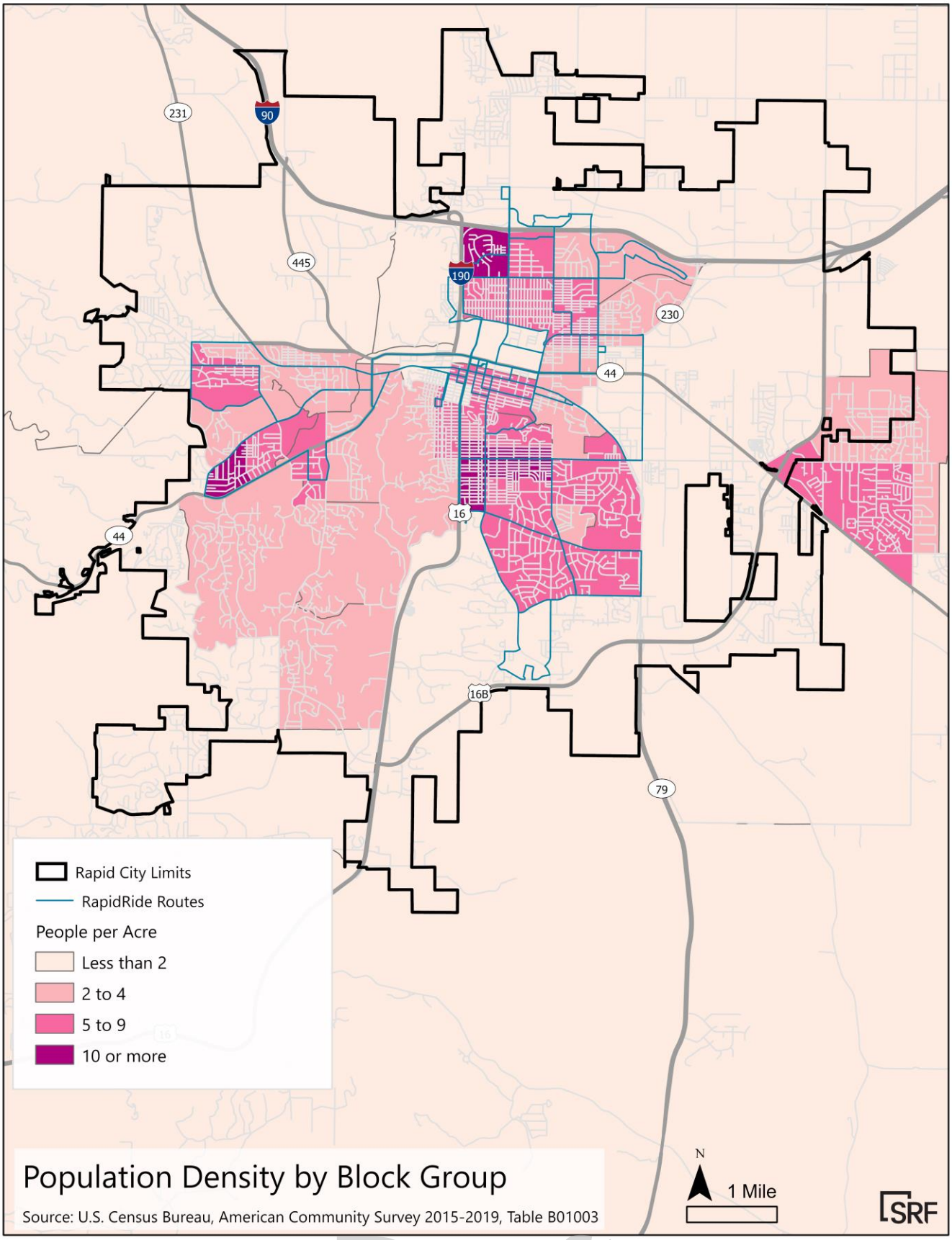


Figure 9: Housing and Employment Density

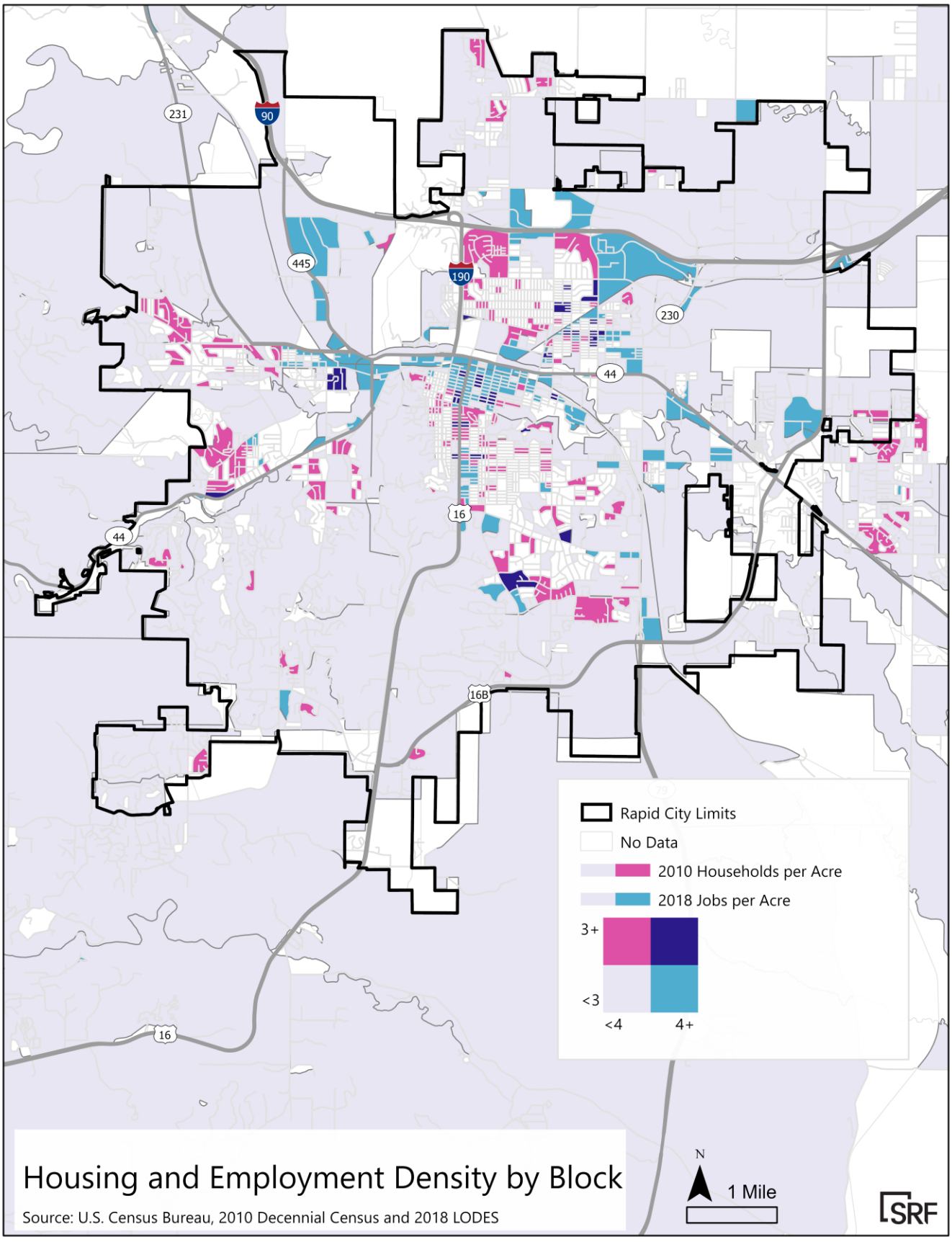
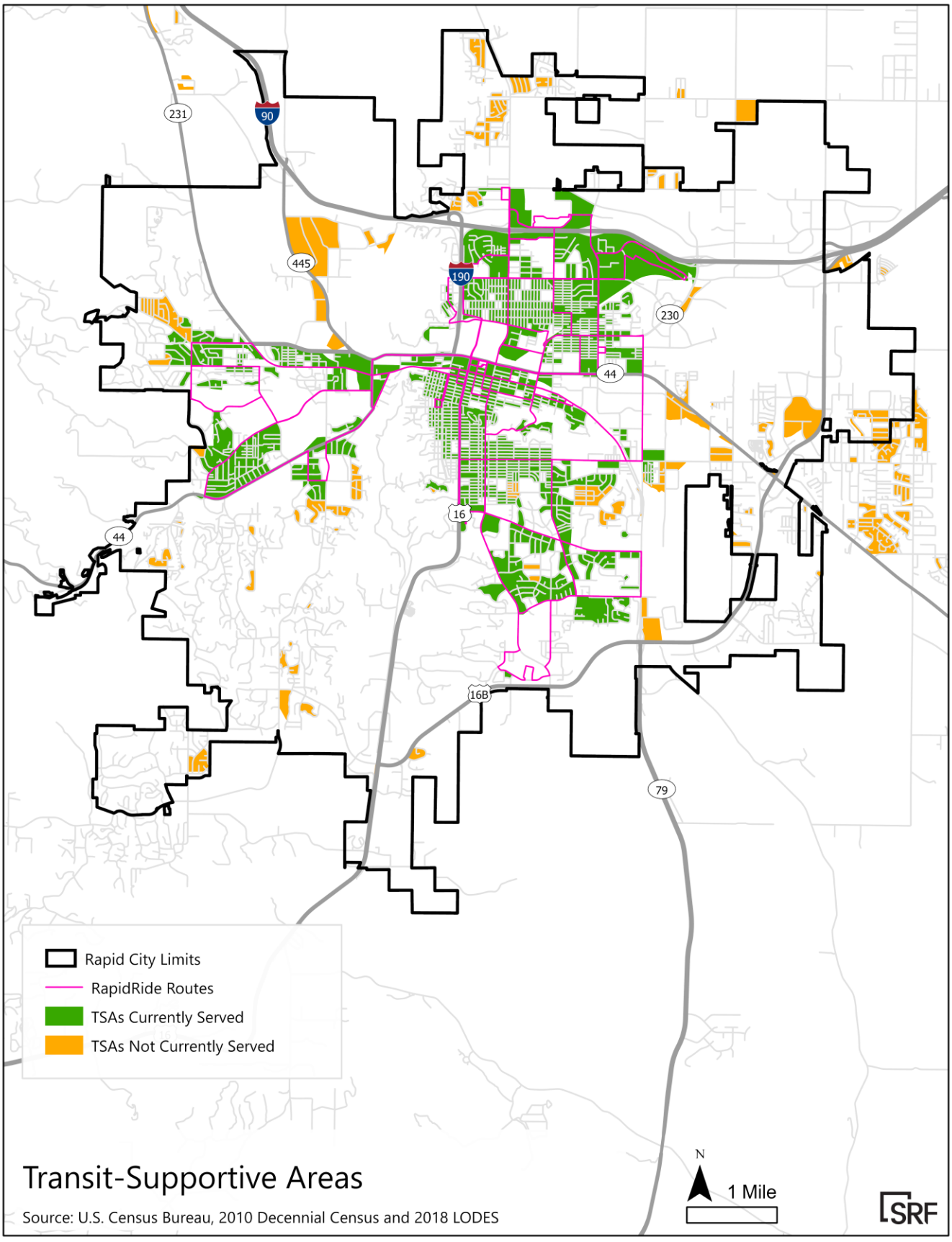


Figure 10: Transit-Supportive Areas



Regional Change

Rapid City's population growth over the last 10 years has outstripped its surrounding county and state at 9.9 percent (Error! Reference source not found.). With a total population of 74,703, it continues to be the second-largest city in South Dakota.[3]

Table 4: Population Change, 2010-2020

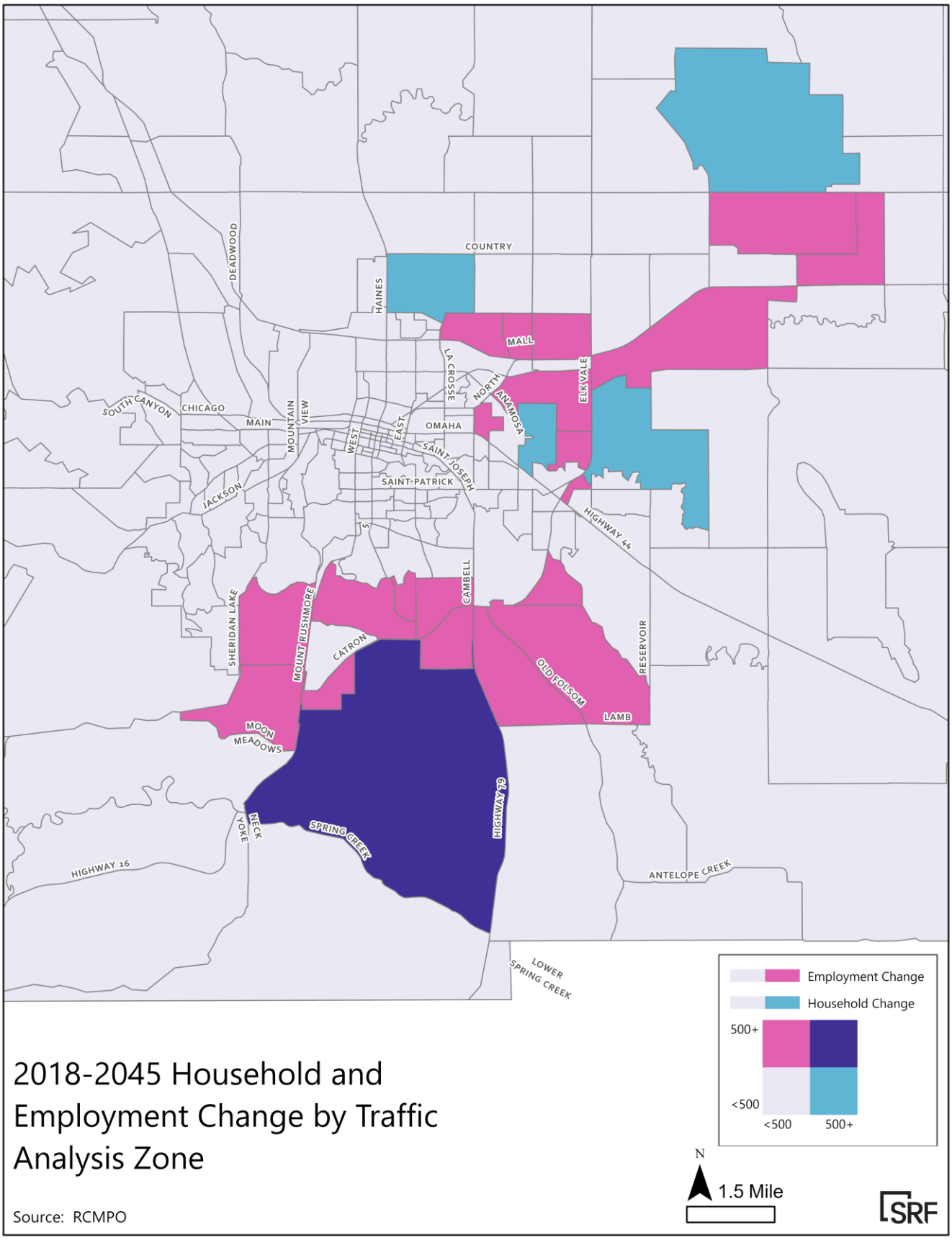
Geography	2010	2020	% Change
Rapid City	67,956	74,703	9.9
Pennington County	100,948	109,222	8.1
South Dakota	814,180	886,667	8.9
Sioux Falls	153,888	192,517	25

Source: U.S. Census Bureau, 2010 and 2020 Decennial Census

Further growth is projected over the next 20 years. The broad pattern of regional growth shows new housing and job opportunities continuing to locate in low-density areas in the outer ring of the city proper or beyond city limits (Error! Not a valid bookmark self-reference.). This will pose a challenge for serving growth areas and connecting residents with jobs via transit. Unless changes to development permitting are made, this is likely to continue to be the pattern in which the region develops.

[3] This estimate was sourced from the 2020 Decennial Census, which produced a count substantially lower than the 2019 American Community Survey estimate of 77, 503.

Figure 11: 2018-2045 Household and Employment Change by Traffic Analysis Zone



Demographics

Several demographic factors are often correlated with transit demand, including income, vehicle ownership, and age. People with lower incomes are more likely to ride public transit, as are those whose households do not own a vehicle. Single-parent households may also have a greater propensity to use transit.

The age of residents can also be a predictor of transit use. Children and older adults may benefit from access to transit and it is typical for young adults of student age to use transit at a higher rate than other groups.

Additionally, it is critical to consider racial equity in the allocation of transit service. Looking at the spatial distribution of populations of color[4] in relationship to existing transit routes can identify potential equity gaps in service.

The next six pages include maps displaying spatial distribution of the following groups in Rapid City:

- People of color
- Low-income people
- Households without a vehicle
- Single-parent households
- Seniors, ages 65 and over
- Children ages 5 to 17

Block groups with the highest concentrations of people of color, low-income people, and zero-vehicle households are located in central parts of the city currently served by transit. However, this is not the case for households with single parents, seniors, and youth. For all populations of interest listed above, there are significant proportions in areas that are not served by transit.

[4] Defined here as individuals who reported any combination of race and ethnicity other than White, Non-Hispanic. In Rapid City, a majority of people of color are Native American.

Figure 12: People of Color

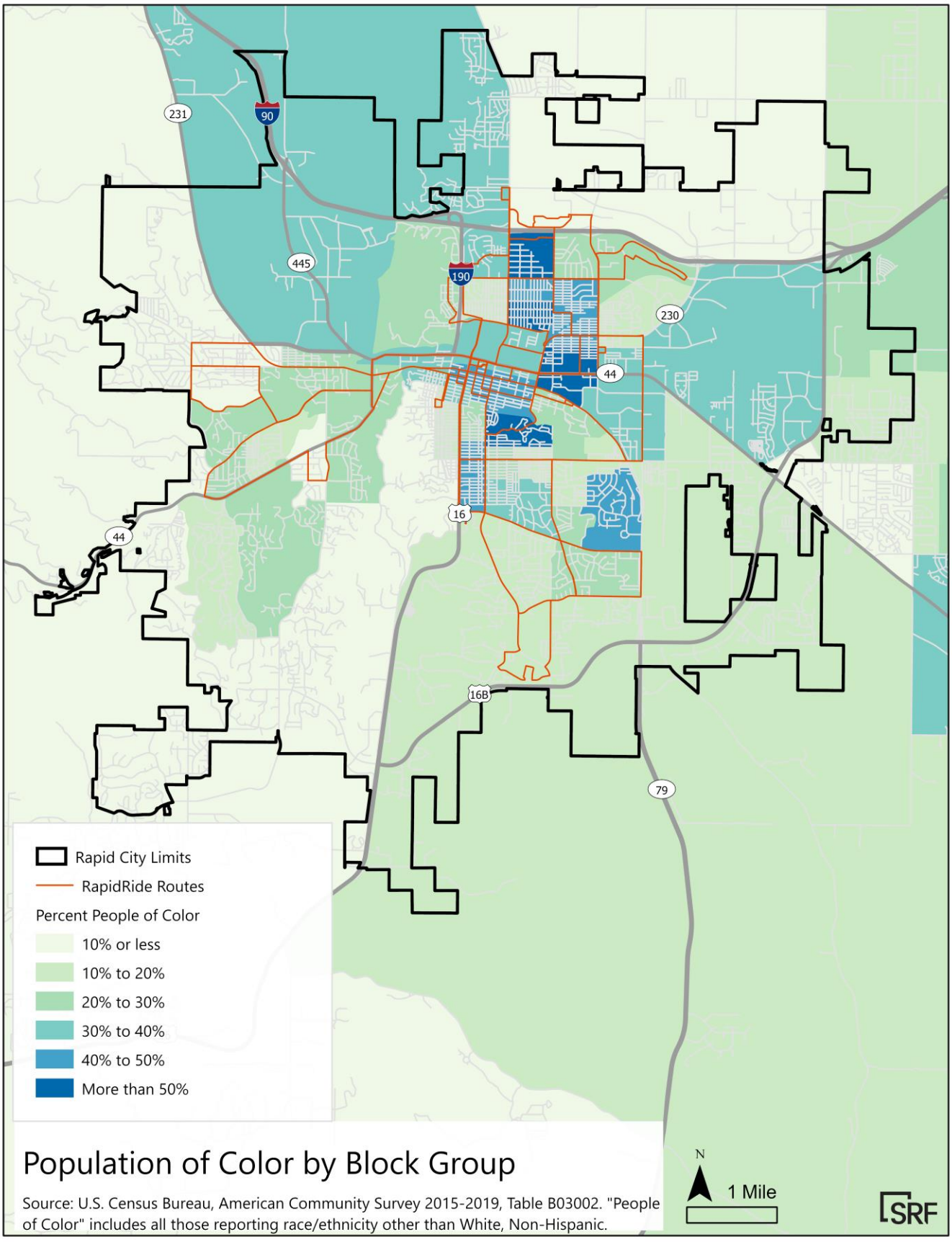


Figure 13: Low-Income Population

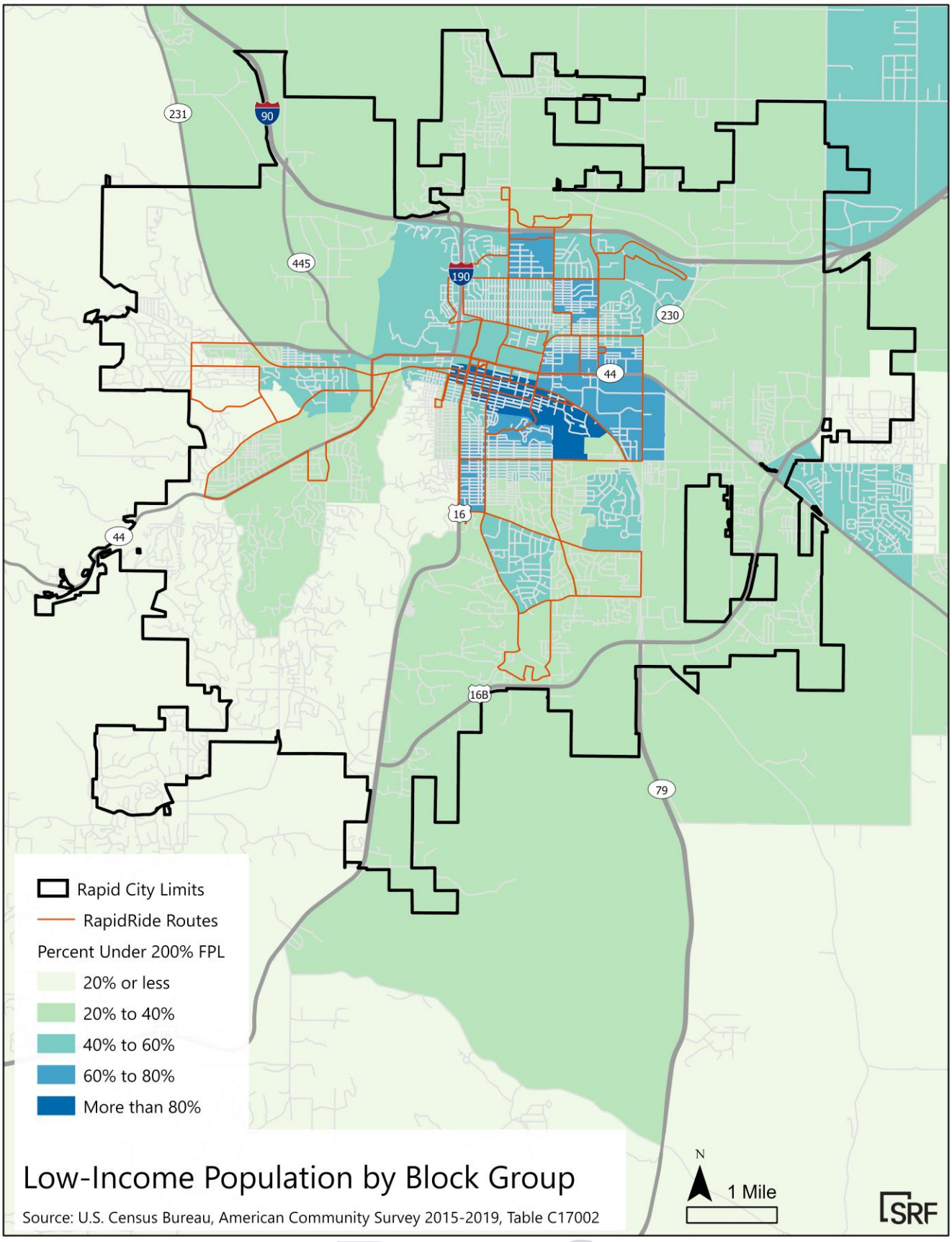


Figure 14: Households without a Vehicle

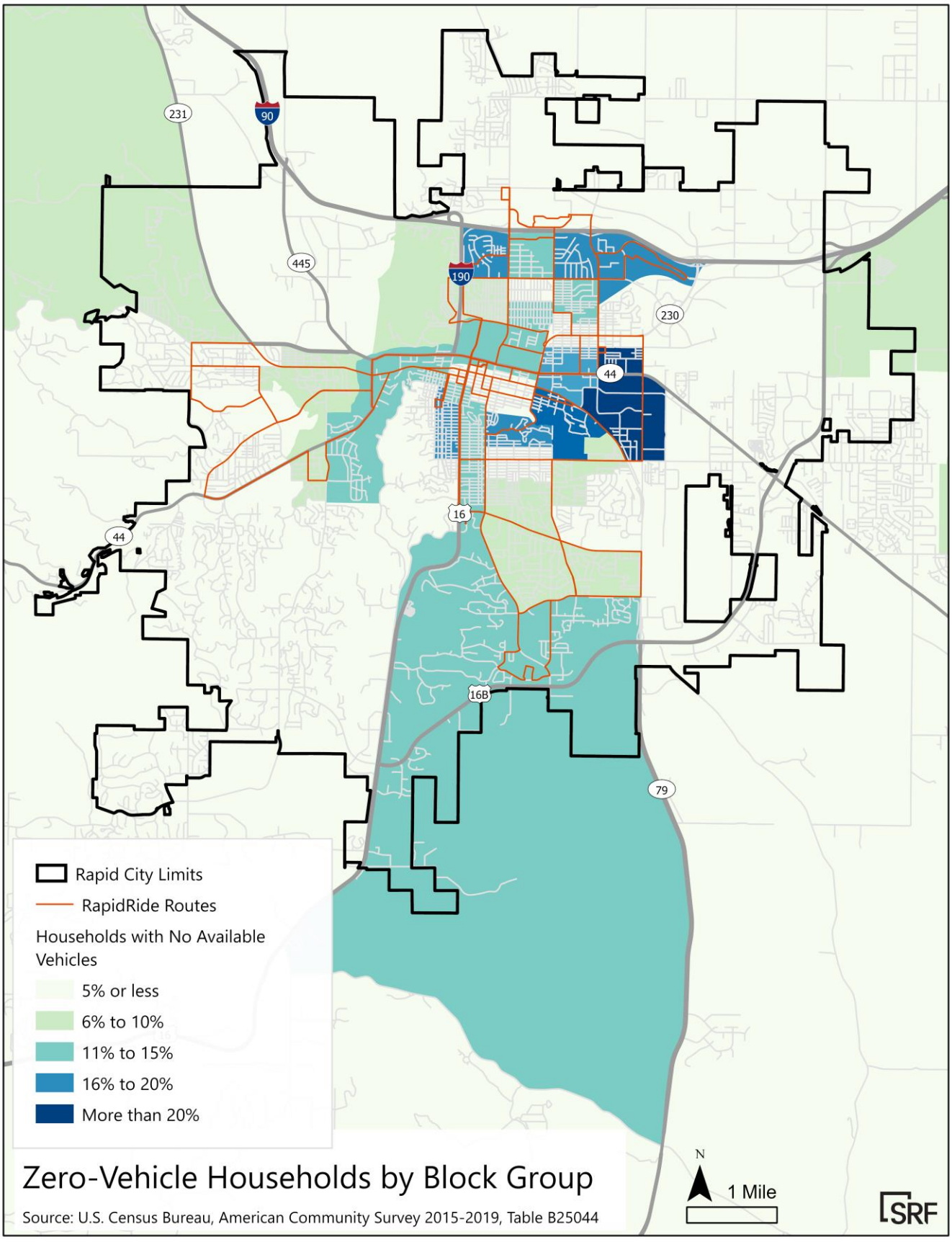


Figure 15: Single-Parent Households

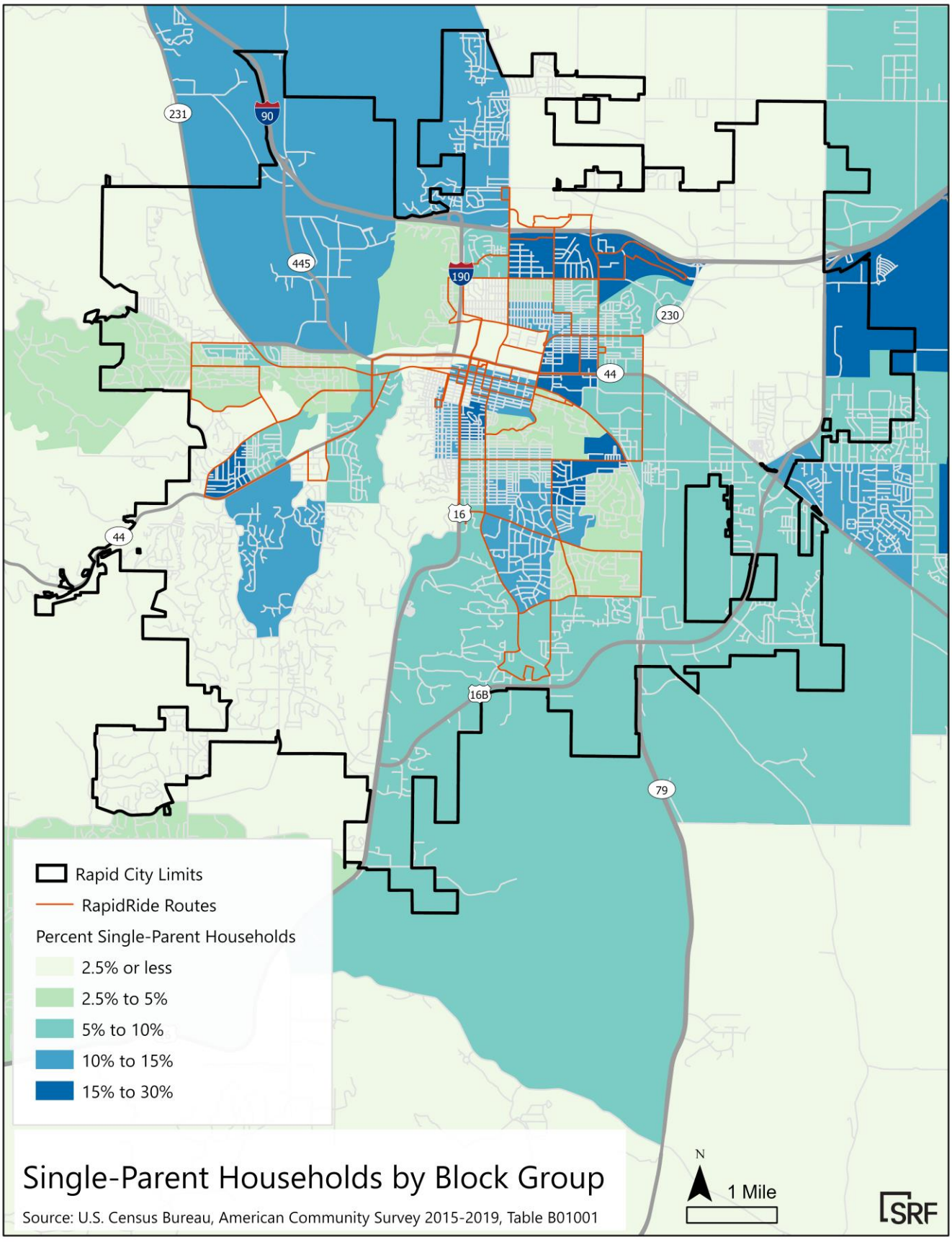


Figure 16: Senior Population

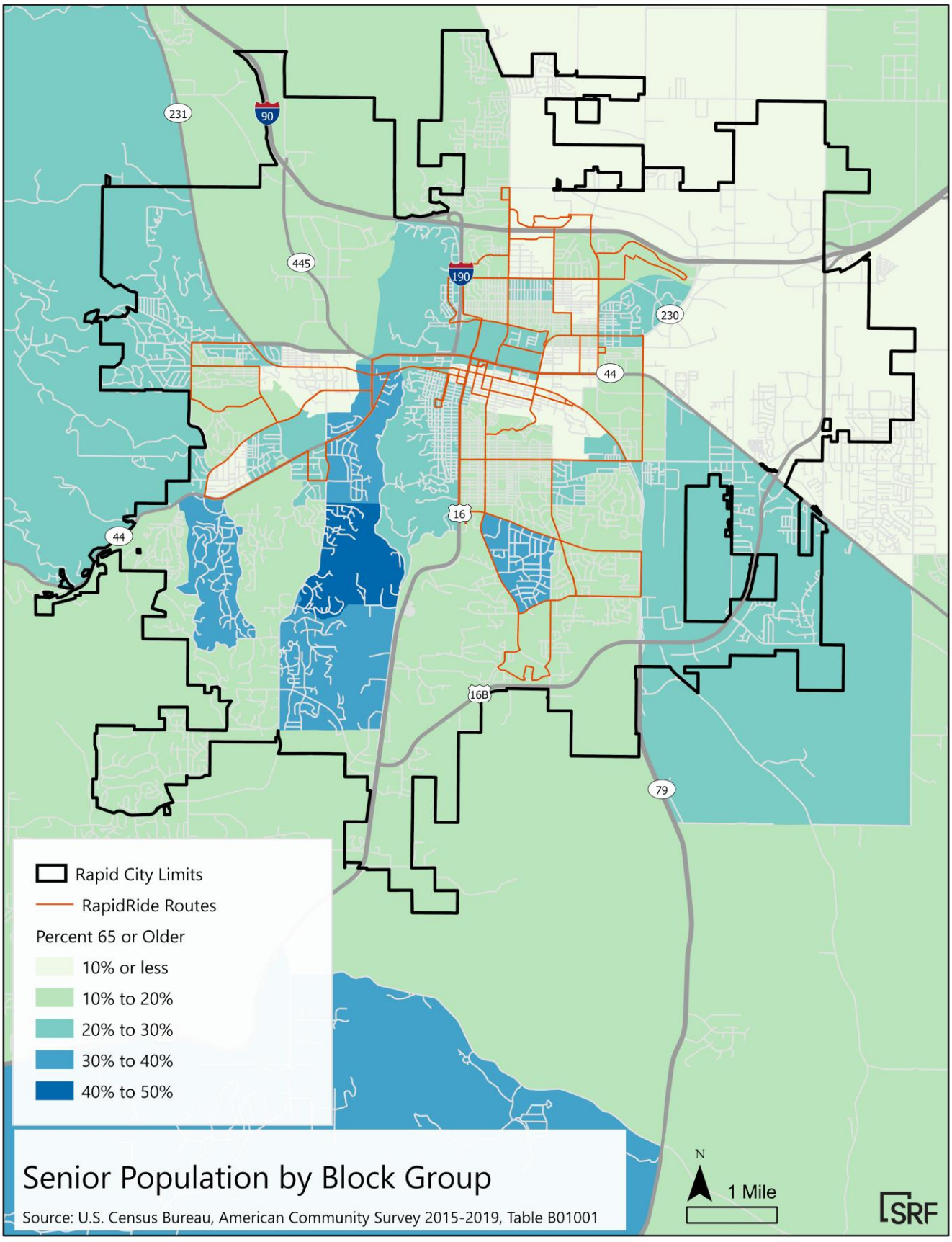
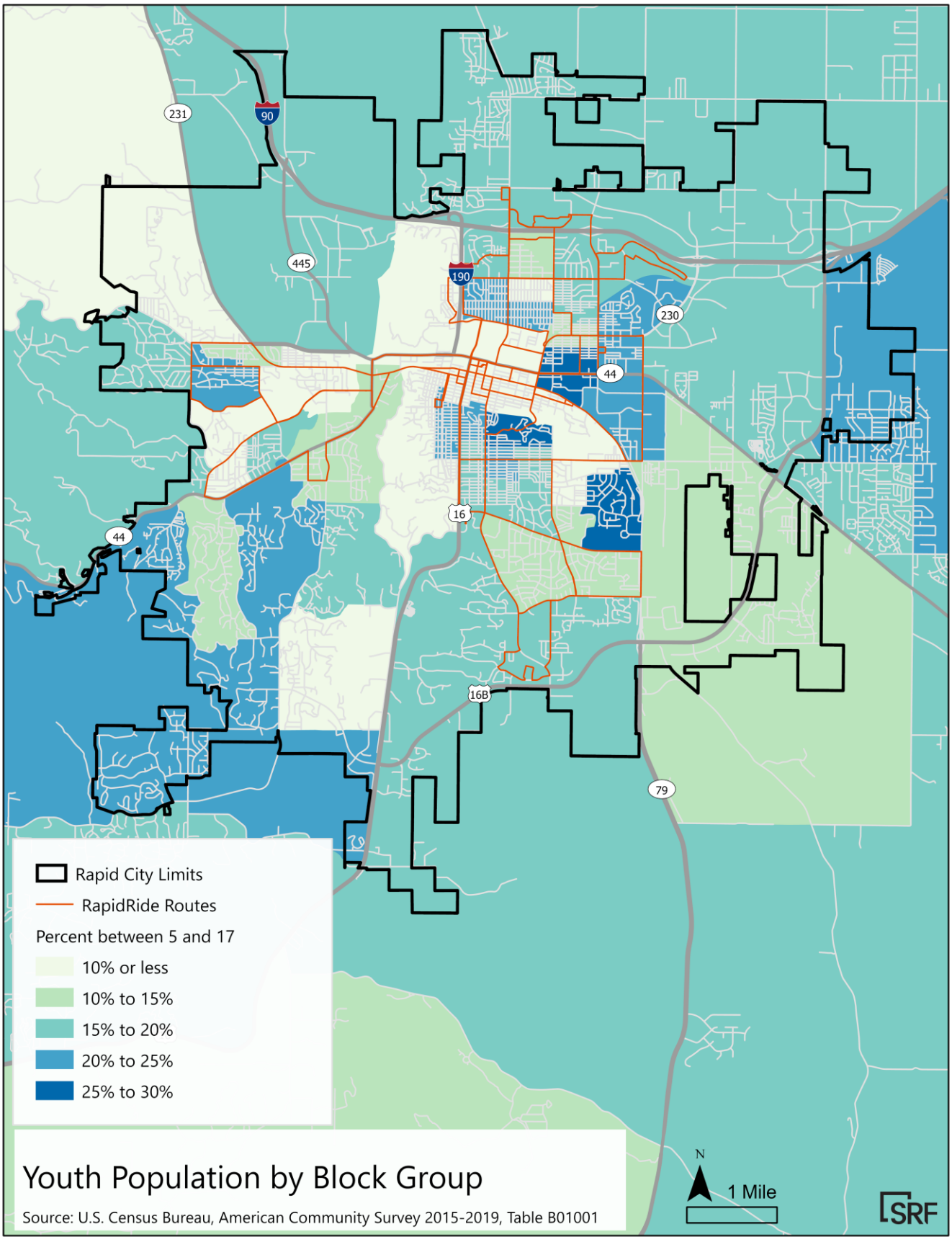


Figure 17: Children between 5 and 17



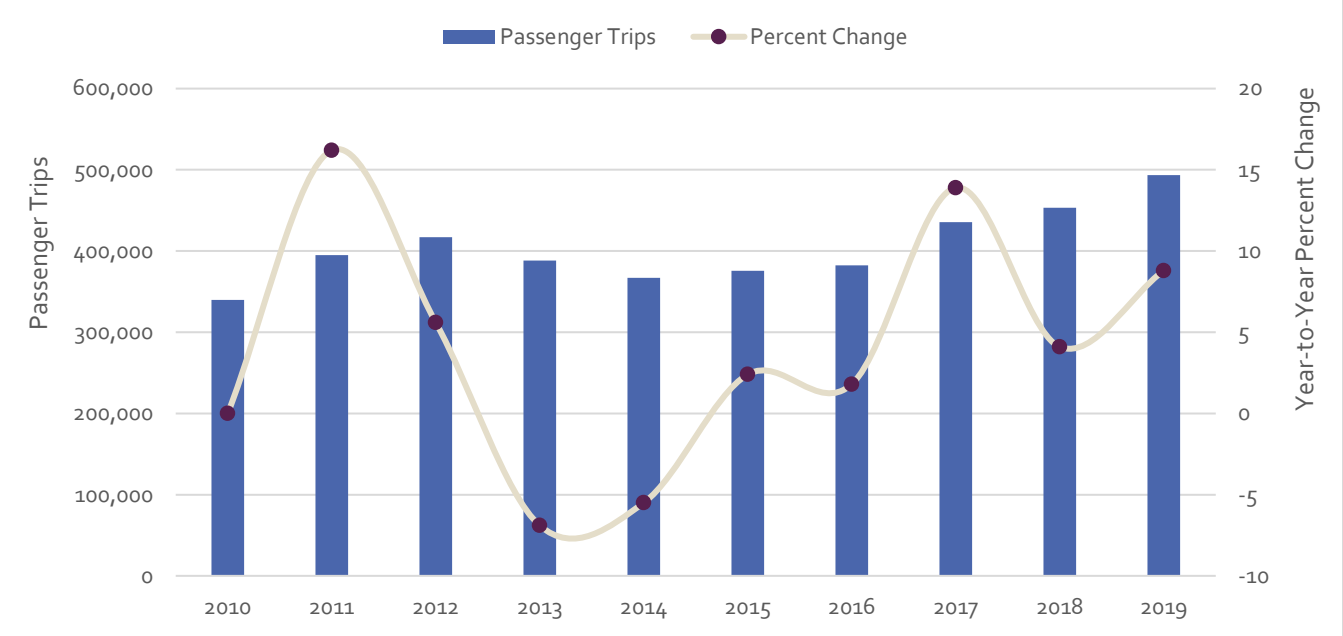
Existing Service Review

The following section summarizes existing fixed-route service and productivity at the system and route levels. The year 2019 is used to represent current levels of service provision and demand, primarily because the global COVID-19 pandemic that began in early 2020 caused ridership levels to drop noticeably as workplaces and schools closed. Since the deepest impacts of the pandemic are not expected to be permanent, 2020 data cannot be considered representative of 'normal' conditions.

System-Wide Review

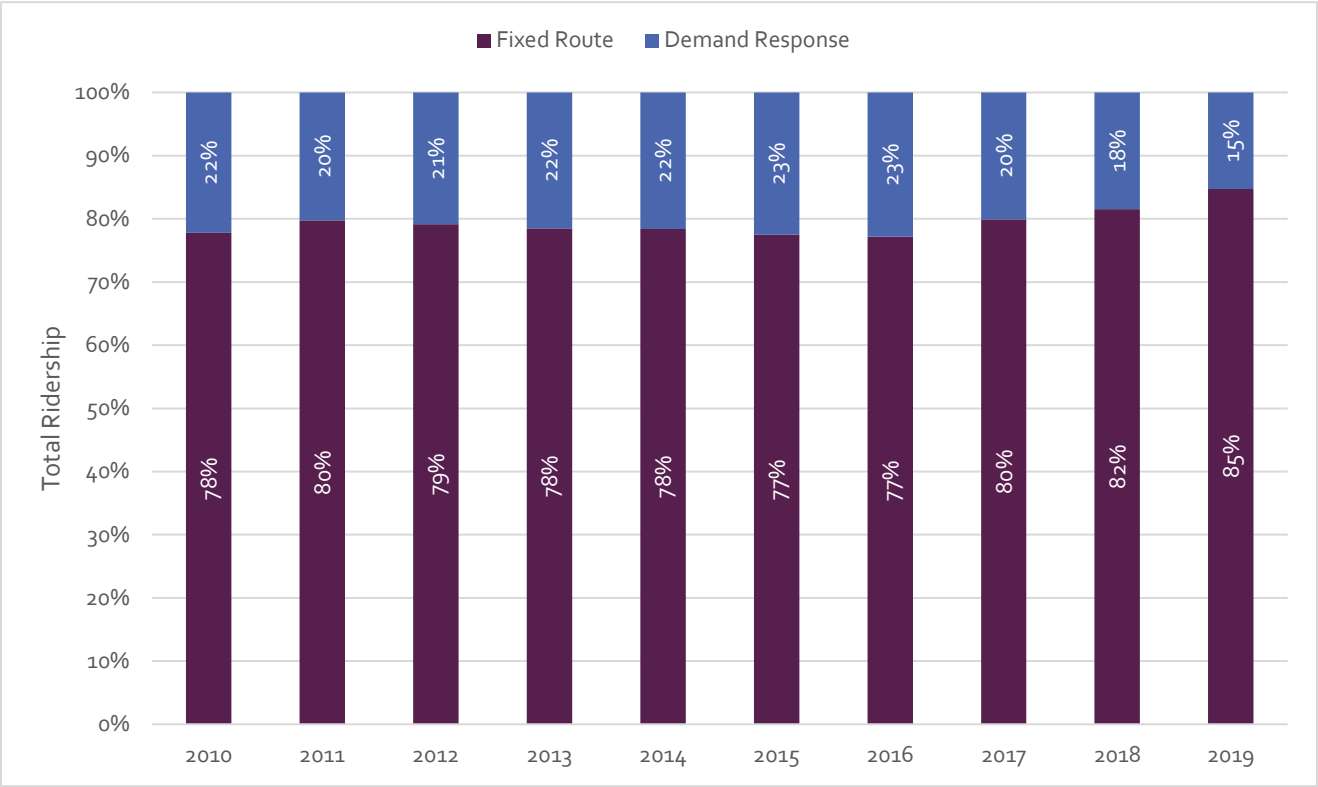
RTS provided 493,541 rides in 2019 across its fixed-route and demand-response modes combined. Ridership has been on an upward trend since 2015, with the largest annual increase of 13.9 percent immediately following the introduction of the Youth Ride Free Campaign in 2016. Ridership increased four percent between 2017 and 2018. The percent of total ridership by mode remained steady over the 10-year period, with fixed-route service accounting for 77 to 85 percent of total ridership annually (Figure 19).

Figure 18: Annual Ridership on All Modes, 2010-2019



Source: National Transit Database

Figure 19: Percent of Annual Ridership by Mode, 2010-2019

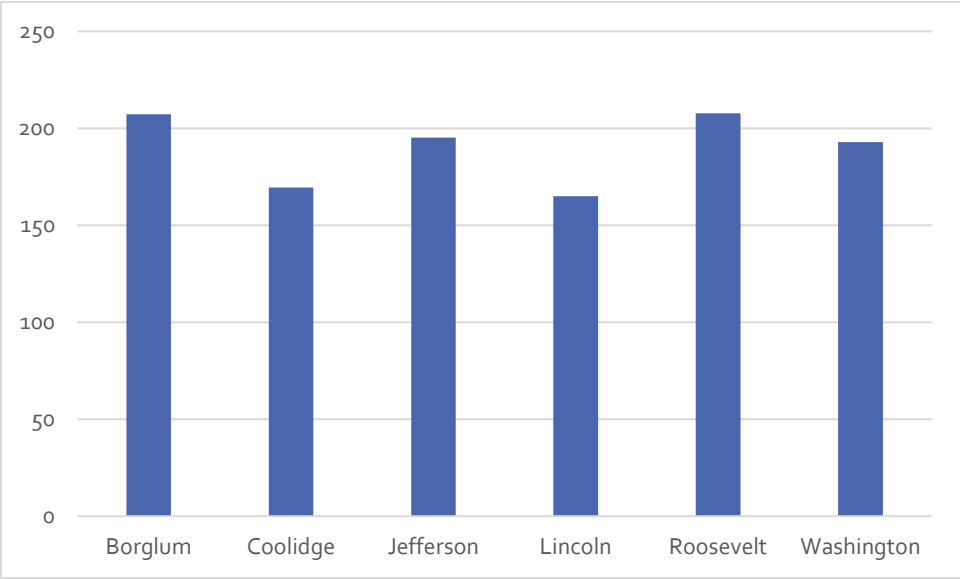


Source: National Transit Database

Ridership Patterns by Route

Over the course of 2019, daily weekday boardings by route averaged between approximately 150 and 200 (Figure 20). The Borglum and Roosevelt routes experienced the highest levels of weekday activity.

Figure 20: Average Daily Weekday Boardings Jan-Dec 2019



Source: SRF analysis of RTS data

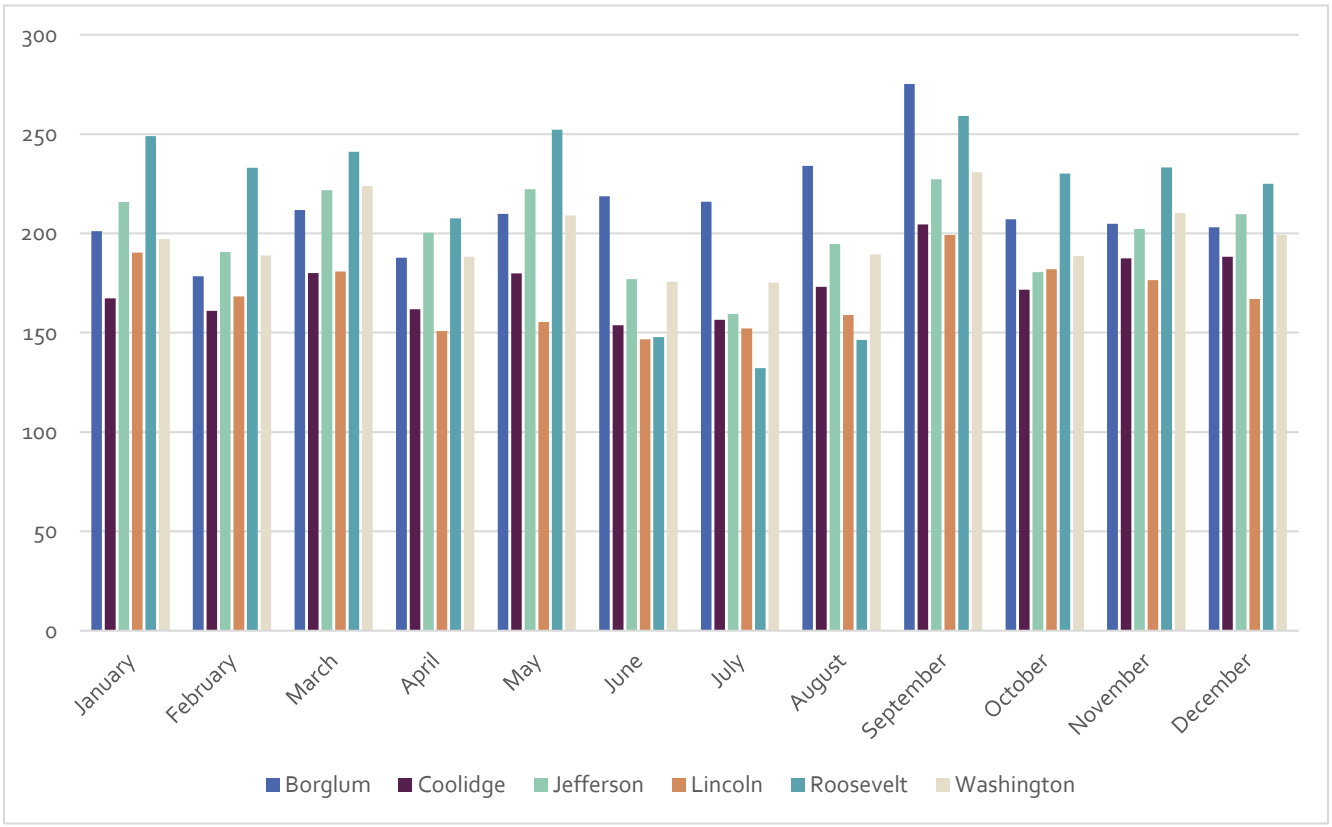
Weekday ridership waned slightly in the summer months on all but the Borglum route, as Table 5 and Figure 21 show. The highest-activity month systemwide was September, with 1,396 average weekday boardings.

Table 5: Daily Average Boardings (Weekdays in 2019)

Period	Borglum	Coolidge	Jefferson	Lincoln	Roosevelt	Washington	All Routes
January	201	167	216	190	249	197	1221
February	179	161	191	168	233	189	1120
March	212	180	222	181	241	224	1259
April	188	162	200	151	208	188	1097
May	210	180	222	155	252	209	1229
June	219	154	177	147	148	176	1020
July	216	157	159	152	132	175	992
August	234	173	195	159	146	189	1097
September	275	205	227	199	259	231	1396
October	207	172	180	182	230	189	1160
November	205	187	202	177	233	210	1215
December	203	188	210	167	225	199	1192

Source: SRF analysis of RTS data

Figure 21: Daily Average Boardings (Weekdays in 2019)



Source: SRF analysis of RTS data

Saturday service does not show the same pattern; systemwide, March and December were the lowest-activity months and August was the highest (Table 6). Washington and Coolidge show the highest average Saturday boardings, although the differences among routes are not significant.

Table 6: Daily Average Boardings (Saturdays in 2019)

Period	Borglum	Coolidge	Jefferson	Lincoln	Roosevelt	Washington	All Routes
January	67	89	92	72	62	83	465
February	68	91	86	65	64	84	458
March	51	75	68	52	64	89	399
April	66	88	82	69	67	92	463
May	77	101	75	66	69	77	465
June	71	84	72	65	69	97	458
July	71	90	69	63	67	101	460
August	83	95	93	77	69	104	522
September	85	96	68	64	64	88	464
October	82	84	56	66	49	75	413
November	62	99	70	54	68	76	428
December	49	73	85	45	49	72	373
Full Year	69	88	76	63	64	87	448

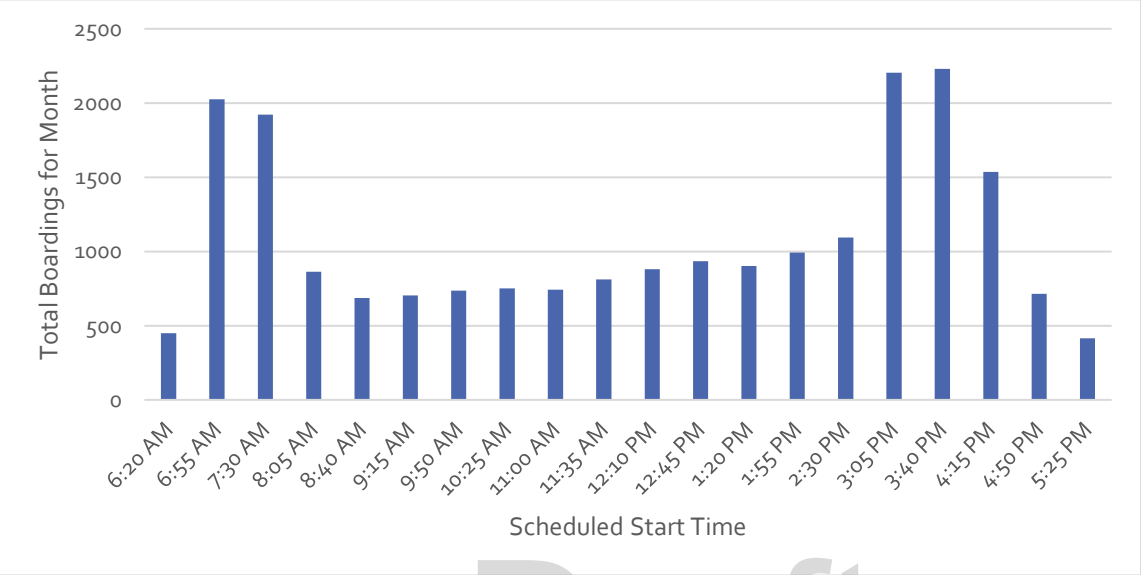
Source: SRF analysis of RTS data

Fixed-Route Ridership by Time of Day

RapidRide drivers write down the number of passengers boarding during each lap of the day, as well as the type of fare each passenger used. These daily records were analyzed for the month of October 2019. October was chosen because its ridership numbers are closest to the annual average.

Figure 22 shows the total October weekday boardings by lap on all six routes. Peak hours are between 7 and 8 in the morning and between 3 and 5 in the afternoon.

Figure 22: Fixed-Route Boardings by Lap, October 2019



Ridership by Route, Fare Type, and Time of Day

Ridership by fare type was examined more closely for each route. The results are displayed in Figure 23 through Figure 28; each figure shows the total boardings over the month of October 2019 for a particular route. Youth fares play a substantial role in defining peak hours for every route. Coolidge and Washington have the most even distribution of ridership over the course of the day. Please note that the total October ridership varies significantly by route, so that the y-axis in Figure 23 (Borglum) ends at 600 boardings but Figure 24 (Coolidge) tops out at 350 boardings per month.

Figure 29 and Figure 30 (page 45) show systemwide trends in ridership over the course of 2019. The most noticeable dips in ridership coincided with federal holidays or inclement weather.

Figure 23: Borglum Weekday Ridership by Time of Day and Fare Type, October 2019

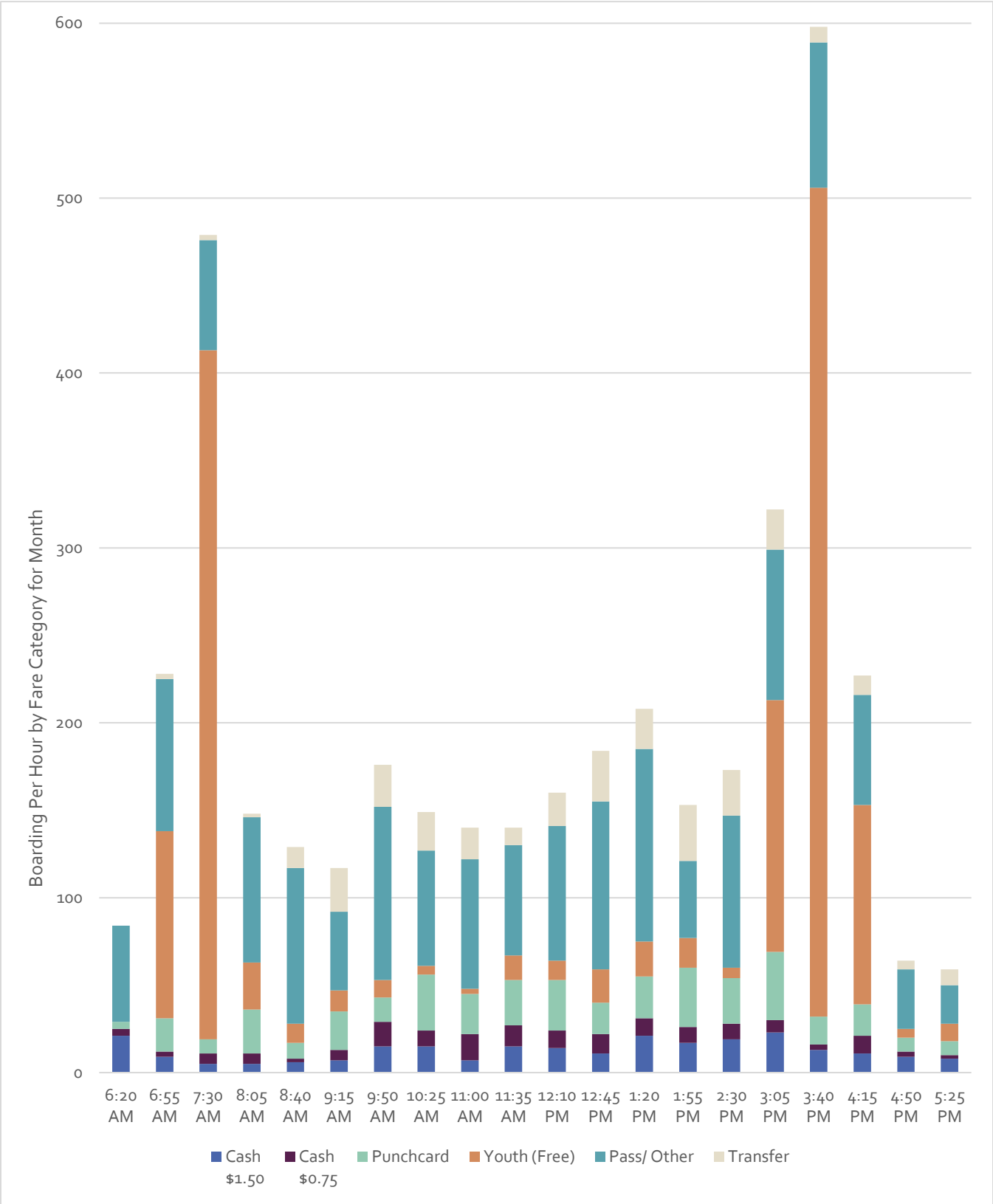


Figure 24: Coolidge Weekday Ridership by Time of Day and Fare Type, October 2019

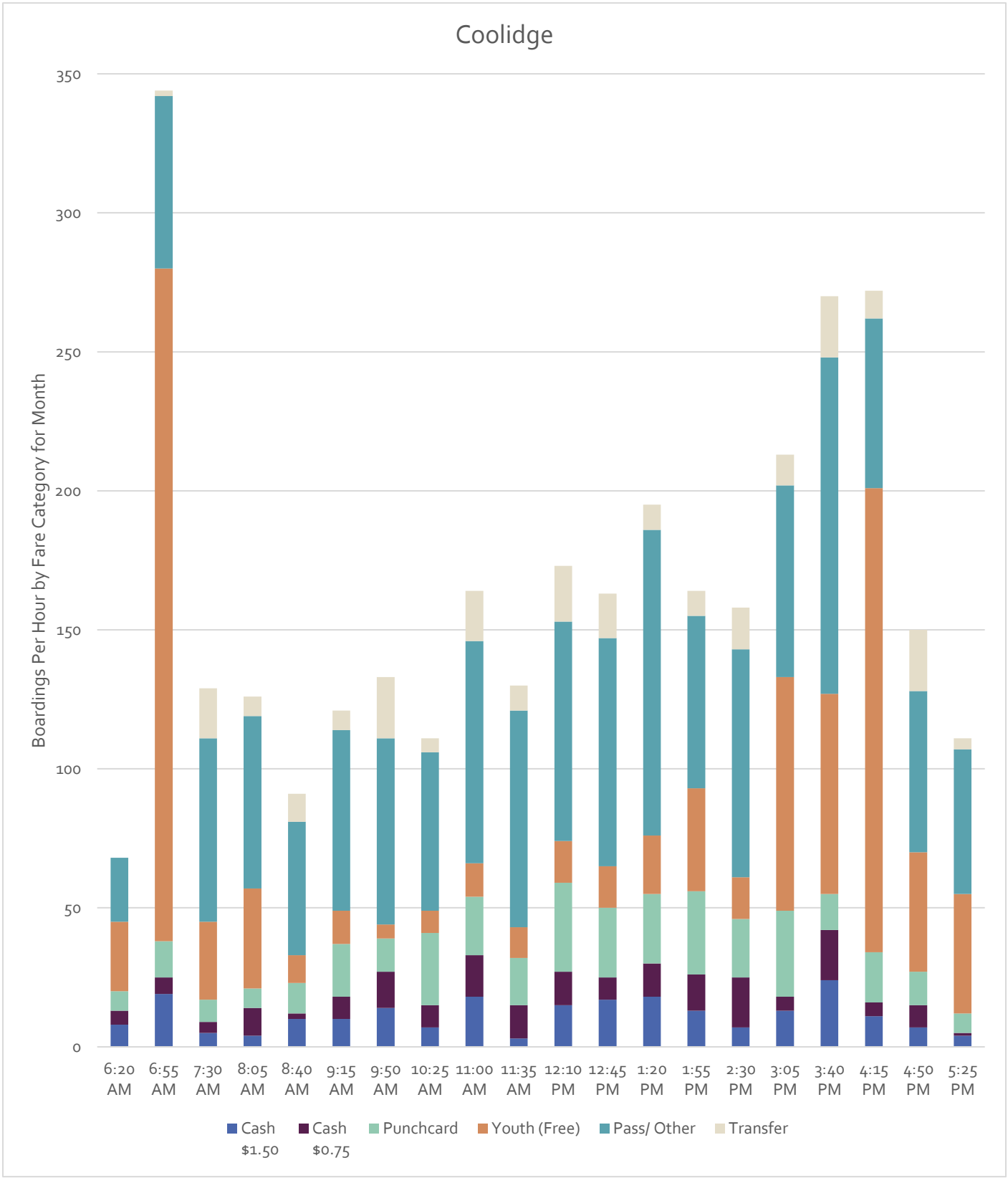


Figure 25: Jefferson Weekday Ridership by Time of Day and Fare Type, October 2019

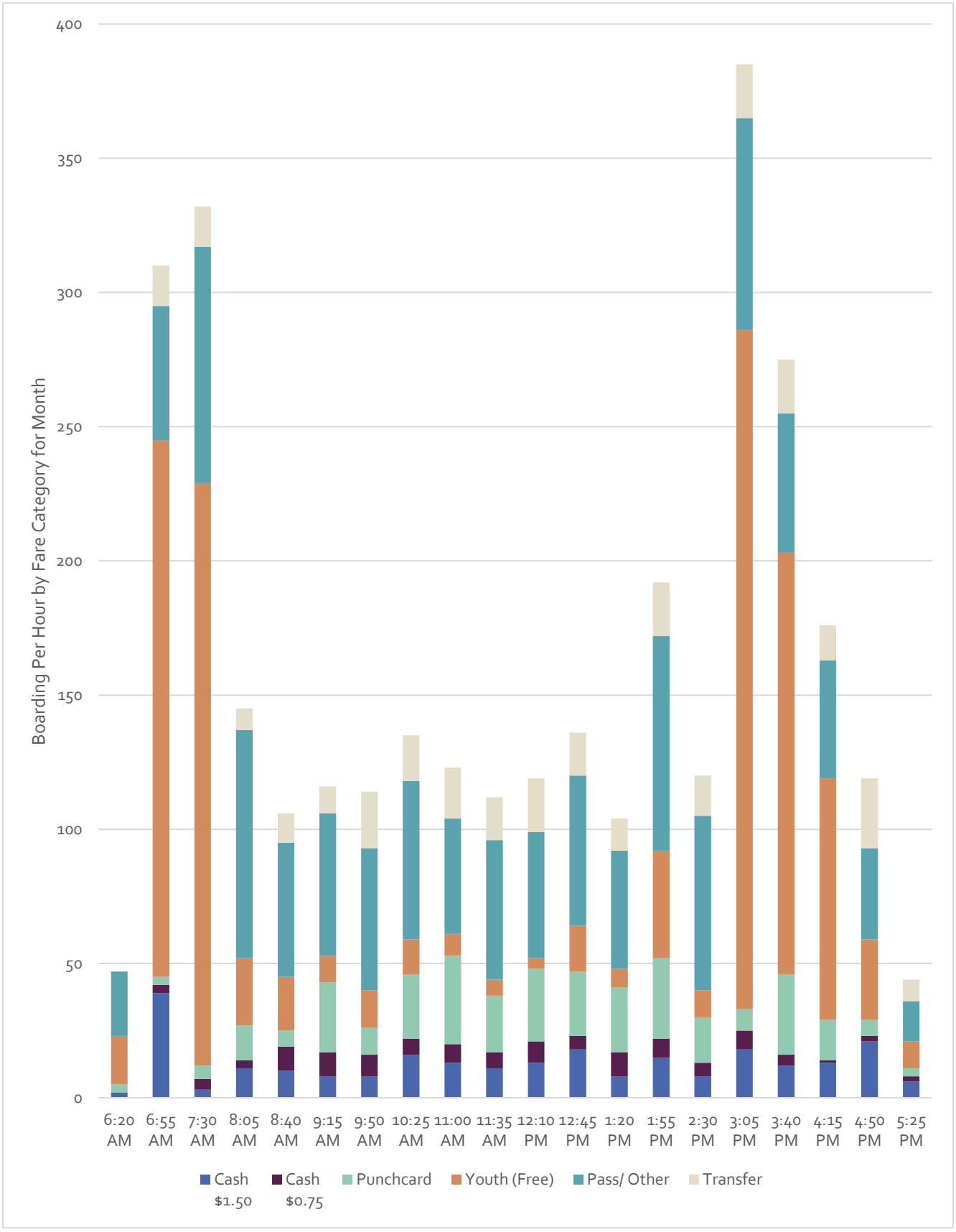


Figure 26: Lincoln Weekday Ridership by Time of Day and Fare Type, October 2019

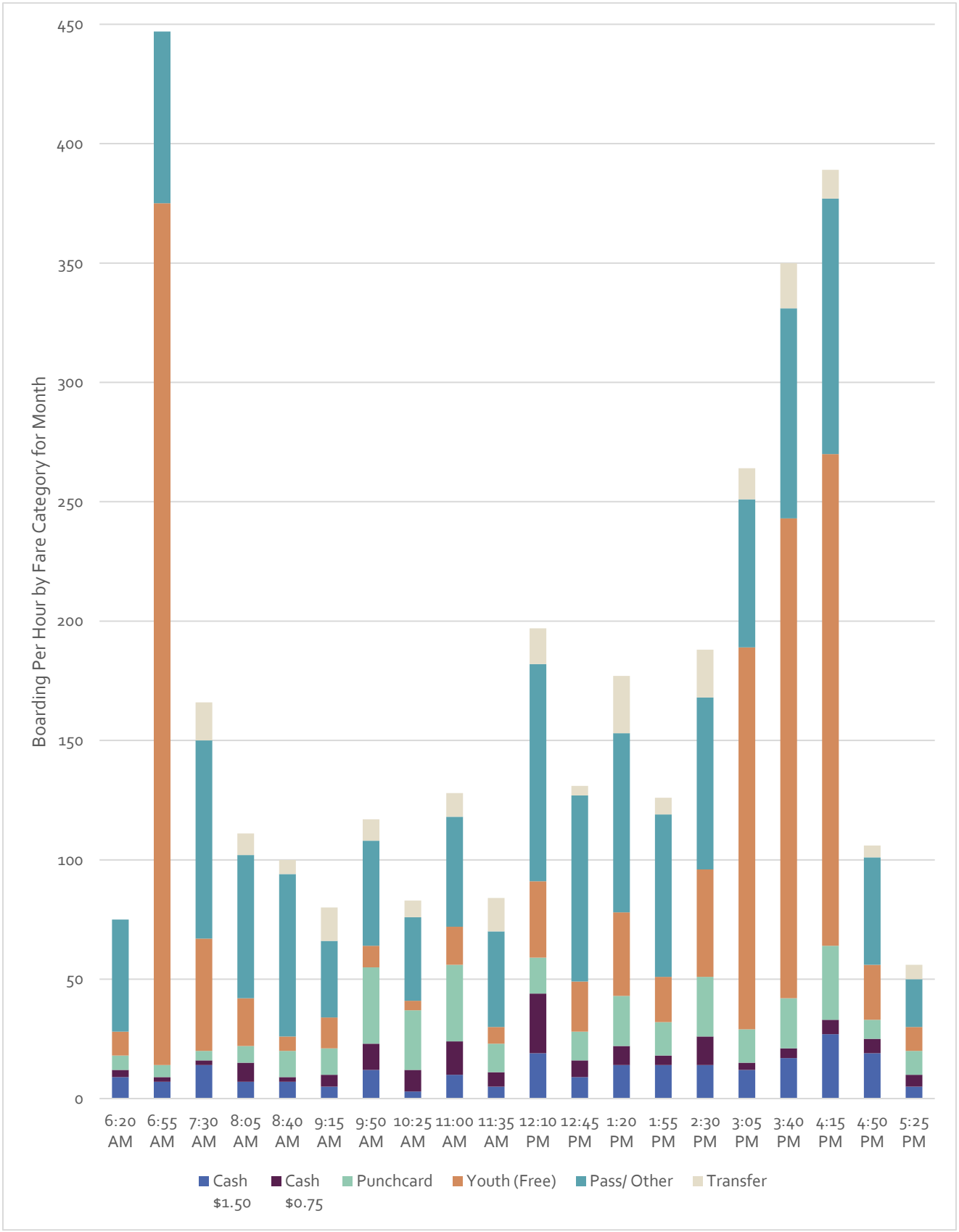


Figure 27: Roosevelt Weekday Ridership by Time of Day and Fare Type, October 2019

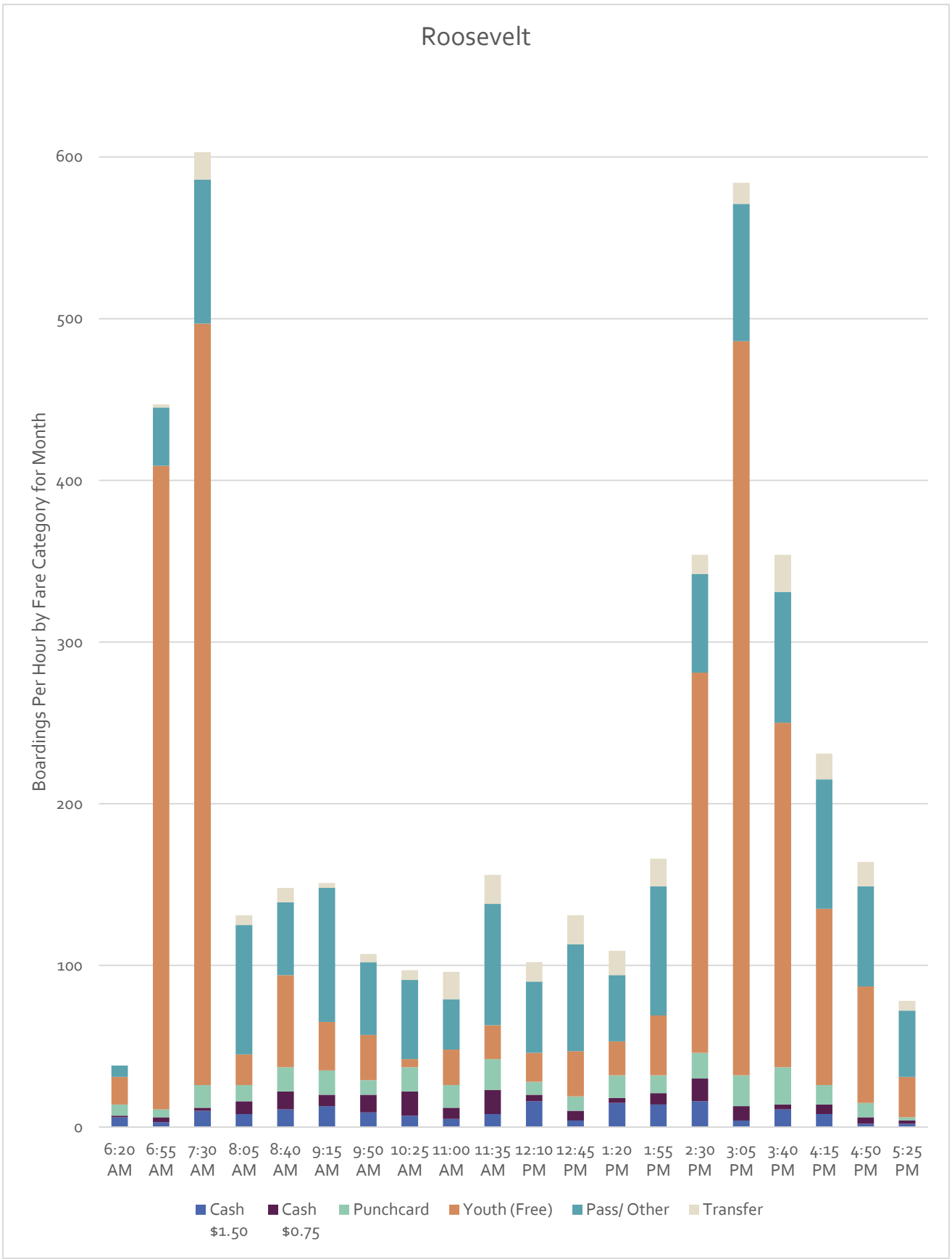


Figure 28: Washington Weekday Ridership by Time of Day and Fare Type, October 2019

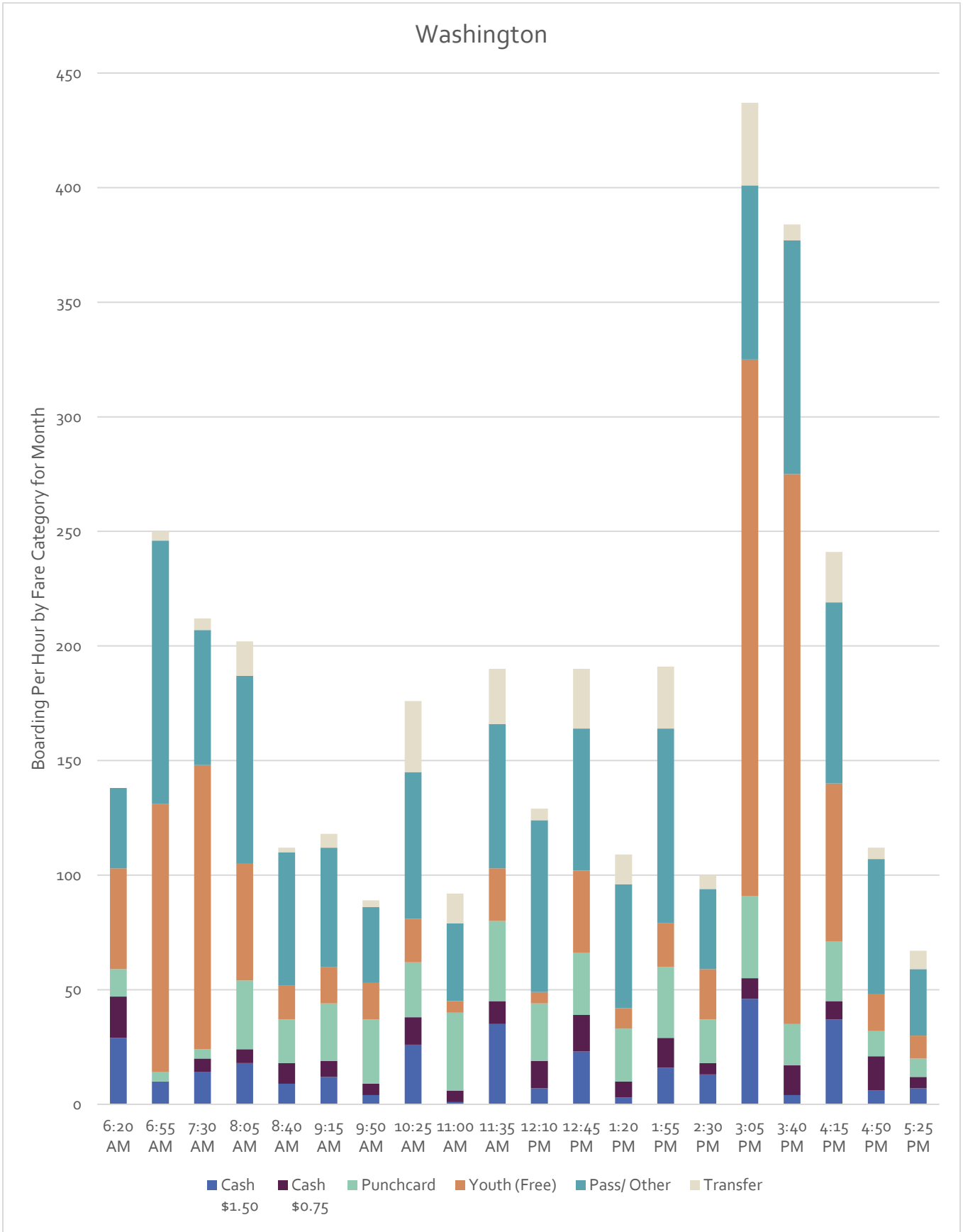


Figure 29: Weekday Fixed-Route Ridership, 2019

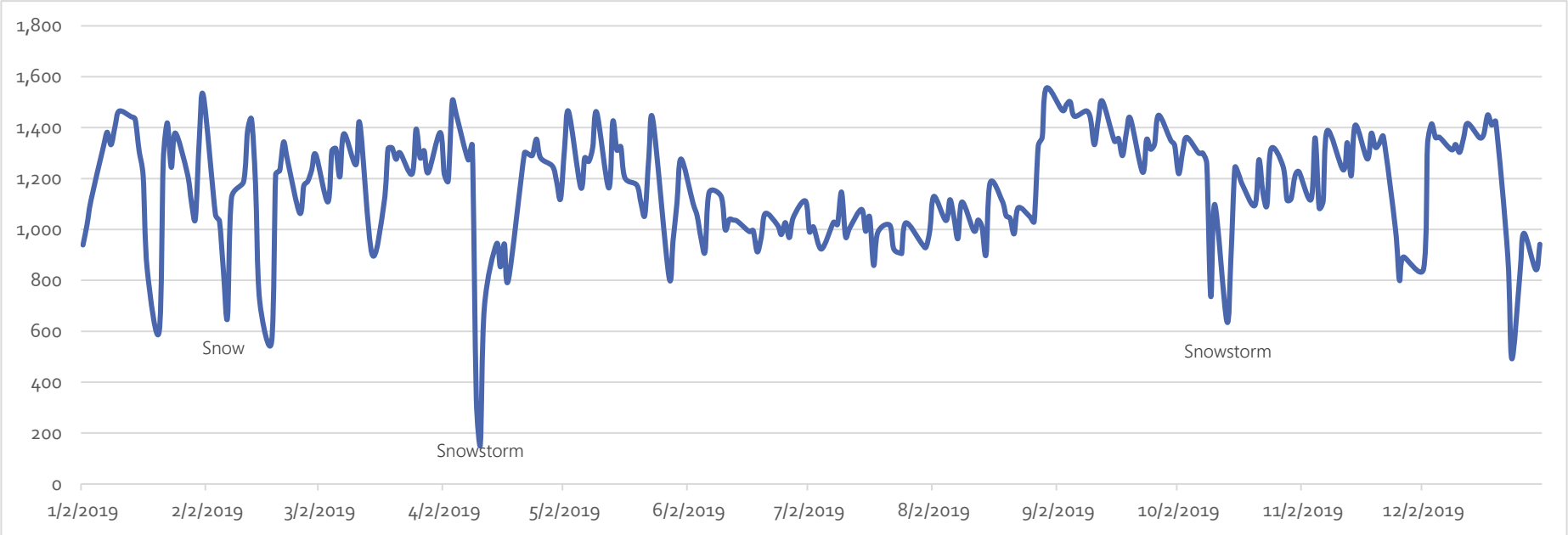
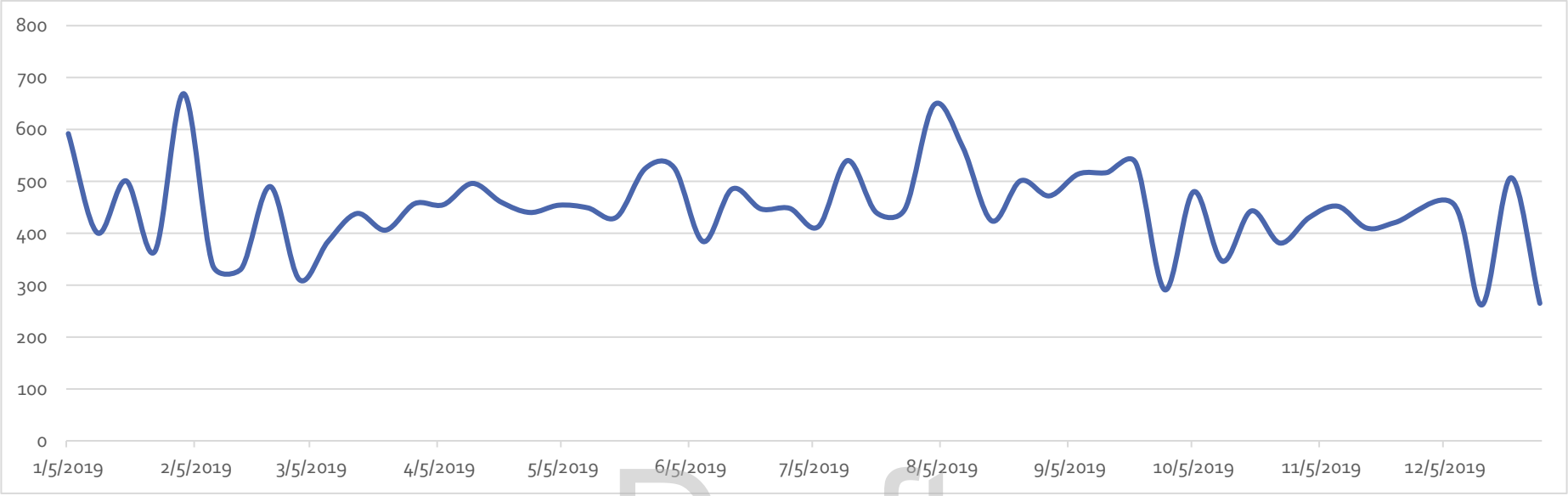


Figure 30: Saturday Fixed-Route Ridership, 2019



Reliability

Reliability is a critical element of the transit rider's experience; if the rider expects to catch a bus at a given time, it should not depart the stop too early or late. Although not every bus stop departure can be timed to the minute, transit systems typically identify several stops on each route that serve as timepoints. Their scheduled departure time is published for riders to use, and/or their adherence to that time is monitored by the agency.

In Rapid City, on-time performance is monitored at MBTC. Each time a driver leaves the MBTC at the start of their run or returns at the end of the run, they report the time to the dispatcher, who writes it by hand on a daily log sheet. There are six or seven additional scheduled timepoints along each route, but adherence to these timepoints is not logged. Because the log sheets are handwritten, reviewing and analyzing RapidRide reliability in detail is generally not done.

One clear trend is that buses tend to run late between the 2:30 PM and 4:30 PM laps, largely due to high student volumes after school ending times. This necessitated a policy that no buses leave MBTC until all transfers have been made. By the 4:50 PM lap, drivers have caught up to the schedule.

Speed

A local-service transit bus travels at a lower average speed than a personal vehicle because it has to stop more frequently. Transit service planners aim for an average operating speed of 12 to 15 miles per hour.[5] Values too far below or above that range indicate that the stop spacing or schedule may need to be adjusted.

The current RapidRide routes and schedule do not allow for average operating speeds under 15 miles per hour. The Jefferson North route has the lowest average speed at 15.55 miles per hour (Some route segments naturally move fast; for example, Lincoln South runs nonstop for half a mile along Cambell Street, which has a posted speed limit of 45 miles per hour. Even with these segments taken into consideration, scheduled run times are surprisingly short compared with the distance each route must cover.

Table 7). The Lincoln South route has the highest average speed at 23.32 miles per hour.

[5] This is a practical goal born of the observation that buses stopping to load passengers at regular intervals move slowly. The Transit Capacity and Quality of Service Manual does not discuss average operating speed in detail. Local bus service was defined by MBTA in the 1970s as a route that operates primarily on arterial streets, with a minimum of eight stops per mile and an average operating speed of 15 miles per hour or less. More recently, the industry has begun to use Google Maps for estimates, using the rule of thumb that the travel time of a bus should be about 30 percent higher than Google's predicted travel time for a car making the same trip.

Some route segments naturally move fast; for example, Lincoln South runs nonstop for half a mile along Cambell Street, which has a posted speed limit of 45 miles per hour. Even with these segments taken into consideration, scheduled run times are surprisingly short compared with the distance each route must cover.

Table 7. Scheduled Route Length and Speed

Route	Segment	Miles	Run Time (Minutes)	Average MPH
Borglum	Jackson	8.37	25	20.08
	West Main	8.10	25	19.43
Coolidge	North	8.66	25	20.78
	South 5th Street	10.38	28	22.23
Jefferson	North	7.98	23	20.81
	South	6.74	26	15.55
Lincoln	North	6.78	22	18.49
	South	9.33	24	23.32
Roosevelt	North	6.96	25	16.71
	South	7.16	25	17.19
Washington	North	6.95	25	16.69
	South	7.93	25	19.02

Stop Activity

Stops near major trip generators typically show more boarding and alighting activity than others. Examining the level of activity at different stops can suggest which parts of the system are critically important and which have narrower use value to riders.

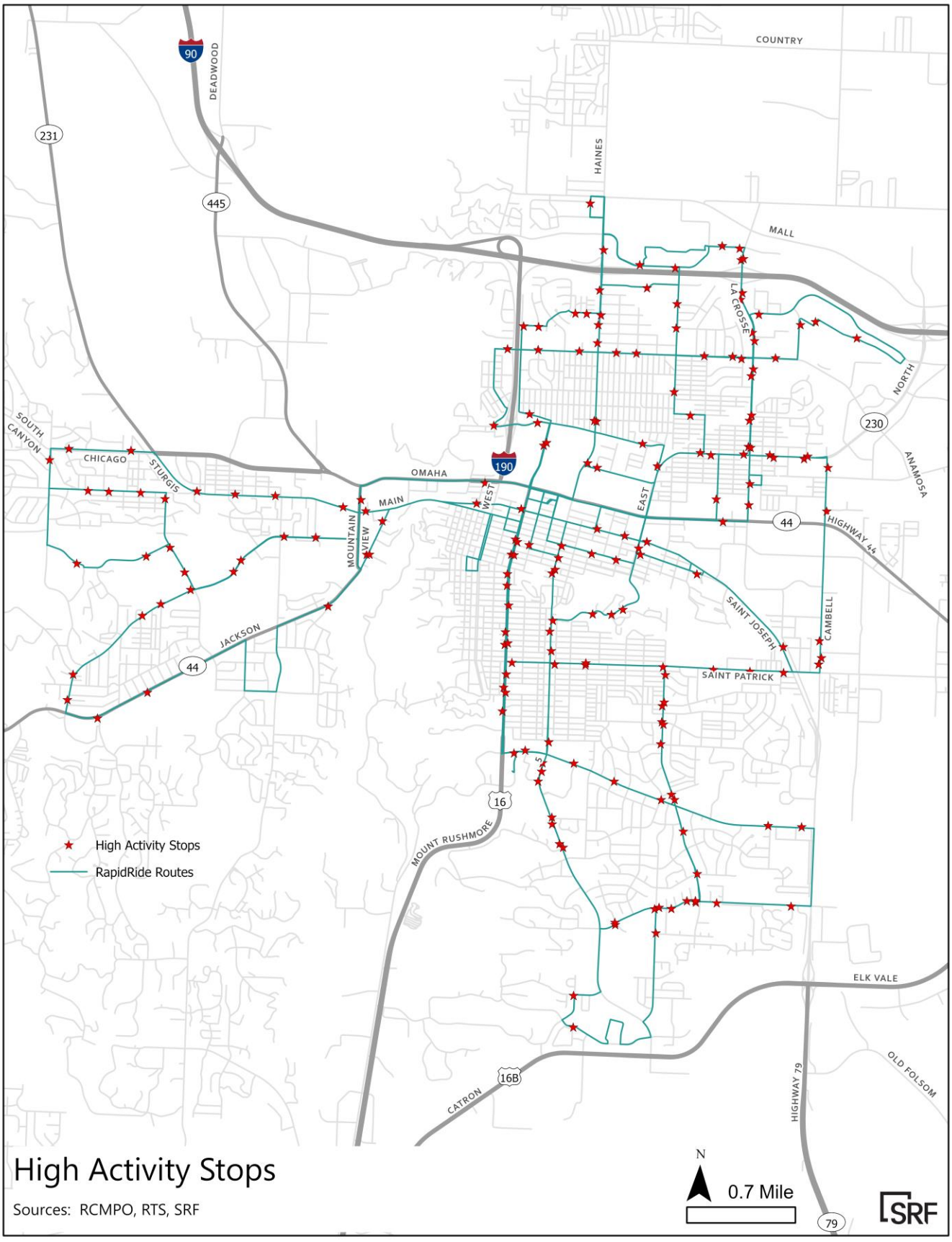
For this study, two operators (one from the AM shift and one from the PM shift) were asked to mark on a map the locations where they typically witnessed "high" activity and "moderate" activity[6] on each route. These locations were then matched with official stop locations as listed in a GIS shapefile created by RCAMPO in 2020. The route-specific activity maps are shown in Appendix X. It must be noted that drivers occasionally marked high activity in locations that do not have official stop locations. The Borglum – Jackson route in particular includes a southern segment that shows no activity on the stop map, but that was marked as high activity by both operators.

The map of all stops marked "high" on at least one route is shown in Figure 31. The results of this exercise indicate that there are no large segments of the fixed-route system with low activity. Short segments, such

[6] The operators were not given thresholds or asked to devise their own thresholds. They were assumed to have a reliable sense of the busiest stops on the route. The AM and PM operators by and large assigned the same scores to stops. Where they differed, the higher score was chosen.

as those on Cambell and 5th Street, are relatively unproductive, but they directly connect high-activity locations.

Figure 31: High Activity Stops



Peer Performance Analysis

This peer analysis examines the performance of the RTS fixed-route network relative to that of peer systems. Since there are no recognized industry standards for most measures of transit system performance, widespread practice is to compare the performance of a system to the average values of a peer group of systems. Data used in this report come from the FTA's National Transit Database (NTD), a repository of data about American public transit systems. NTD was used because its data are readily available and consistently reported.

The following peer analysis compares RapidRide performance to a peer group of six other fixed-route bus systems, using the performance measures listed in Table 8.

Table 8: Performance Objectives and Performance Measures

Performance Objective	Performance Measure
Cost Effectiveness	Operating Expenses Per Passenger Trip
Cost Efficiency	Operating Expenses Per Revenue Hour
Service Effectiveness	Passenger Trips Per Revenue Hour
Passenger Revenue Effectiveness	Average Fare Per Passenger Trip
	Operating Ratio (Passenger Revenues Per Operating Expenses)
	Subsidy Per Passenger Trip
Community Investment	Passenger Trips Per Capita
	Total Investment Per Capita
	Local Investment Per Capita

The measures in Table 8 are used to assess RTS fixed-route performance in two ways:

- Single Year: Comparison to peer average for the most current year. Year 2019 NTD data are used. This is the most recent year for which NTD data was available for all peer systems at the time of analysis.
- Multi-Year Trend Analysis: Comparison to peer average for five consecutive years. NTD data from 2015 to 2019 are used. The multi-year analysis excludes the three per capita measures, as reliable annual population updates are not available.

Peer Groups

The selection of the peer groups for RTS was based on a review of small urban bus systems in NTD. Other systems' fixed-route bus data (excluding any other modes operated) were used in the selection of peers and the subsequent analyses. Missoula, MT stands out in that it introduced a zero-fare policy in 2015. It was included in the peer group because it is one of the closest peers in terms of service area population and because its post-2015 boost in ridership is similar to the outcome of the Youth Ride Free campaign in Rapid City.

Table 9 contains 2019 operating statistics for RapidRide and the selected peer systems.

Table 9: 2019 Operating Statistics – Rapid City Peer Group

System Name	City	Revenue Hours	Passenger Trips	Operating Expenses	Passenger Revenues	Service Area Population
MET Transit	Billings, MT	41,735	424,671	$3,893,242	$369,856	114,773
CTP	Cheyenne, WY	21,966	146,166	$937,786	$93,597	73,588
GET	Greeley, CO	41,956	807,836	$3,710,029	$397,733	117,825
Mountain Line	Missoula, MT	50,193	1,556,774	$5,543,103	$0	82,157
SCTS	Sioux City, IA	42,820	834,379	$4,923,397	$675,803	106,494
SAM	Sioux Falls, SD	62,344	769,437	$4,280,835	$431,576	156,777
RTS	**Rapid City, SD**	20,752	**418,085**	**$1,380,153**	**$194,389**	81,251
Average		40,252	708,193	3,524,078	$360,492	104,695
RTS as Percent of Average		51.6%	59%	39.2%	53.9%	77.6%

Source: National Transit Database.

Performance Measures: Results

RapidRide Five-Year Summary

Table 10 and Table 11 show RapidRide operating statistics and performance measures, respectively, for 2015 through 2019. The average annual rate of change for the five-year period is calculated for each statistic and measure.

Table 10: Operating Statistics – RapidRide, 2015-2019

Operating Statistic	2015	2016	2017	2018	2019	Annual Rate of Change
Revenue Hours	19,452	19,755	21,043	20,987	20,752	2%
Passenger Trips	291,026	295,060	348,210	369,697	418,085	9%
Operating Expenses	$1,009,286	$988,280	$997,384	$1,211,152	$1,380,153	8%
Passenger Revenue	$229,542	$226,710	$174,897	$209,652	$194,389	-4%

Source: National Transit Database

Table 11: Performance Measures – RapidRide, 2015-2019

Performance Measure	2015	2016	2017	2018	2019	Annual Rate of Change
Operating Expense Per Passenger Trip	$3.47	$3.35	$2.86	$3.28	$3.30	-1%
Operating Expense Per Revenue Hour	$51.89	$50.03	$47.40	$57.71	$66.51	6%
Passenger Trips Per Revenue Hour	14.96	14.94	16.55	17.62	20.15	8%
Average Fare Per Passenger Trip	$0.79	$0.77	$0.50	$0.57	$0.46	-12%
Operating Ratio	22.74%	22.94%	17.54%	17.31%	14.08%	-11%
Subsidy Per Passenger Trip	$2.68	$2.58	$2.36	$2.71	$2.84	1%

Source: National Transit Database

RTS Performance Relative to Peer Groups

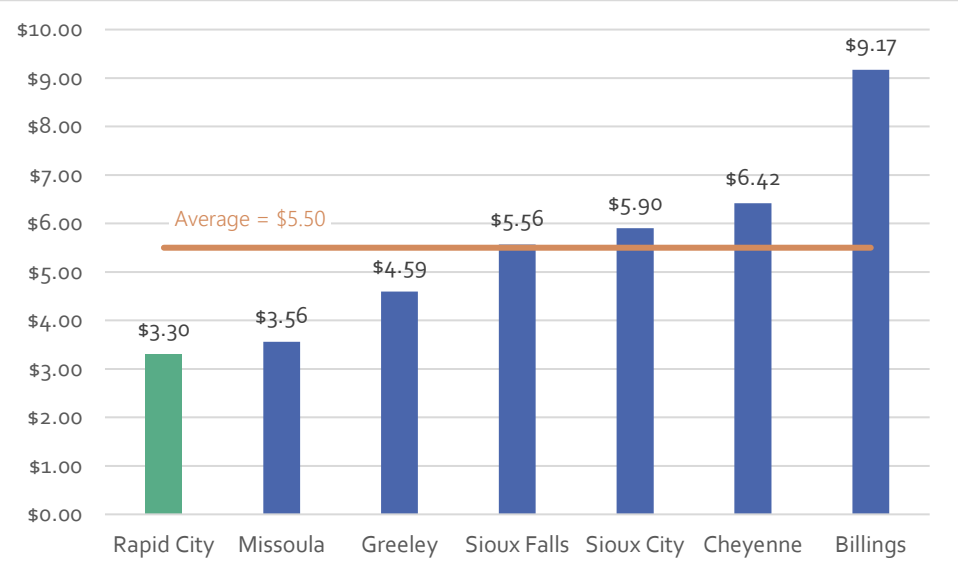
This section summarizes the results of the single-year (2019) and multi-year (2015-2019) analyses of the performance measures. RTS is compared to its peer group for each of the performance measures.

Cost Effectiveness

Cost effectiveness addresses transit use in relation to the level of resources expended. The primary measure for comparison in this category is **operating expenses per passenger trip.** The lower the cost per passenger trip, the more cost effective the service.

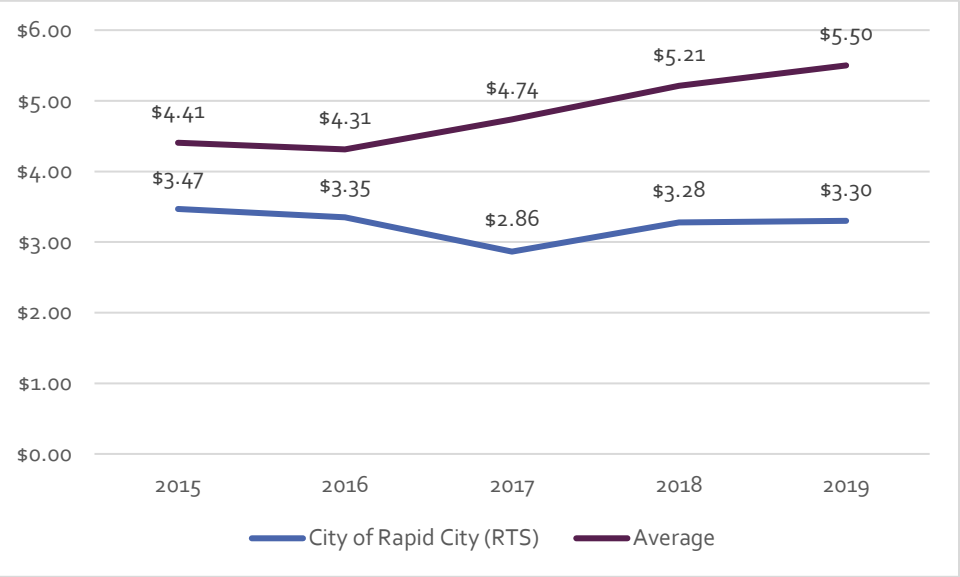
Rapid City has the lowest cost per passenger trip in its peer group, with Missoula a close second. Over the last five years it has trended in an opposite direction from peers, holding roughly steady as the peer average pulls upward.

Figure 32: Peer Operating Expenses Per Passenger Trip (2019)



Source: National Transit Database

Figure 33: Operating Expenses Per Passenger Trip Compared to Peer Average, 2015-2019



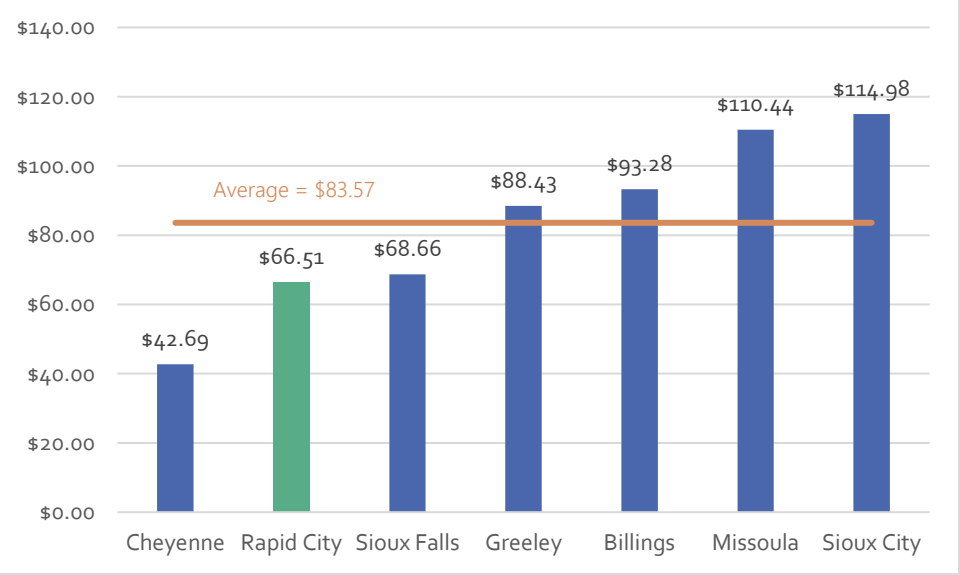
Source: National Transit Database

Cost Efficiency

Cost efficiency examines the amount of service produced in relation to the amount of resources expended. **Operating expenses per revenue hour** is the measure used to assess service efficiency.

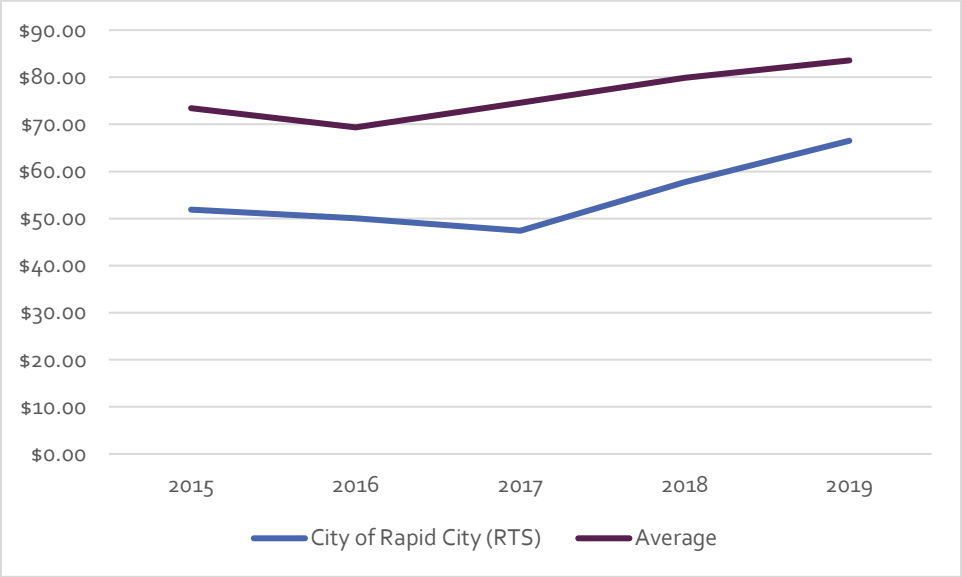
Rapid City is well below average in this metric as well, although it has been increasing faster than the peer average since 2017.

Figure 34: Peer Operating Expenses per Revenue Hour, 2019



Source: National Transit Database

Figure 35: Operating Expenses per Revenue Hour Compared to Peer Average, 2015-2019



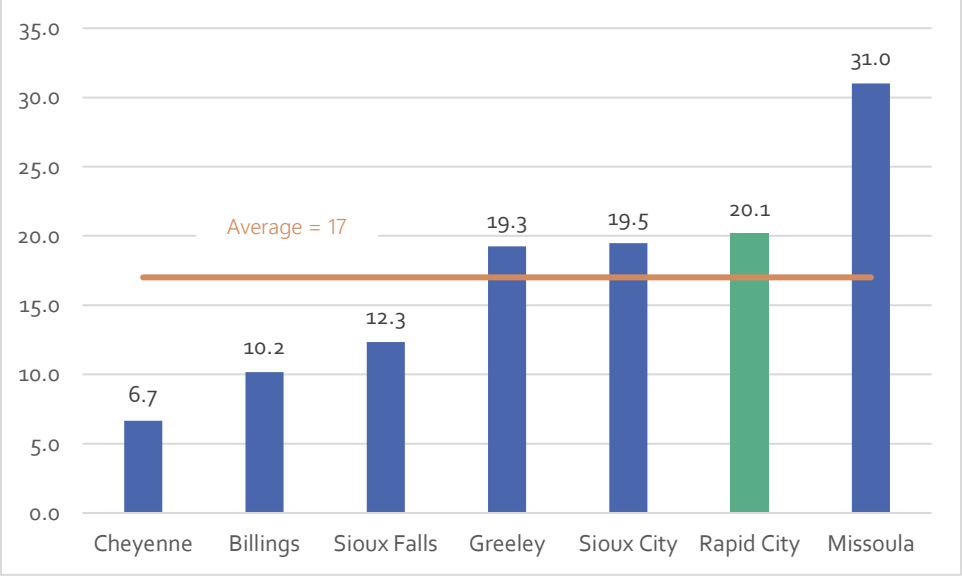
Source: National Transit Database

Service Effectiveness

Service effectiveness is a measure of the consumption of public transportation service in relation to the amount of service available. **Passenger trips per revenue hour** is the measure used to assess service effectiveness.

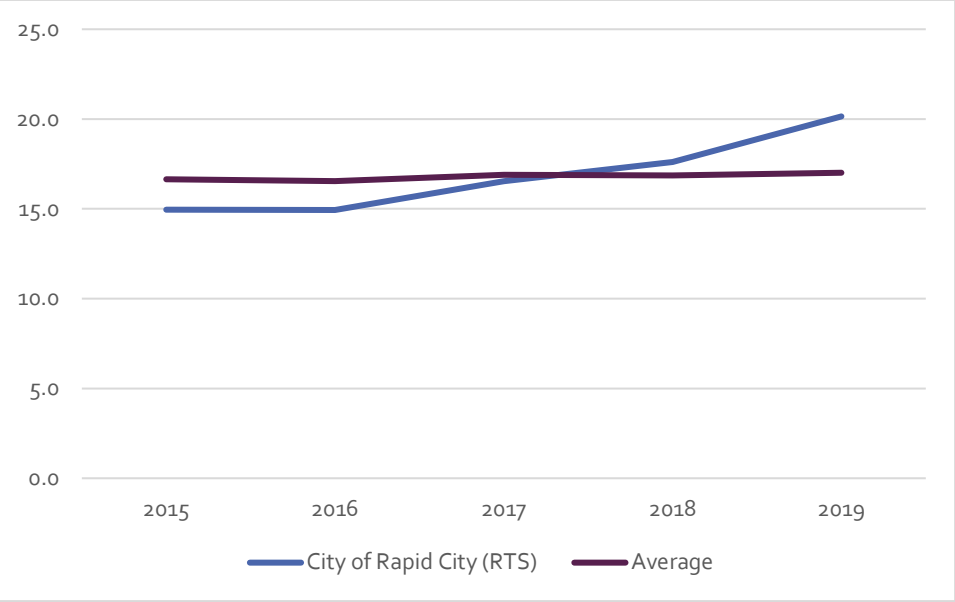
Rapid City has the second-highest number of passenger trips per revenue hour in its peer group, putting it above average and second only to Missoula. Unlike the peer average, Rapid City's performance has improved between 2015 and 2019.

Figure 36: Peer Passenger Trips per Revenue Hour



Source: National Transit Database

Figure 37: Passenger Trips per Revenue Hour Compared to Peer Average, 2015-2019



Source: National Transit Database, 2015-2019.

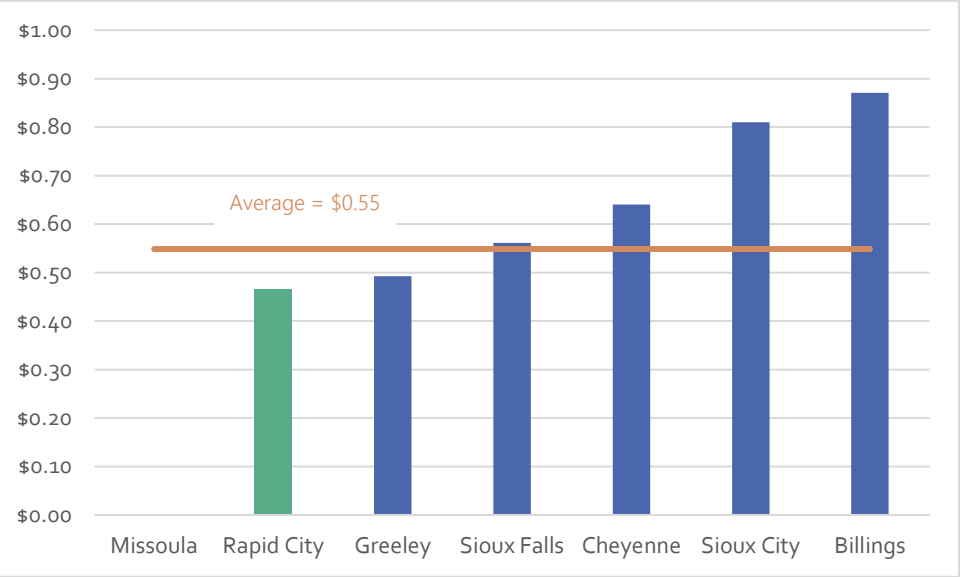
Passenger Revenue Effectiveness

Passenger revenue per passenger trip is a measure of the amount each passenger is paying to use the service and is reported as the **average fare per passenger trip**. From a financial perspective, a higher average fare is a positive finding for a public transit system whose operating budget depends on passenger fares. Understanding many transit customers are lower-income persons, active monitoring of whether the average fare level reduces use is needed and can be assessed relative to peers. Across the peers, the City of Missoula is an obvious exception, having decided to fund its service by other means. The zero-fare policy was initiated in 2015 with the financial support of the City of Missoula, Missoula County, and 13 other organizations. Prior to that, fares had represented nine percent of the operating budget.

Rapid City is again closest to Missoula in the peer group with below-average[7] fares per passenger trip. As Figure 39 illustrates, this metric declined sharply in 2016, coinciding with increased fare-free youth ridership.

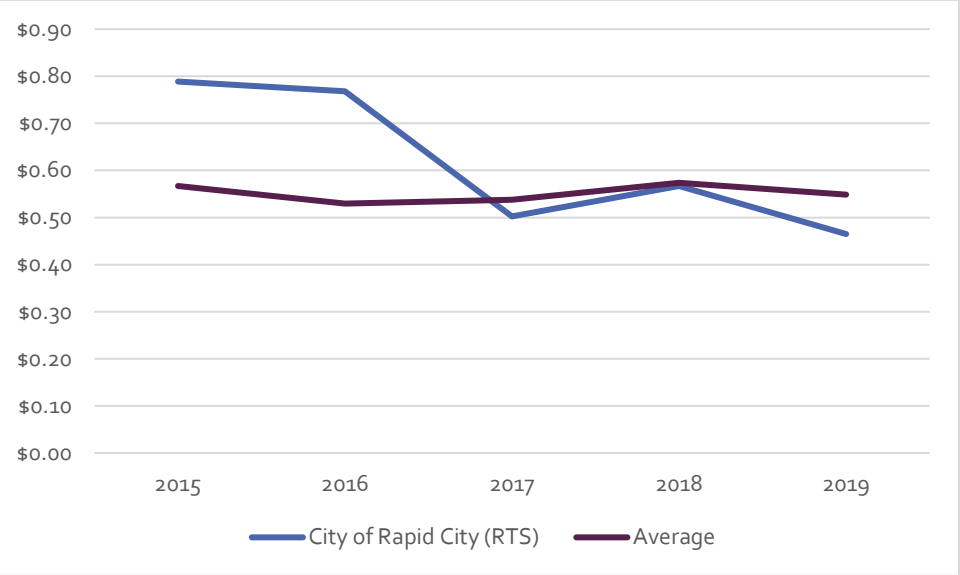
[7] Missoula is included in the calculation of every peer average, including fare-based metrics such as average fare per passenger trip. This decision was made because the metrics are not independent of one another. In Missoula as in Rapid City, zero-fare for all or some passengers results in higher ridership. The same factor that draws down the peer average for fares raises the peer average for ridership.

Figure 38: Peer Average Fare per Passenger Trip, 2019



Source: National Transit Database

Figure 39: Average Fare per Passenger Trip Compared to Peer Average, 2015-2019

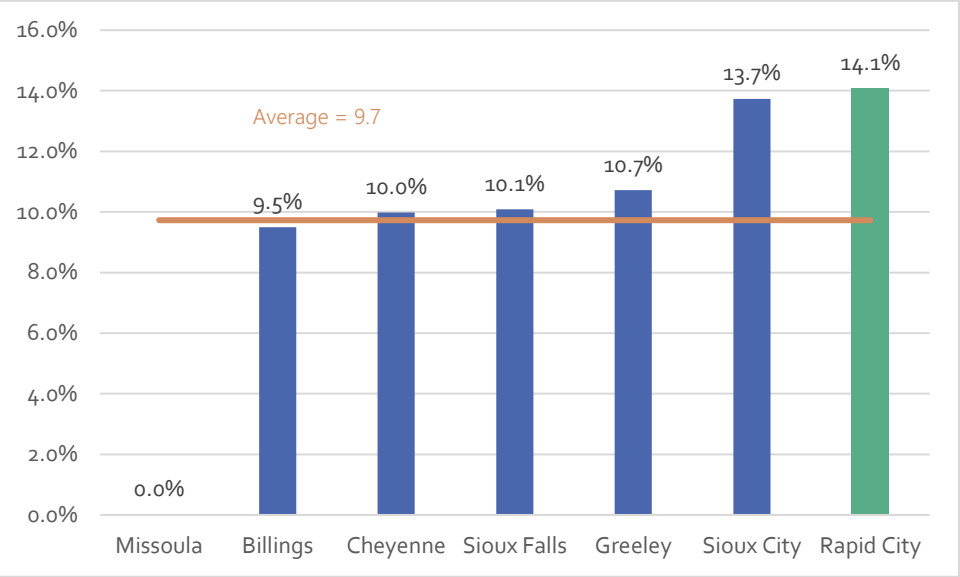


Source: National Transit Database

The ratio of revenue to operating expenses measures the level of operating expenses that are recovered through passenger fare payment. This measure is also simply referred to as the **operating ratio** or **farebox recovery**.

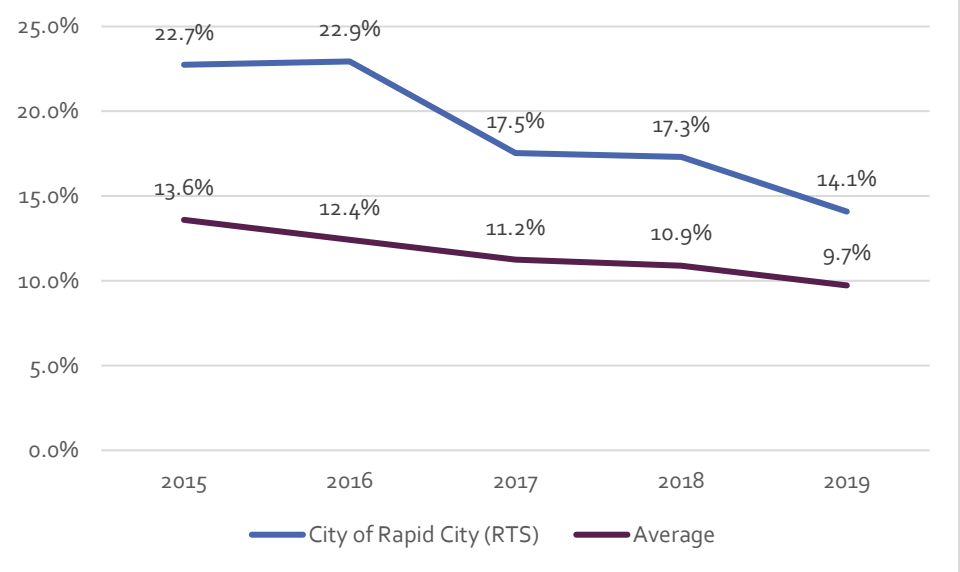
Rapid City's operating ratio is the highest in its peer group, although it has been declining at a faster rate than the peer average over the last five years.

Figure 40: Peer Operating Ratio, 2019



Source: National Transit Database

Figure 41: Operating Ratio Compared to Peer Average, 2015-2019

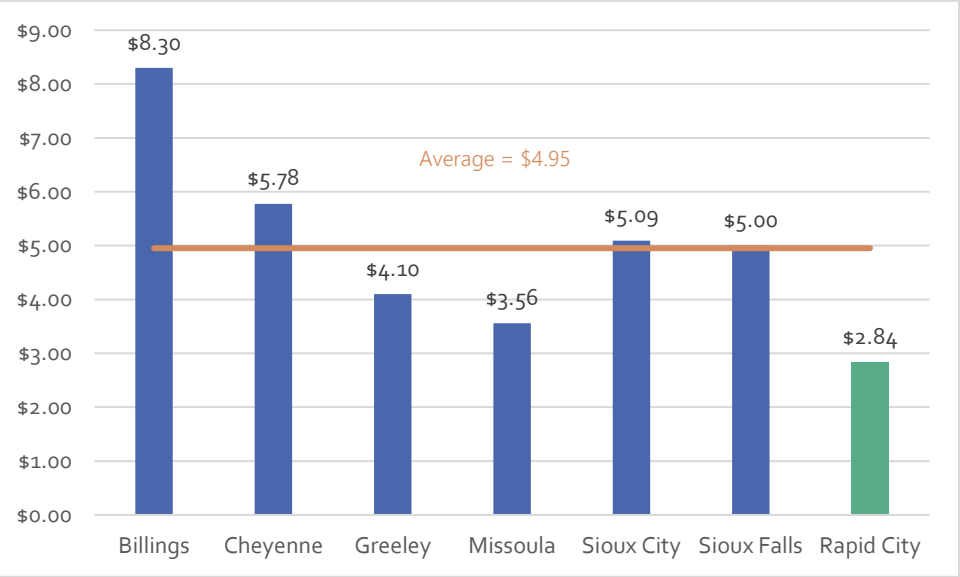


Source: National Transit Database

Net expense (subsidy) per passenger trip is used to measure the portion of each passenger trip that comes from sources other than fares.. Subsidy per passenger trip is calculated by subtracting passenger revenues from total operating expenses and dividing by total trips. The higher the operating subsidy, the more local, state, and federal resources are required to cover expenses.

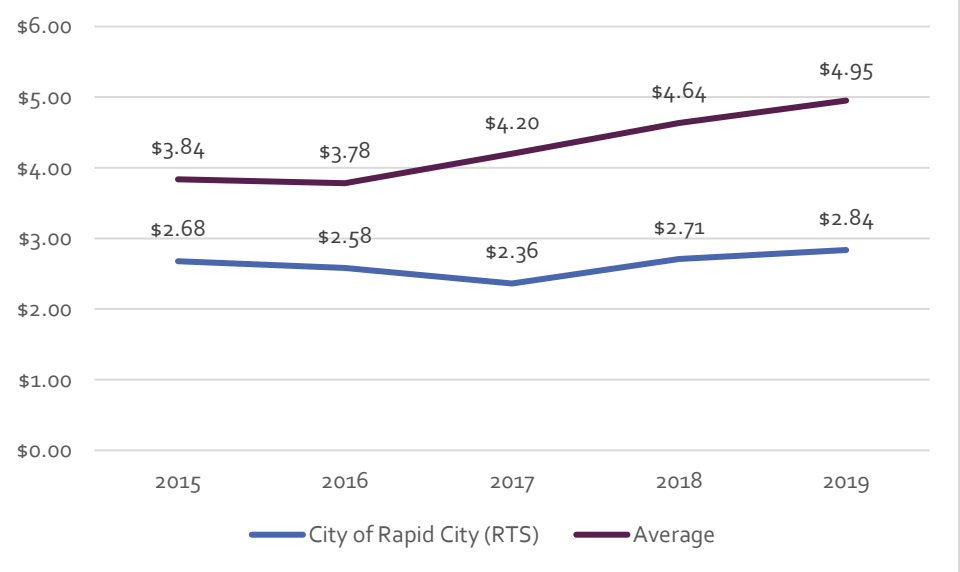
Rapid City's net subsidy per passenger trip is the lowest in its peer group at $2.84. It is increasing, but at a slower pace than the peer average.

Figure 42: Subsidy per Passenger Trip, 2019 Peers



Source: National Transit Database

Figure 43: Subsidy per Passenger Trip Compared to Peer Average, 2015-2019



Source: National Transit Database

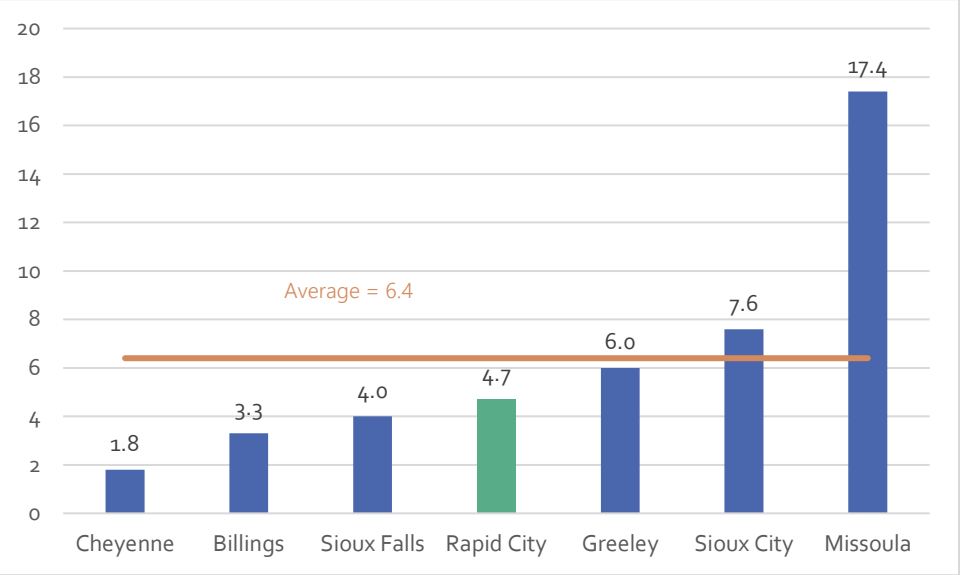
Community Investment

Three performance metrics use the total population of the transit service area to identify to the degree to which the community invested in public transit. This category includes market penetration, as measured by passenger trips per capita, but it also includes the degree of funding allocated to transit by decision-makers, as measured by total investment per capita and local investment per capita.

The per-capita figures used here are derived from the urbanized area population reported by each transit agency to the NTD. This count relies on the 2010 Decennial Census and will not be updated again until the 2021 reporting year. In the last decade, each of the peer cities has experienced annual population growth of up to two percent, resulting in populations that are between three and 25 percent larger than they were in 2010.[8] These city-specific growth rates are used to estimate 2019 urbanized area populations.

Although Rapid City comes in ahead of Cheyenne, Billings and Sioux Falls in terms of passenger trips per capita, it is well below average – likely because Missoula's high ridership drives the peer average upward.

Figure 44: Passenger Trips Per Capita, 2019 Peers

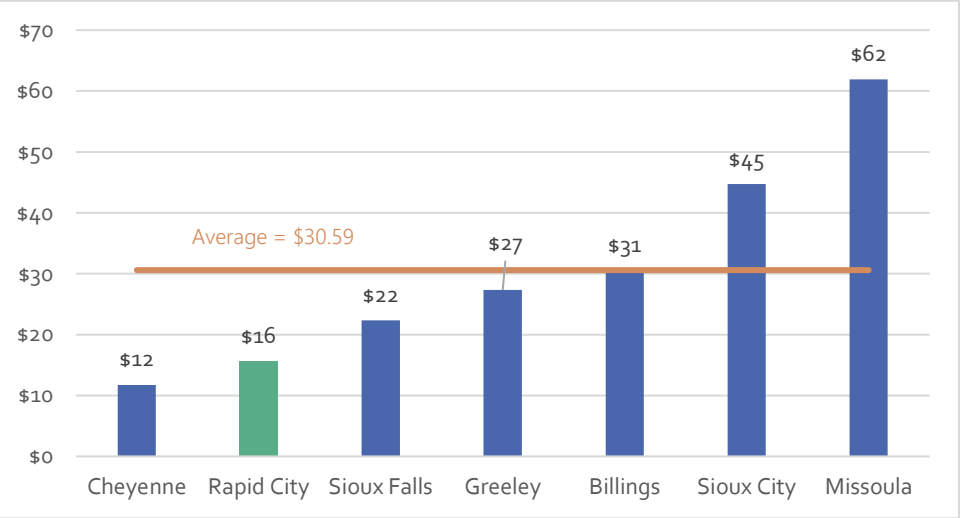


Sources: National Transit Database, U.S. Census Bureau

Rapid City is at the low end of the spectrum in terms of dollar investment per capita. Figure 45 shows the total operating expenses (for all modes) reported to the NTD for 2019. At $16.99 per capita, Rapid City is well below the average and lower than all but one of its peers.

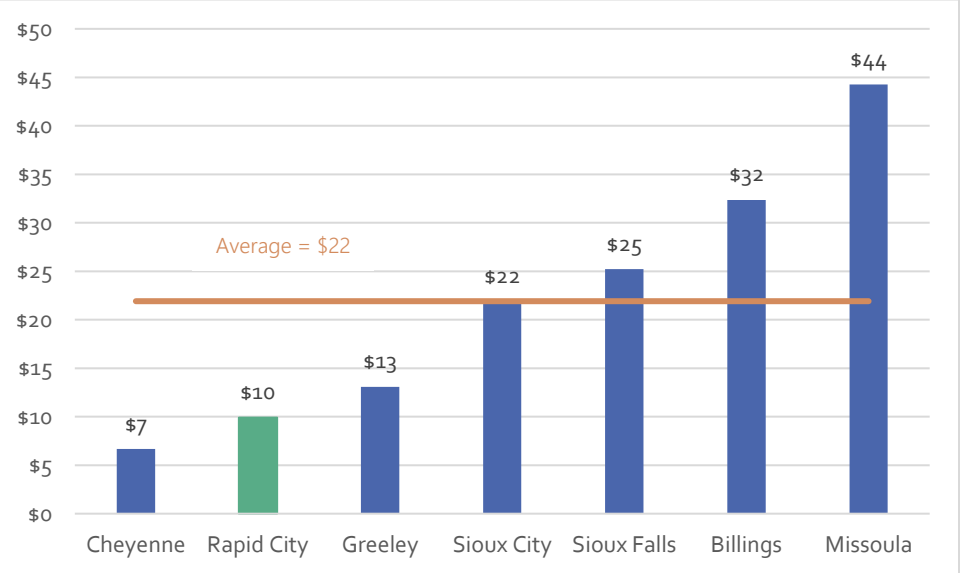
[8] Based on the difference between the 2020 Census high-level counts released in August 2021 and the 2010 Census counts.

Figure 45: Investment per Capita, 2019 Peers



Source: National Transit Database

Figure 46: Local Investment Per Capita, 2019 Peers



PART 3:
PUBLIC ENGAGEMENT

Public Engagement

Engagement efforts conducted in 2021 provided input on current conditions and generated ideas for service improvements from current riders and community members through an onboard passenger survey, a community survey, presentations and discussions with stakeholder groups, and pop-up events.

Study Advisory Team

The outreach process included three videoconference meetings with a Study Advisory Team (SAT) composed primarily of representatives from federal, state, and local government agencies. The SAT provided input and oversight over the course of the project. Participants in these meetings included Bill Troe, Menno Schukking, and Eavan Moore (SRF); Kelly Brennan (RCAMPO); Megan Gould (RTS); Kip Harrington (City of Rapid City); Sarah Gilkerson and Monte Meier (SDDOT); Kumar Veluswamy and Melissa Karpo (Rapid City Area Schools); Pat Jones (Rapid City Council); and Kristin Kenyon (FTA).

Project Website

A standalone project website (rtstransitplan.com) went live in April 2021 and remained online for the duration of the project. It included information on the TDP process; contacts at RCAMPO, RTS, and SRF; a link to a community survey; and a link to an interactive map-based survey described in more detail below.

Normally a transit development plan would launch with a public meeting that would include a presentation by project staff and/or an open house. In light of pandemic-related restrictions on public gatherings, the project team instead recorded a presentation and uploaded it to the website.

Stakeholder Meetings

The project team held small group discussions and interviews with stakeholders to gain their perspectives on how transit service can make their communities better places to live and work. In doing so, valuable insights were gained from people with diverse viewpoints and experiences in the community; this stimulated creative thinking and enabled discussions to be driven by stakeholders.

Small group discussions took place in person and via conference call. Participants included representatives from the Rapid City Human Services Agency; Pennington County Housing Authority; Monument Health; Rapid City Council; the Standing Committee on Sustainability; Western SD Community Action Agency; YMCA; Elevate Rapid City; Feeding South Dakota; Prairie Hills Transit; and RTS personnel employed in dispatch, route supervision, bus operation, and maintenance.

The following is a summary of themes that emerged from stakeholder meetings and conversations with transit riders.

Input Received
Lack of transportation is a barrier to human services agencies outside the transit service area. Request expanding area – Catron/Mt. Rushmore area, industrial areas in northeast part of town, apartments near Black Hills Energy are examples.
Focus needs to be on getting people to work.
Service to Western Dakota Tech is needed.
Additional service hours are needed. There is demand between 6 PM and 6 AM that is not served.
Need to equitably provide service to areas with low-income populations.
There are dialysis services on the east side of town – outside the fixed-route coverage – As long as location is inside the city limits, people can use Dial-a-Ride to get to dialysis (short-term certification).
Need to consider greenhouse gas emissions from diesel buses. Are electric buses feasible?
Sidewalk condition and whether they are present at stops and from stops to destinations is critical.
Development patterns are not transit friendly.
Added information on bus location is needed at stops.
Are crosstown routes (or one route) feasible? Not everyone wants to go downtown. An issue to address – Very few transfers occur outside the downtown transit center.

Pop-Ups

In July 2021, the project team spent time engaging those who were unable to attend a meeting or have a phone call by spending time in community places. These "pop-up" events enable brief but impactful engagement with the broader public, especially those who are less likely to attend a formal meeting, including low-income people, those working multiple jobs, and busy families.

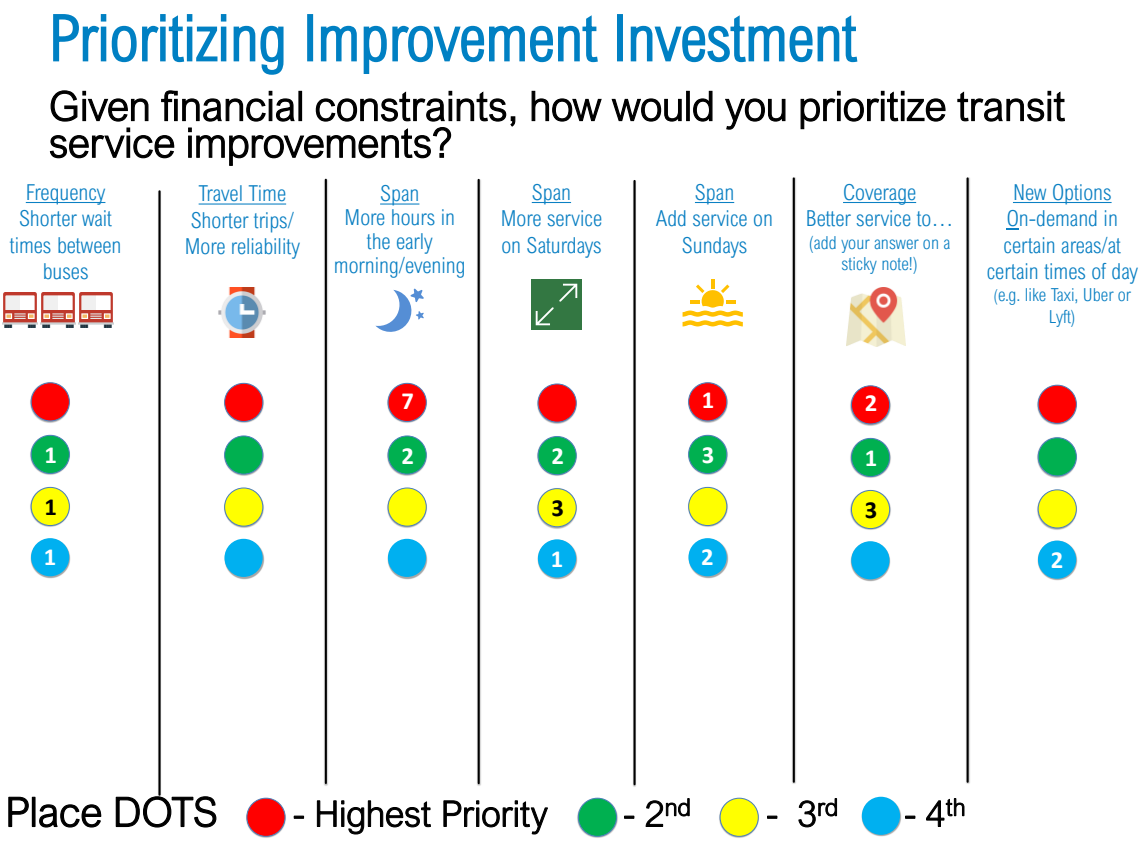
This engagement strategy allows opportunity to introduce the project in an informal setting and initiate open dialogue with community members. At the pop-up events, community members could talk with the project team and provide input through dot exercises and filling out the community survey. The project team held pop-up meetings at a "Coffee with Planners" event at City Hall, at a Summer Nights outdoor concert, and at a public housing complex.

During the July 15 Summer Nights pop-up, passersby were engaged to gather input on their use of transit and types of improvements that would benefit the community. While the majority of people the team interacted with were not transit riders, those who were provided input on current service perceptions and types of new service or new service areas needed. In a dot-sticker exercise, they indicated which service improvements were highest priority. The final results of the exercise are illustrated in Figure 48. In summary, preferences for service improvements were as follows:

- Add more service hours: 7 Highest Preference; 2 Second Highest
- Expand service coverage: 2 Highest Preference; 1 Second Highest; 3 Third Highest

Figure 47: Summer Nights Pop-Up Engagement

Figure 48: Preference for Transit Service Investment, July 25 Summer Nights Event Input



Onboard Survey

Surveys of transit customers, often referred to as onboard surveys, are useful in informing a transit system's planning and operations functions; they enable staff and elected officials to make data-driven decisions. The RTS onboard survey gathered information about how the transit system is working for customers, identified areas of need and priorities, and collected demographic information.

Methodology

The survey consisted of 15 questions, presented concisely to maximize legibility and responses. Questions included the subjects of the passenger's trip origin and destination, trip purpose, and bus transfer information; demographics; and which potential improvements would be preferred by riders.

The survey was offered in both online and paper format from Thursday, May 13 through Saturday, May 15. The online survey was promoted by including a QR code link on the paper surveys and on posters hung on bus and MBTC walls. However, only two individuals chose to fill out the online version of the survey.

Paper onboard surveys were handed out by bus drivers and self-administered by passengers. Passengers were asked to fill out a new survey every time they boarded. As an incentive to participate in the survey, those who voluntarily entered their contact information at the end of the survey were entered to win one of five $25 gift cards.

Findings

A total of 240 responses were collected, equivalent to about a quarter of one day's average ridership. 128 were collected on a Thursday, 89 were collected on a Friday, and 13 were collected on a Saturday. Ten surveys could not be attributed to a specific date.

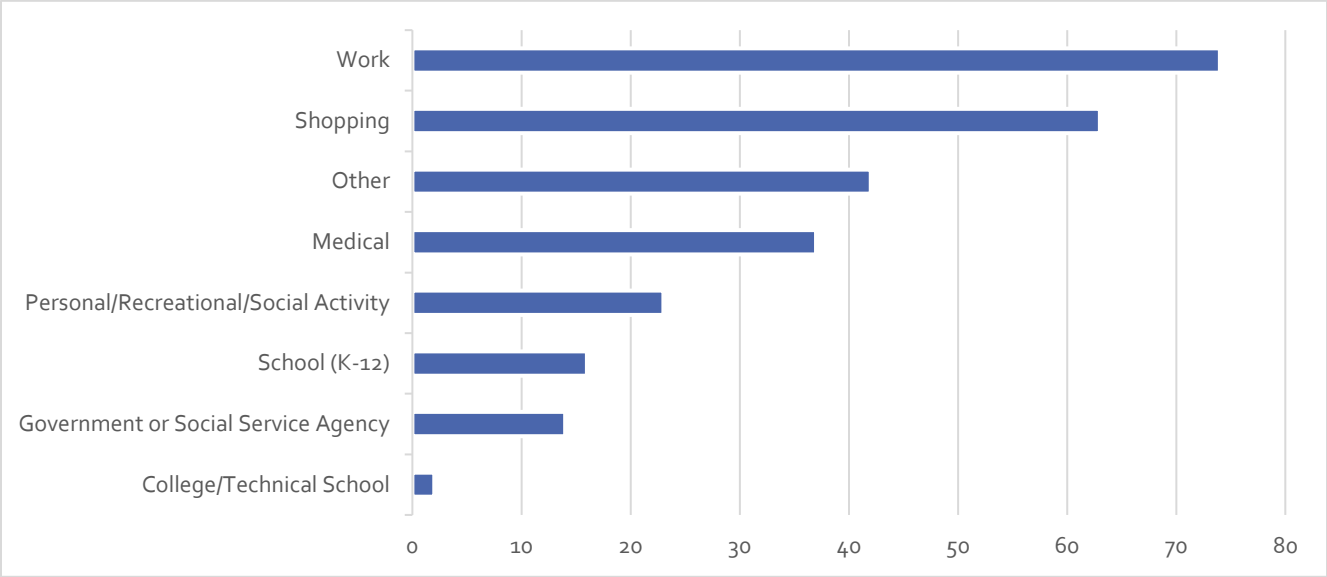
One survey response represents one boarding, not one individual; a review of the responses showed that at least some passengers did fill out the survey multiple times as requested. All of the findings discussed in this section, including demographic data, should be interpreted in this light.

Trip Purpose

Passengers were asked for the origin and destination of their trip, both as a type of place (such as "home" or "medical") and as a specific location. About 80 percent of trips were made directly to or from home. About one in five responses were chained trips, i.e. they combined multiple stops into one transit journey. For example, five surveys reported leaving a medical appointment to go shopping, and four reported traveling from one shopping destination to another.[9]

[9] This is a common but often overlooked feature of transit-dependent life. In this case, the four trips were made from 6th and Main to Rushmore Mall; from Sweet Treats on North Haines to Bankwest on Omaha Street; from Family Fare to Cloud 9 on North Haines; and from Mount Rushmore Road and East Anamosa to Wal-Mart.

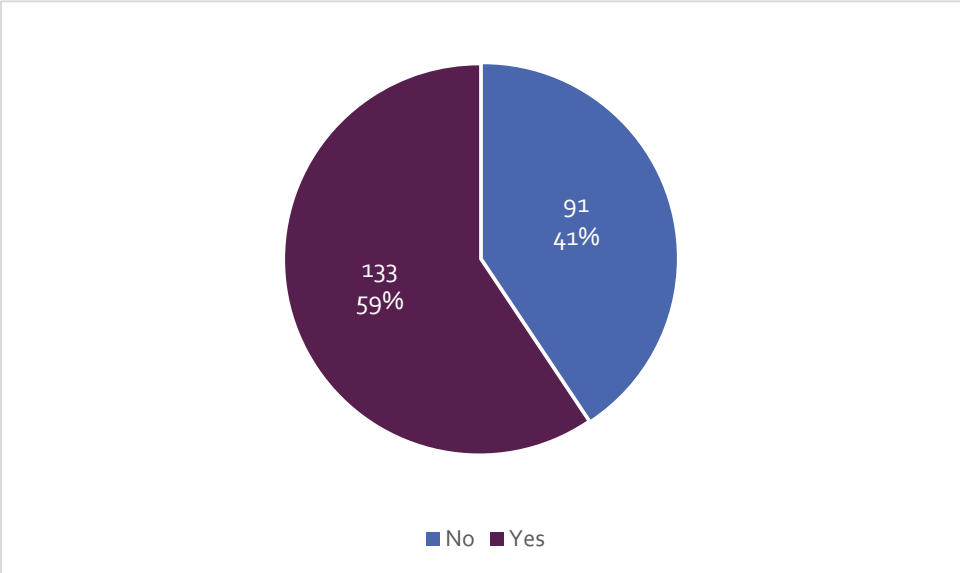
Figure 49: Combined Origins and Destinations (Excluding Home)



Travel Mode and Transfers

Figure 50 shows whether respondents transferred during their one-way trip.

Figure 50: Number and Percent of Trips Requiring Transfers



Source: 2021 Onboard survey

Few of the survey respondents named the route they were planning to transfer to; only 98 offered one of the six official route names. Table 12 was produced by counting these 98 and by interpreting an additional 19 responses. "Brown" (one response) was reclassed as "Coolidge," and "North" (eight responses) was assumed to mean the northbound loop of the same route. Responses not included in the table were "East" and "Main."

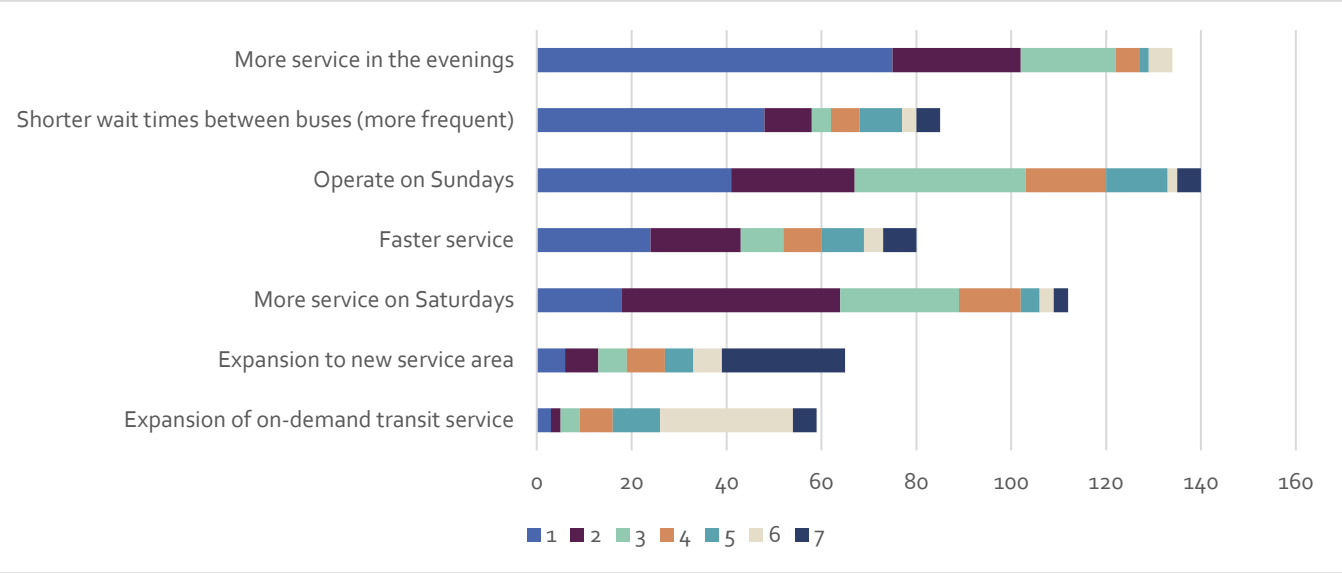
Table 12: Onboard Survey Transfer Routes

Current Route	Transfer Route					
	Borglum	Coolidge	Jefferson	Lincoln	Roosevelt	Washington
Borglum		4	3	3	8	6
Coolidge	2	5	4		3	3
Jefferson	6	3	3	1	2	2
Lincoln	3	2	2	1	5	3
Roosevelt	8	3	2	1		2
Washington	6		2	4	3	2

Potential Improvement Preferences

Passengers were presented with six potential transit service improvements and asked to rank them. Figure 51 shows these improvements ordered by the number of surveys that assigned them the top ranking of 1. The most frequently top-ranked improvement was "more service in the evenings." Frequency was the second most desirable service improvement.

Figure 51: Potential Improvements



Source: Onboard survey

Few respondents ranked all seven improvements. Among those who did, a majority assigned the lowest ranking of 7 to service area expansion. That, and the relatively low response rate for this improvement, suggests little positive interest among current fixed-route riders. However, a number did take the time to write out a potential expansion area. Their responses are shown in Table 13, along with the rank they assigned this improvement.

Table 13: Suggested Service Areas

Ranking	New Service Area

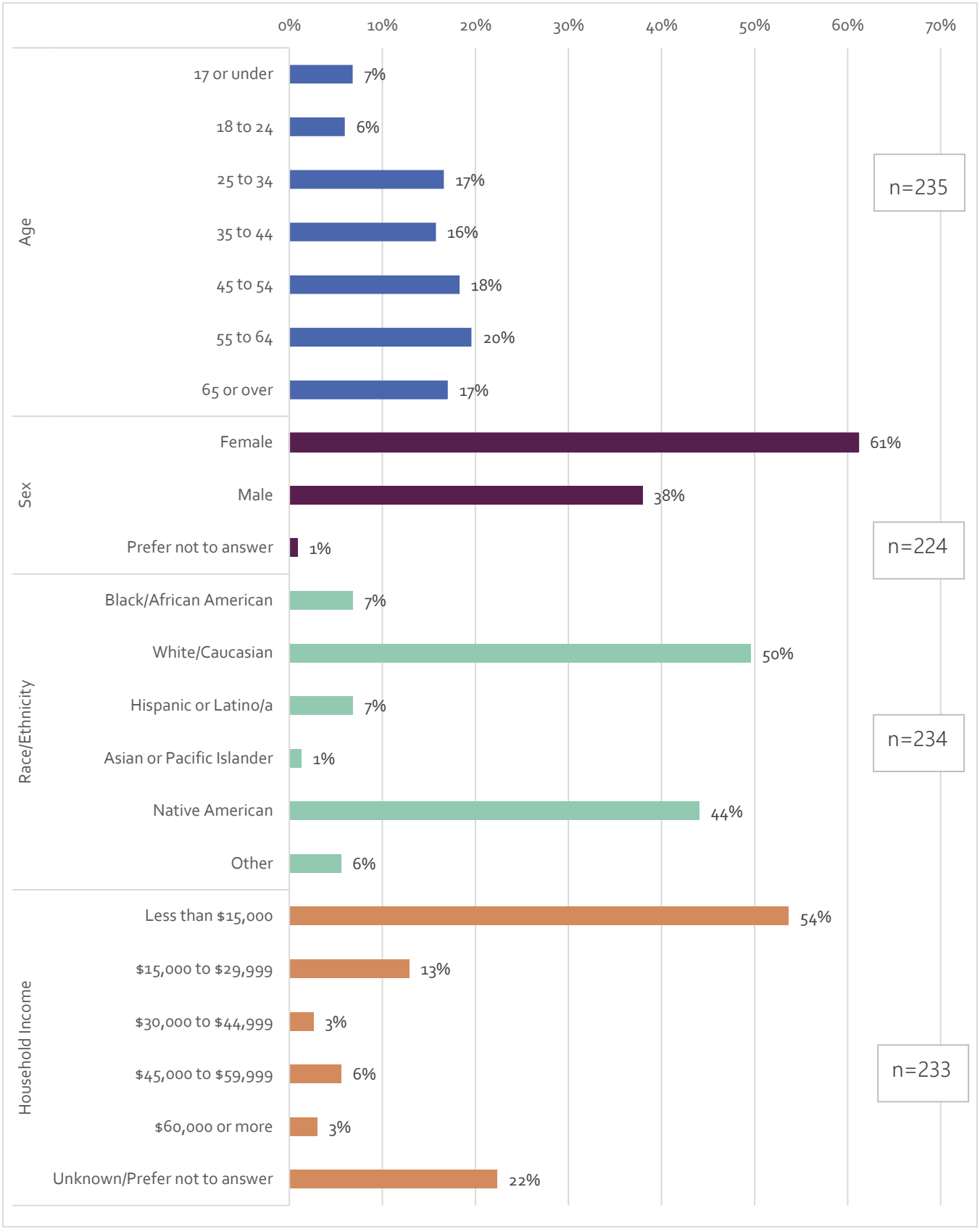
Left blank	Watiki & Box Elder
1	Lombardy Rd.
1	Drive uphill at Village at Skyline Pines. A lot of people that live and work there take the bus.
1	Lumbardy St
1	Canyon Lake, and Haggerty's
2	Valley
3	Rapid Valley
3	More Valley Buses
4	The Valley; Twilight Dr.
4	Twilight Dr. in Valley
4	The Valley; Twilight Drive
5	Service to outer city limits
5	Fair grounds area
6	Box Elder and Blackhawk
6	Valley
7	Downtown
7	Valley

Source: Onboard survey

Rider Demographics

Figure 52 shows the demographic and socioeconomic characteristics of onboard survey respondents, including age, student status, race or ethnicity, sex, and household income.

Figure 52: Onboard Survey Demographic and Socioeconomic Characteristics

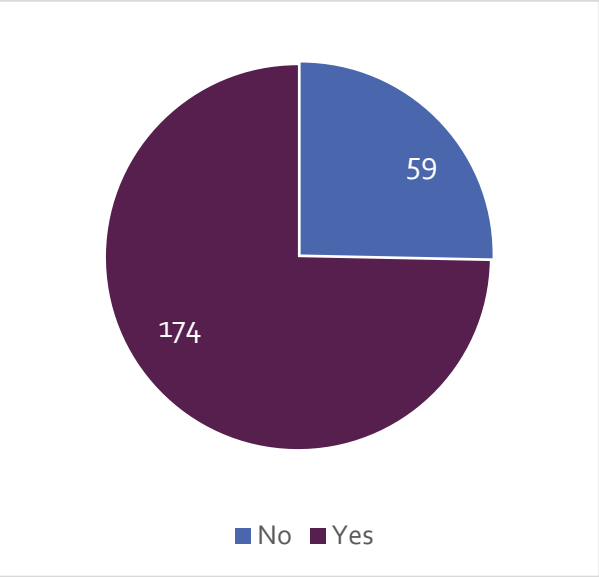


Source: Onboard survey

Mobile Devices

The survey also asked: "Do you own a smart phone or other Internet-connected mobile device?" A quarter of the respondents did not own a mobile device, as shown in Figure 53.

Figure 53: Mobile Device Ownership



Additional Comments

The survey ended by asking how else Rapid City transit services could be improved. Many of the comments reiterated the service improvement preferences listed earlier in the survey, such as frequency and service hours. By far the most frequent comment was a request for evening hours (25 mentions). Other suggestions include:

- Bus driver attitude. Thirteen comments mentioned this in varying ways, e.g. "Nicer drivers", "Less grouchy drivers", "More patience", "Give bus drivers a raise", "Don't drive so aggressively."
- New buses. Nine comments suggested new and/or larger buses.
- Transfers. Seven comments requested more free transfer points or faster transfers.
- Stop placement. Four comments suggested more stops or more efficient stops.
- Technology. Requested technologies include phone apps with bus arrival updates, electronic fare payment, and automated fareboxes.
- Lower volume of music played by drivers, regular brake inspections, timeliness, more shelters, more fare-free senior days, fewer storm sewer grates between the curb and bus door, safer crossings at 5th and Minnesota, and bathroom access at MBTC.

The full list is included in Appendix X.

Community Survey

Community surveys – distributed to transit riders and non-riders alike – help establish the value a community places on transit services and can provide insight for guiding future investments. The

community survey addressed transit use, future travel patterns, and overall interest and willingness to support additional transit services in the community.

Methodology

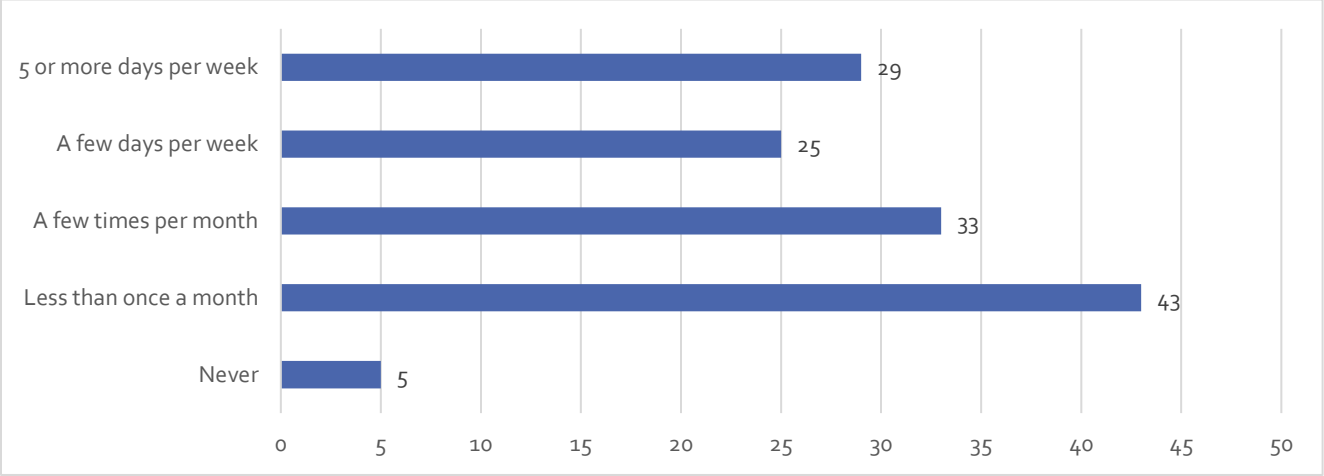
The community survey was designed to enable participation from as many users as possible. The survey collected information on the use of transit, the use and perception of transit, potential improvements, and demographic information, such as the number of vehicles in the household, income, age, race, and gender. See Appendix X for a copy of the community survey.

The survey was conducted in both online and paper formats during spring and summer of 2021. Paper copies of the survey were available at City Hall, MBTC, and the downtown public library. The Pennington County Housing Authority mailed out paper copies with its June rent invoices and received a substantial number of completed surveys from tenants. The paper survey included a QR code link to the online version, which was also advertised on the project website and on social media.

Findings

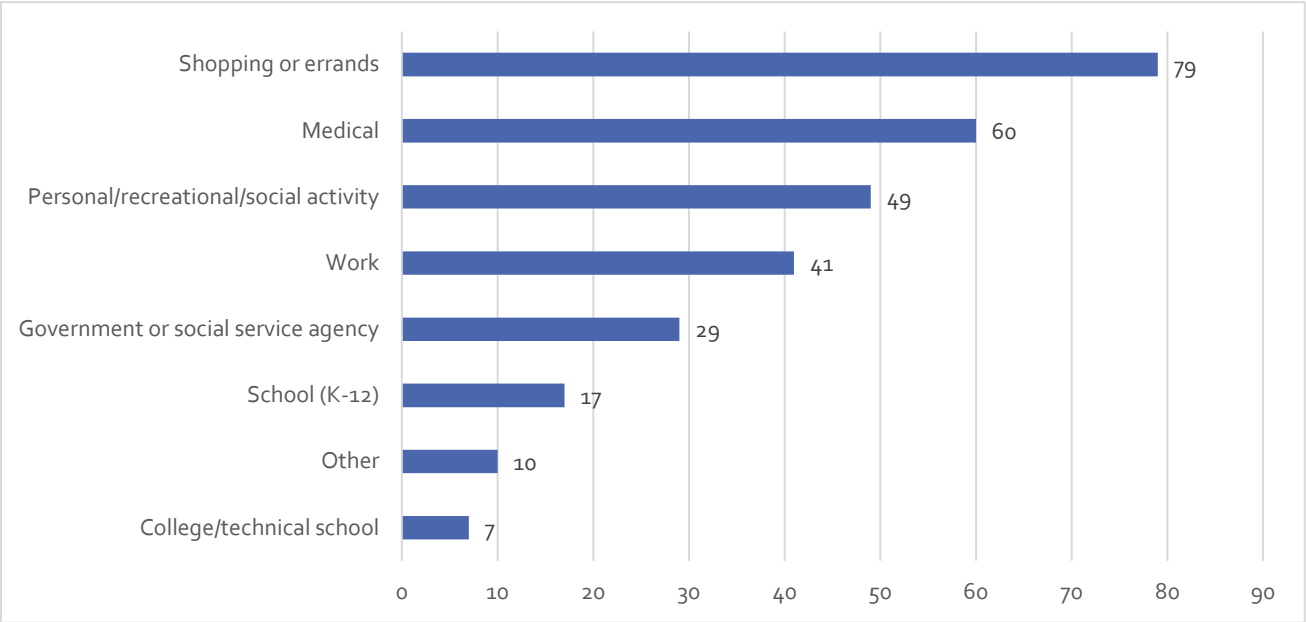
Altogether, 303 surveys were completed, representing about 0.4 percent of the Rapid City population. About 40 percent of respondents reported riding at least a few days a week (Figure 54). The remainder were largely infrequent/occasional riders.

Figure 54: Frequency of Transit Use



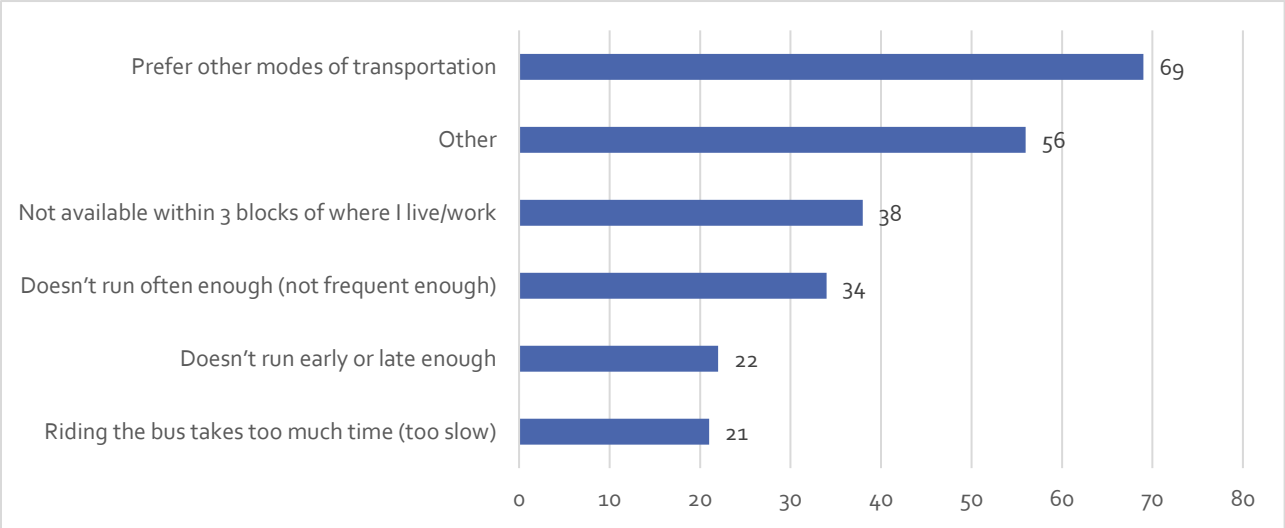
The next question asked for a typical transit trip purpose. Shopping or errands was the most common purpose, followed by medical trips and personal/recreational (Figure 55). College commutes were the least frequent. The broad pattern here is similar to the onboard survey results; the most notable exception is that only 31 percent of community respondents reported taking transit to work, whereas work was the single most common trip purpose in the onboard survey. This is likely due to the greater inclusion of infrequent riders in the community survey.

Figure 55: Typical Trip Purpose



The survey then asked: "If you do not use RTS regularly, what are the reasons discouraging you from doing so?" The two most common categories checked were "Prefer other modes of transportation" (46 percent of respondents) and "Not available within 3 blocks of where I live/work" (25 percent of respondents).

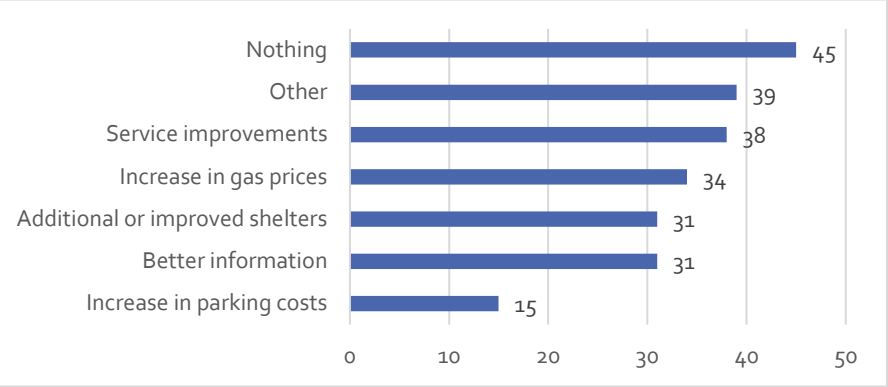
Figure 56: Reasons Not to Take Transit



Thirty-seven percent wrote in a response under "Other." Although some of these responses simply expanded on other categories – e.g. "have a car" is a more specific way of saying "prefer other modes of transportation" – others offered new reasons, including inadequate space for shopping bags, safety concerns, timeliness, and cost. The full list is included in Appendix X.

The next question asked: "What condition(s) might make you reconsider using transit in the future?" Thirty percent of respondents answered "nothing." Only 10 percent checked "Increase in parking costs."

Figure 57: Reasons to Reconsider Transit

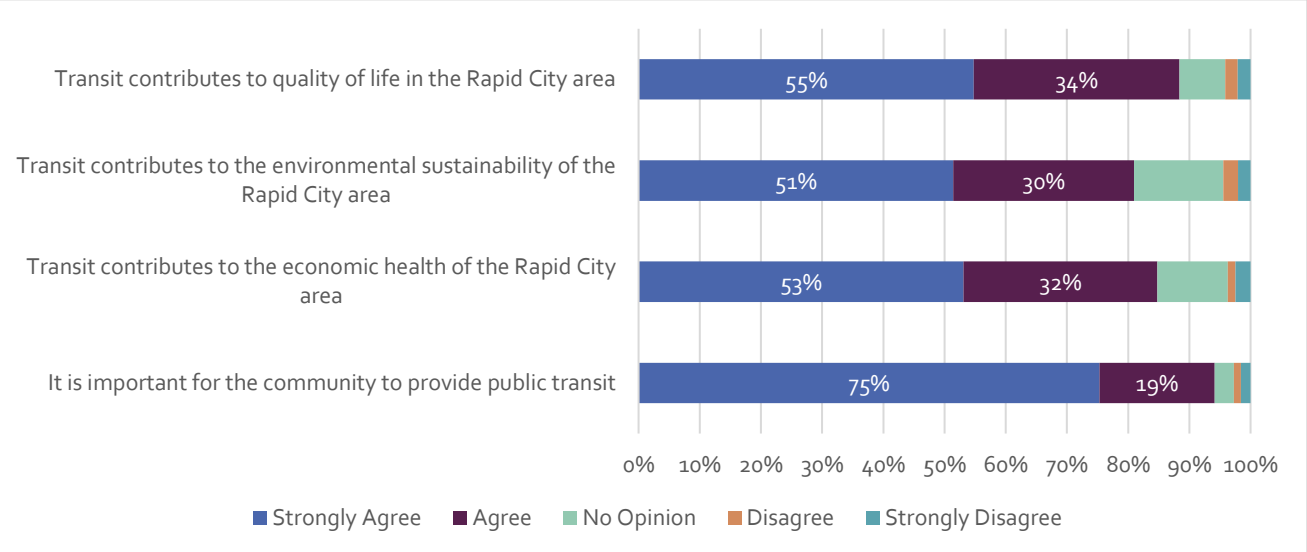


The "Other" category included varied responses, many of which could also be categorized as service improvements and better information. Seven people indicated they would take transit only if driving became impossible. One person requested door service for those visually impaired. The full list is included in Appendix X.

Transit and the Community

Respondents were asked whether they agreed or disagreed with statements describing the value of transit in the community.

Figure 58: Transit and Community Values



Strong majorities agreed that public transit is important (94 percent), that it contributes to quality of life (89 percent), that it contributes to the city's economic health (85 percent) and that it contributes to environmental sustainability (81 percent).

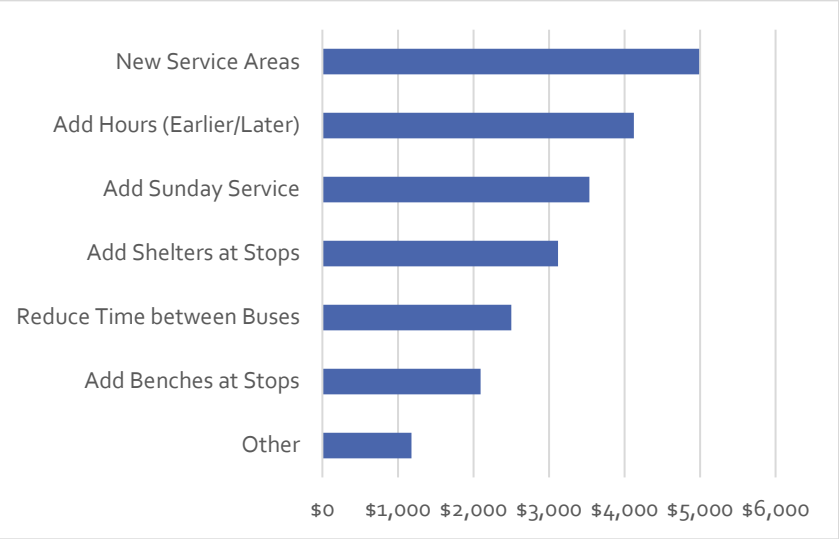
Community Priorities

Like the onboard survey, the community survey asked respondents to prioritize potential improvements. Rather than rank their choices, respondents were instead asked: "If you had $100 to invest in transit service, how would you allocate the funds to make service better for you?" Respondents could choose from a list of six improvements or add their own.

The results of this question are shown in Figure 59. New service areas received the total largest amount of proposed funding, followed by extended service hours.

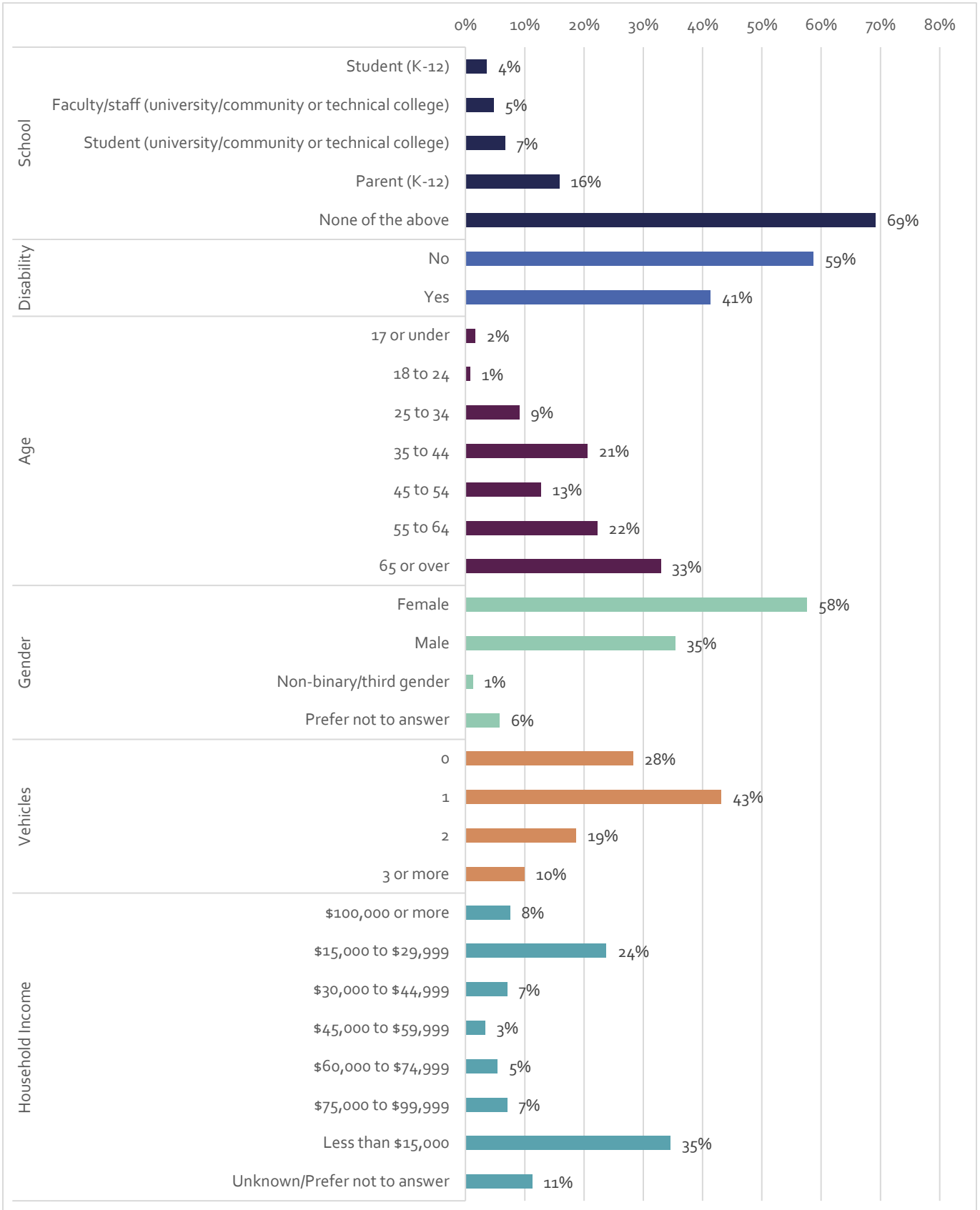
"Other" received the smallest total allocation. Some of the write-in suggestions included "safer rest stops," "making payment easier," "proper cleaning," "more disability training and enforcement for drivers," and "lower ticket prices." The full list of open-ended comments and suggestions is included in Appendix X.

Figure 59: Community Transit Priorities



Finally, the community survey also asked for demographic information. The responses are shown in Figure 60.

Figure 60: Demographic Information



PART 4: SERVICE RECOMMENDATIONS

Introduction

This plan makes two recommendations based on the operations analysis, public outreach, and planning principles described in the previous chapter.

Refresh

First, a set of revenue-neutral changes to the current routes is recommended. This "refresh" program can be carried out in the near term. Although small at first glance, the refresh makes meaningful improvements to RTS service. Among other changes, it adds a new service area, improves the efficiency of the loop system, and promotes reliability by making the operating schedule more consistent.

Service Expansion

Looking at opportunities to expand service to new hours and locations was included in the original scope of work, with the intention that planning staff would approach the Rapid City Common Council for any needed budget increases. Since then, Congress has approved an increase in federal formula funds for transit starting in 2022, making it all the more imperative to identify feasible service expansions. The recommendations presented here include:

- Expansion of evening service hours
- Expansion to Sunday service hours
- Coverage expansion by one or more new routes
- A flex zone pilot

Refresh Concept

An ideal bus route picks up and drops off passengers throughout its run, stops at regularly spaced intervals, is spaced from other routes so as not to compete for riders, arrives on time, and is easy for riders to use and understand. While the previous sentence highlights the ideal route and system characteristics, every network is influenced by geographic and budgetary constraints that result in some level of conflict with the ideal. Through the detailed service assessment completed as part of the TDP, series of network adjustments that reflect a "refreshing" of the RapidRide system to move closer to the ideal, while staying within local constraints. The following sections describe the constraints that guided service planning; the objectives that drove it; and the full refresh concept.

Constraints

Discussions with RTS staff established critical considerations that set hard constraints on any service changes.

Layover Time

Current schedules were planned around a layover/recovery time of 10 minutes at the end of each lap. Layover/recovery time built into each route ranges from nine to 13 minutes, out of a total 35-minute cycle time. While long by industry guidelines, the recovery time helps to ensure that drivers accumulate their contractually required 15 minutes of break time per shift without a separate break schedule. It also provides a buffer to address unavoidable sources of delay, most importantly the several points at which bus routes cross train tracks.

Maintain Service to Existing Locations

RTS made clear that no route segments could lose service altogether. Most critically, serving public schools is a top priority for RTS, as school trips account for a high proportion (approximately 40 percent) of its ridership. This includes continuing to serve all schools; maintaining a scheduled deviation to South Park Elementary School; and maintaining a direct connection between housing on Signal Drive and the nearest elementary and middle schools.

Objectives

The refresh incorporates six objectives based on fundamentals of service planning as they apply to the Rapid City context.

Minimize Redundancy

When transit routes run in the same direction along the same road during the same lap, they each pick up fewer riders than if the service were distributed to separate, parallel roads. To maximize the productivity of

each route, it is better to avoid long stretches where multiple bus routes overlap. (There are some exceptions to this observation, such as busy downtown transit malls.) In Rapid City, routes overlap chiefly because the limited number of continuous streets leaves few through streets to choose from. The refresh reduces redundancy while keeping some overlaps out of necessity.

Reduce Unproductive Time

When bus routes do not stop at all on a segment of the route to pick up or drop off riders, the time spent traveling that segment is unproductive. An effort to optimize such routes would look for ways that the nonstop segment could either be cut out entirely or be shifted to a different street with adjacent land uses that may be better representative of areas generating transit demand.

Where nonstop segments exist on Rapid City routes, they serve to connect one productive segment/area with another or to reach a single, relatively distant stop. For instance, cutting along Cambell Street is the fastest way to connect East Minnesota Street and East Fairmont Boulevard, but the 45 mile per hour speed limit makes it unsafe to stop on Cambell.

The refresh concept retains the Cambell routing, but it reduces unproductive time by eliminating one stop on Saint Joseph Street and one stop north of Rushmore Mall. These changes are detailed in the route description section.

Identify and Adjust Low-Performing Route Segments

Sometimes route segments are unproductive, not because there are no scheduled stops, but because riders simply do not board or alight there. Stop-level activity data can reveal locations where the agency appears to be providing largely unused service. Adjustments can include changing stop locations, changing the schedule to meet local needs, or rerouting to more productive areas.

As described in the existing conditions section, the bus operators who were asked to share their perception of high-activity stops did not point out any low-performing segments. This speaks to the effectiveness of the current system in meeting customer needs.

Standardize Operating Speed and Run Time

RapidRide operates on a pulse system in which every route leaves MBTC at the same time. However, not every route returns at the same time; the scheduled run time for a given loop ranges from 22 to 28 minutes, allowing between seven and 13 minutes of layover time.

The current condition with a relatively wide range of run times is challenging for two reasons. Firstly, the variability of run times blurs the distinction between run time and layover time, which in turn blurs the distinction between work time and break time for each operator. Secondly, longer routes are more vulnerable to unacceptable layover impacts should even minor delays occur along the route.

The refresh concept standardizes each loop's run time to 25 minutes, with a 10-minute layover at MBTC. In the near term, this should mitigate the impacts of delays.

In the longer term, a 25-minute standard run time could serve as the first step toward another improvement: moving to a clock face schedule in which every lap departs MBTC at the hour or half-hour. This type of schedule is easy for passengers to memorize and build into their plans for the day, as they can always expect the bus to drive past their stop at the same minute past the hour.

The idea of tightening cycle times from 35 to 30 minutes was brought up early in the study. However, it soon became clear that would be too ambitious to target while maintaining service to all existing streets. In the future, if operators are able to consistently maintain a 25-minute run time, that will provide support for a consistent five-minute layover and 30-minute cycle.

Improve Legibility

The legibility of a transit system is critically important to ridership and user experience. Legibility encompasses such questions as:

- Do I know which route(s) I can take to reach my destination?
- Do I know where the route stops, where it ends, and which streets it will follow in between?
- Do I know where I can/have to transfer?
- Can I pick up this information easily by looking at a system map, route name, stop pole, or schedule?

RapidRide is simple to understand in that all routes begin and end at MBTC, and all transfers are completed there. However, its legibility is limited by its street grid, its system of loops, and its system of deviations. Users have a higher cognitive load to manage when transit does not travel in a straight line, when it does not travel in the same direction inbound and outbound, and when it deviates from the main route. From a service perspective, little can be changed about this given the current constraints, but the refresh concept does make one improvement discussed in the next section, "Improve Directness."

Improve Directness

Like anyone getting from A to B, transit users prefer a straight line to a scenic tour. The direct line concept is rarely possible in a loop-based system. A short clockwise outbound trip becomes a very long clockwise return trip if there is no service traveling counterclockwise.

The refresh concept takes the combined resources of the Lincoln and Washington routes and redraws them as two sets of complementary loops. Lincoln North covers follows the same street path as Washington North – only in the opposite direction. Lincoln North runs clockwise where Washington North runs counterclockwise. Where Washington South runs clockwise, Lincoln South runs counterclockwise. This change will allow passengers to make comparatively short and predictable journeys in both inbound and outbound directions. 35 minutes after they get off the bus, another bus will go by in the opposite direction. 70 minutes later, they will be able to catch a bus in the same direction. This improvement addresses both directness and legibility.

Refreshed Route Descriptions

Figure 61 shows the full refresh concept overlaid on existing routes for comparison. In terms of coverage, the most significant changes are as follows:

- Service is extended eastward on Anamosa
- Service is truncated at Rushmore Mall
- Service is removed from 3rd Street downtown
- Service is removed from East Adams Street
- Service is removed from Saint Joseph Street

The refresh concept does not make any changes to the Borglum route, primarily because the payoff would be minimal. As detailed in the existing conditions section, Borglum is already a top performer in terms of ridership. It is geographically isolated from other routes; stretched to the limits of its coverage possibilities; and constrained by the steep hills of Rapid City's west side.

Figure 61: Refresh Concept

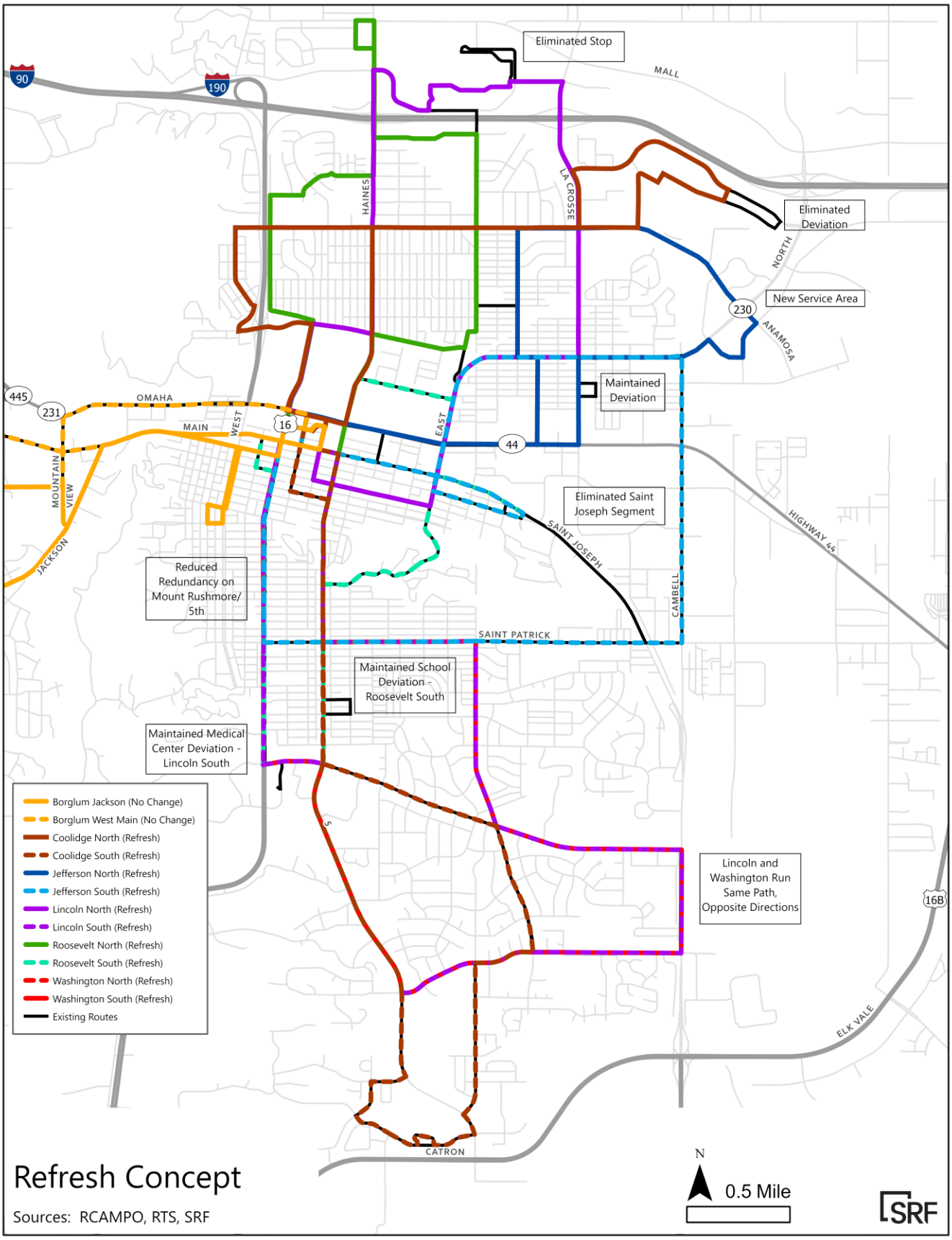


Figure 62 through Figure 66 show each refreshed route separately for the sake of clarity. The refresh should be viewed as a system, since many of the changes to individual routes are dependent on changes made to other routes.

Coolidge

Southbound service on Coolidge South is shifted from Mount Rushmore Road to 5th Street. The refreshed Coolidge South loop thereby becomes less of a loop and more of a "lollipop" – a bidirectional route that loops at the end.

Coolidge North undergoes a similar change – by shifting to North 5th Street and Haines Avenue, it becomes bidirectional along Anamosa. An on-request deviation at Rushmore Crossing is eliminated to make the route more consistent and reduce unproductive time.

Jefferson

The Jefferson refresh eliminates an unproductive half-mile stretch of Saint Joseph Street from the Jefferson Northeast loop and adds a new service area near the intersection of Anamosa and East North Street, where significant recent development has occurred. Some segments of Jefferson are also exchanged with other routes, either to compensate for other changes or to reduce the size of the loop. The Jefferson Southeast loop is shifted to travel on Mount Rushmore Road.

Roosevelt

The Roosevelt refresh changes little on its south end, as the existing loop structure serves an important function for students. Similarly, the north end of the Roosevelt route serves Lakota Homes with no change. However, segments closer to MBTC are exchanged with Jefferson and other routes. A segment of Roosevelt South moves to New York Street.

Lincoln and Washington

In the refresh, Lincoln and Washington are each slightly modified so that they create identical, complementary loops for the reasons described earlier.

The most noticeable change in coverage is the removal of a stop north of Rushmore Mall. In order to serve the South Dakota Department of Labor and Regulation, buses on the Washington route currently take a circuitous detour on North Maple Avenue. Some operators already choose not to make this detour if the stop looks empty from a distance, resulting in confusion and missed rides if passengers were not waiting directly at the stop. Eliminating the stop would avoid both confusion and unproductive time, at the cost of a longer walk for some riders.

Figure 62: Coolidge Refresh

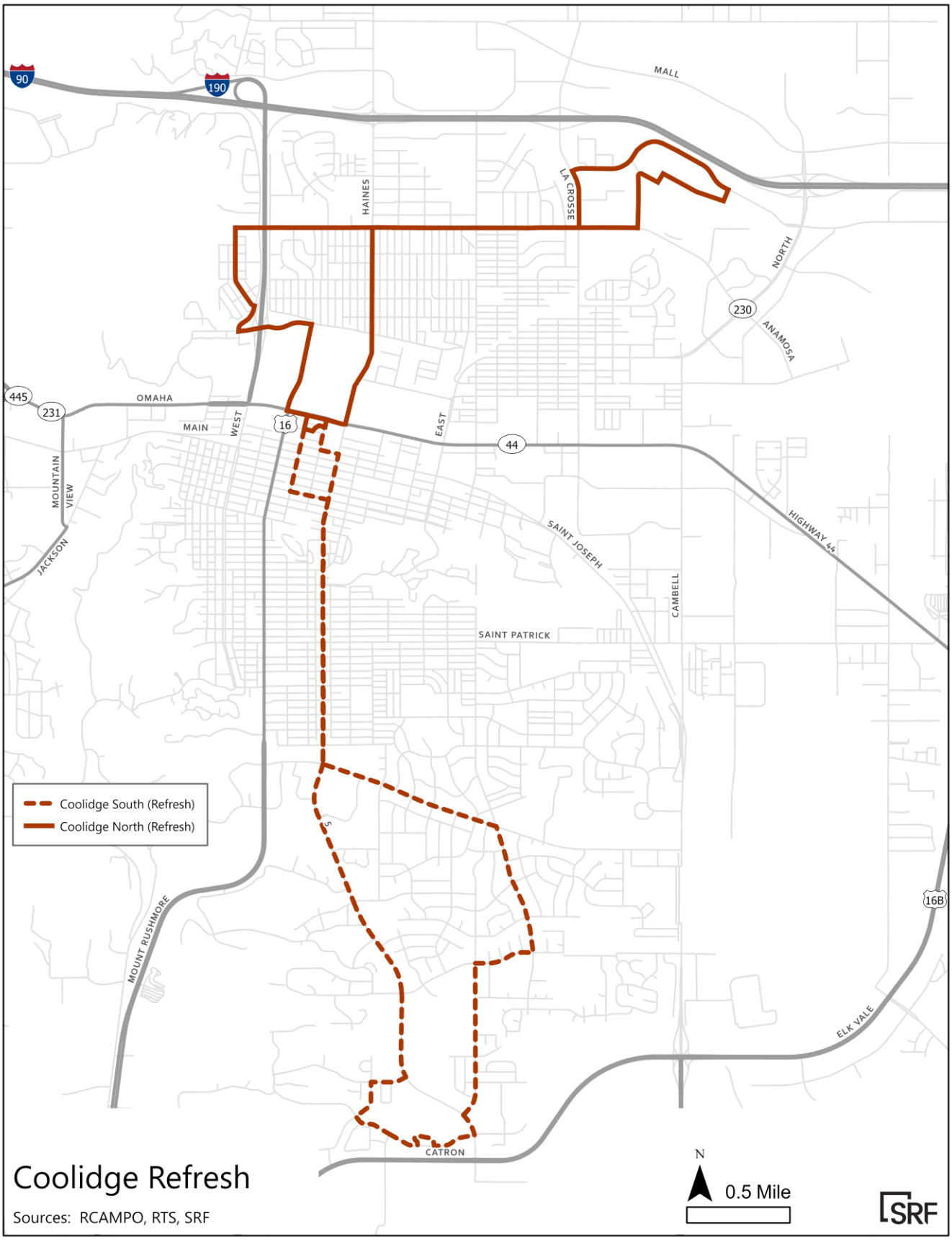


Figure 63: Jefferson Refresh

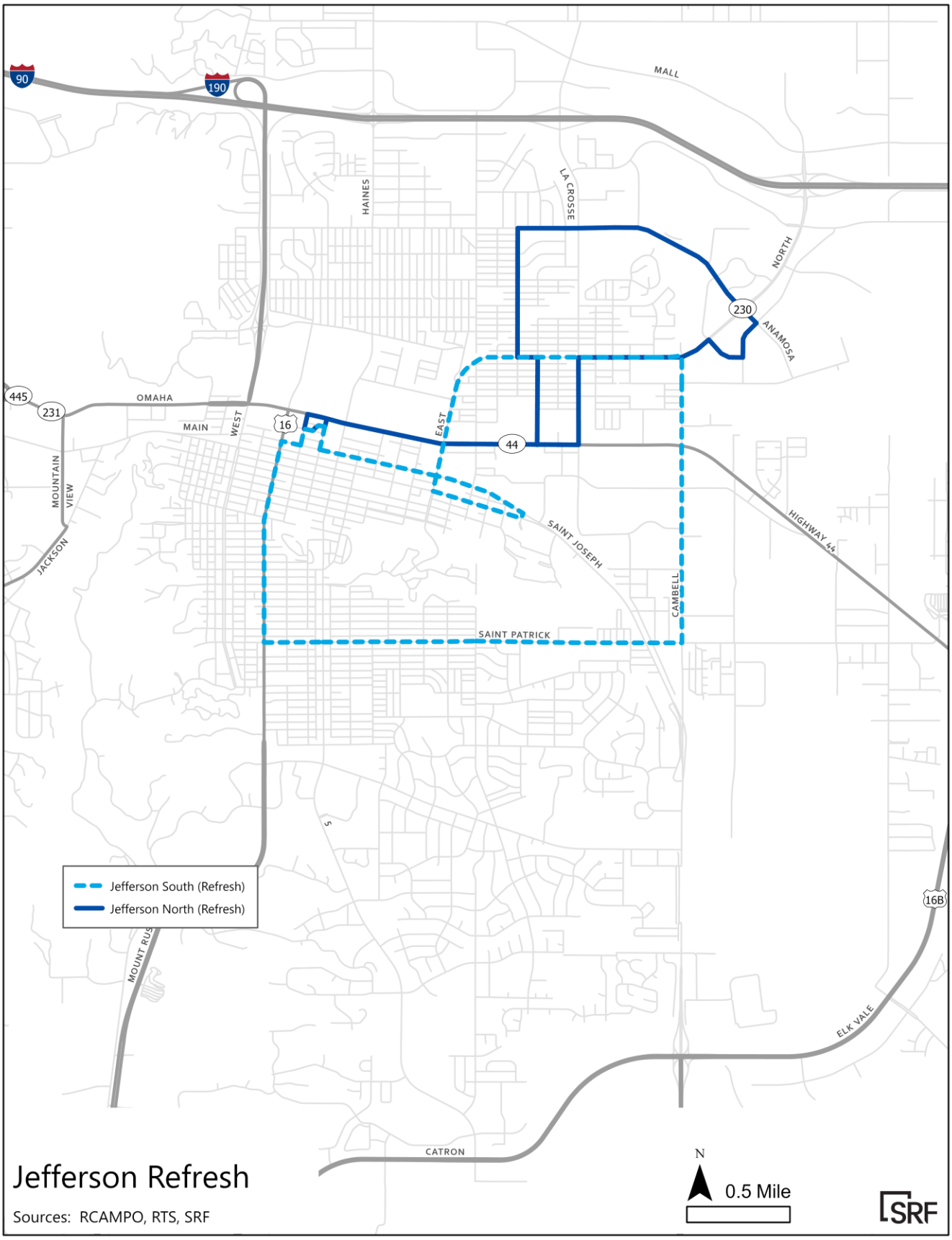


Figure 64: Lincoln Refresh

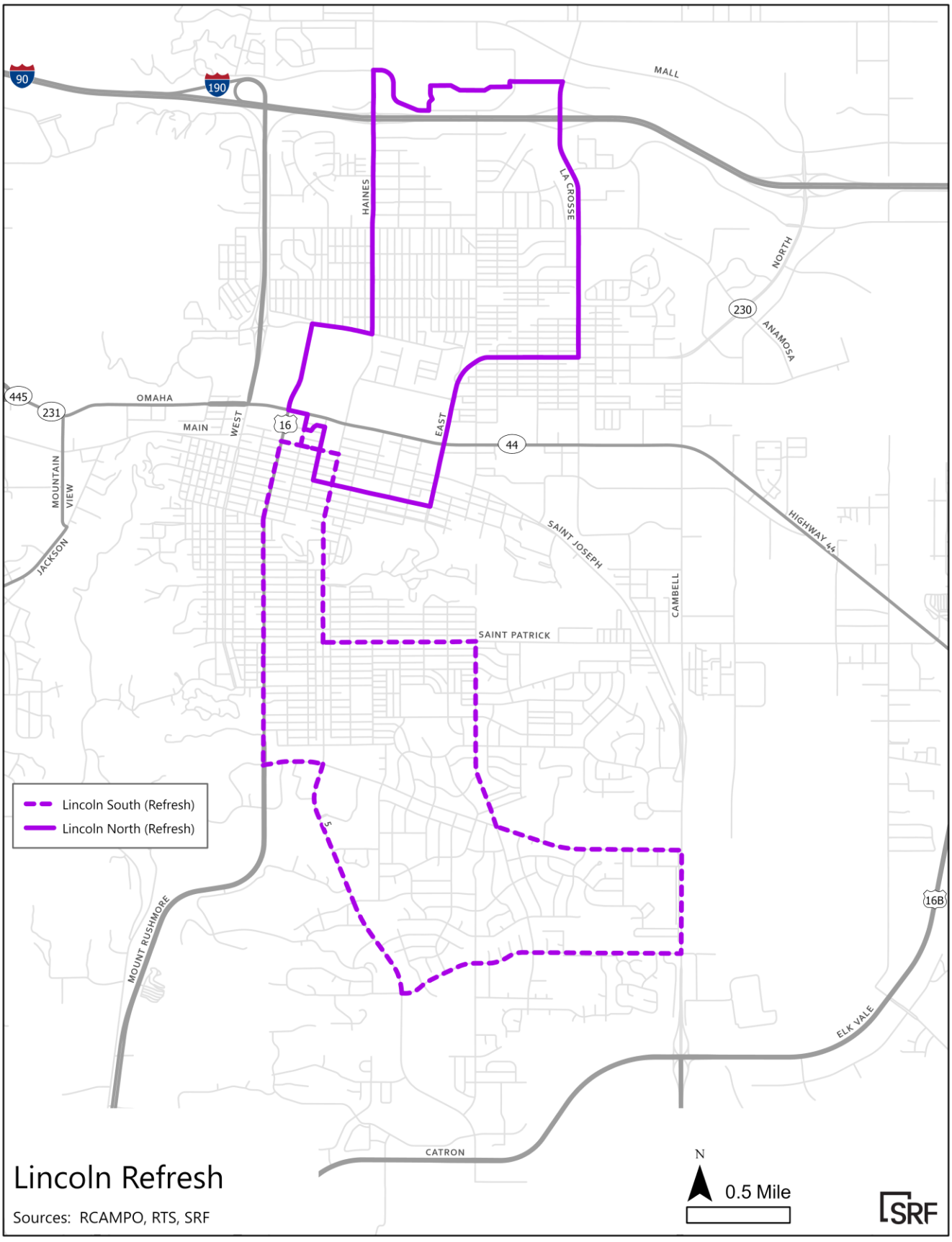


Figure 65: Roosevelt Refresh

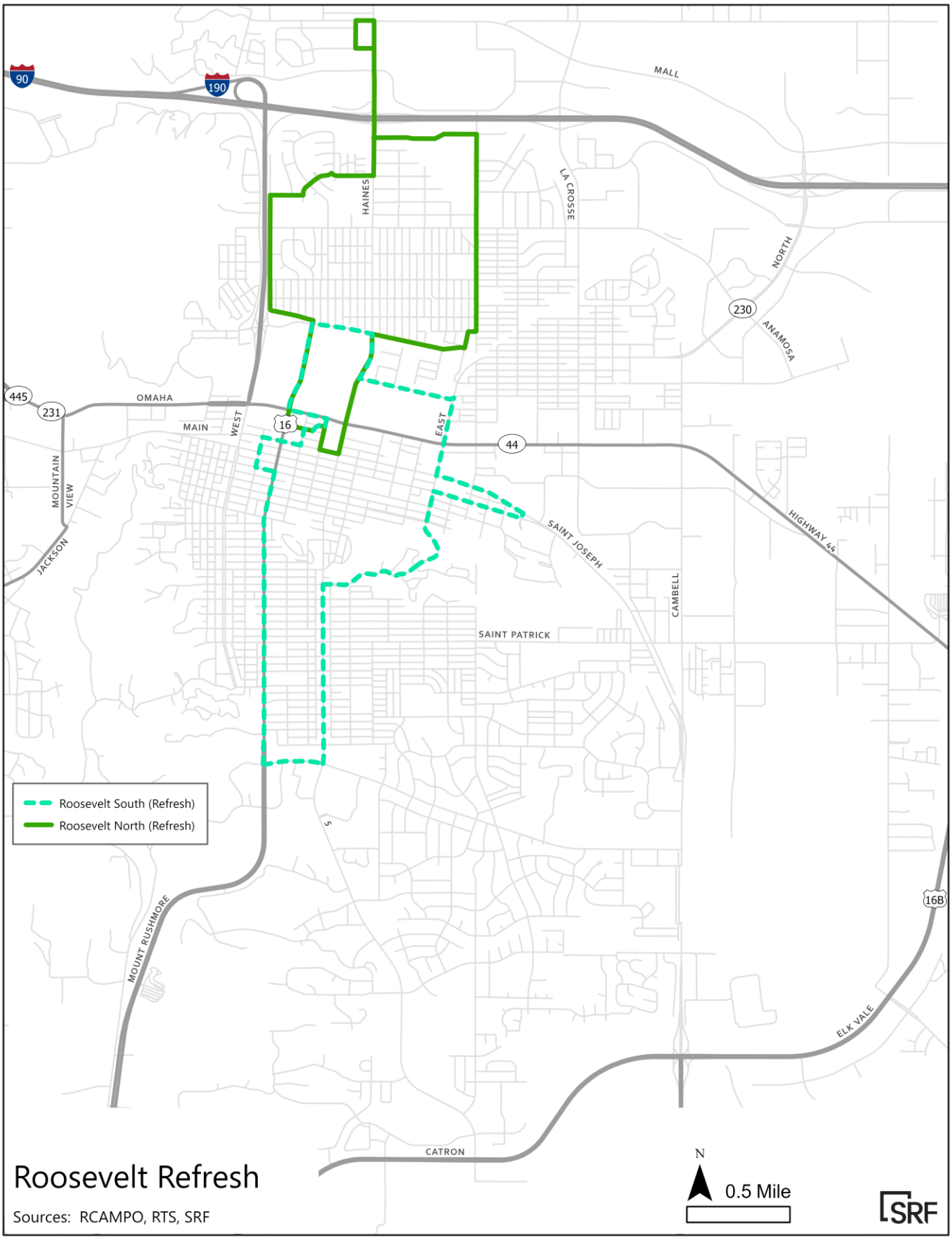
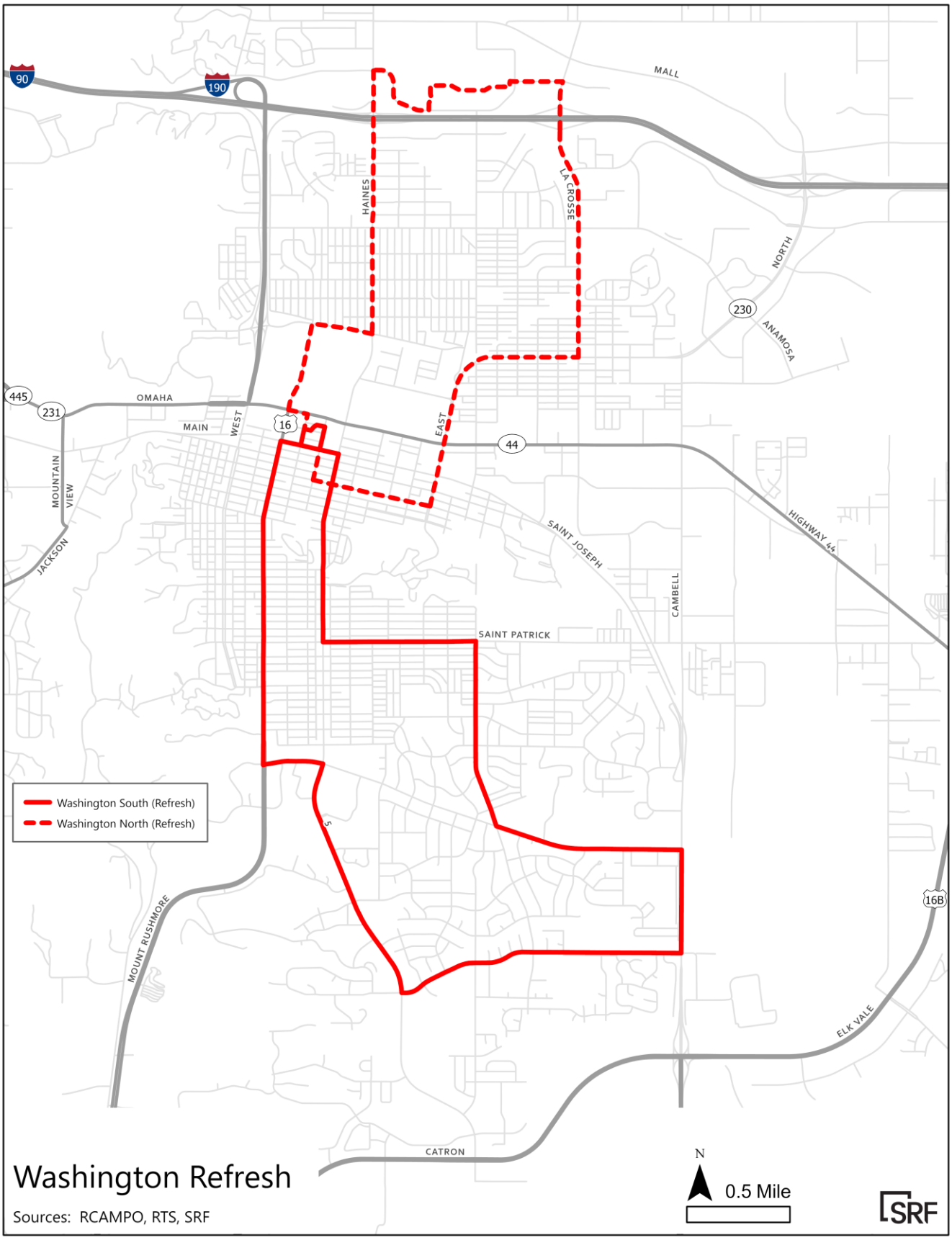


Figure 66: Washington Refresh



Service Hour Extension

Current service hours per day, the span of service, is controlled to a large extent by the amount of operating subsidy available from federal and state sources. The federal Infrastructure Investment and Jobs Act of 2021 transit funding over the next five years is estimated to be 40 percent more than current federal funding. As federal funding makes up approximately 50 percent of RTS' budget and almost 60 percent of the subsidy, it is prudent to plan for effectively accessing additional federal funds when they are available.

Extending service hours or days is a straightforward means of adding service. Table 14 shows the estimated operating cost of adding evening hours and adding Sunday service. It does not include the cost of expanding paratransit hours to match the fixed-route service span. Even with that caveat, it is likely that both service hour expansions could be achieved with a 40 percent increase in budget. The two extension scenarios are discussed in more detail below.

Table 14: Estimated Annual Cost of Service Hour Extensions

Extension	Hours per Route	Routes	Days	Cost (2019$)	% 2019 Fixed-route Budget	Inflation Rate	Cost (2022$)
Evening	2.3	6	255	$234,049	16.96	3%	$255,752
Sunday Service	7	6	51	$142,464	10.32	3%	$155,674

Source: SRF analysis of NTD data

Weekday Evenings

During public outreach, one of the most-requested service changes was an extension of hours into the evening. The last weekday bus currently returns to MBTC at 5:53 PM. If each loop ran twice more, the last bus would pull in at 8:10 PM. This would allow enough time to cover some after-school activities and the homeward commute for those who work until 6:00 PM.

Table 15: Scheduled Weekday Departures from MBTC with Service Extension

First Loop	Second Loop	
6:20 AM	6:55 AM	Current
7:30 AM	8:05 AM	
8:40 AM	9:15 AM	
9:50 AM	10:25 AM	
11:00 AM	11:35 AM	
12:10 PM	12:45 PM	
1:20 PM	1:55 PM	
2:30 PM	3:05 PM	
3:40 PM	4:15 PM	
4:50 PM	5:25 PM	
6:00 PM	6:35 PM	Extended
7:10 PM	7:45 PM	

A key advantage of this service expansion is its potential to extend the workday for current drivers, rather than requiring new hires. Current drivers work in two six-hour shifts. With an extension past 8:00 PM, the service day would be about 14 hours long and could be maintained with two eight-hour shifts.

The ridership potential of adding evening service is difficult to predict. On the one hand, ridership is at its lowest in the last hour of the current service span, and it is possible that extending service by two more hours would show similarly low ridership per hour. On the other hand, the absence of an evening peak after 5:00 PM is unusual and may indicate there is an untapped pool of evening commuters currently excluded from transit service.

Sunday Service

With an approximately 10 percent increase in the current fixed-route budget, it would also be possible to extend the Saturday service schedule to Sundays. Currently, Saturday service is provided by truncating the weekday schedule (Table 16).

Table 16: Scheduled Saturday Departures from MBTC

First Loop	Second Loop
9:50 AM	10:25 AM
11:00 AM	11:35 AM
12:10 PM	12:45 PM
1:20 PM	1:55 PM
2:30 PM	3:05 PM
3:40 PM	4:15 PM

For simplicity's sake, this plan assumes that Sunday service would mirror Saturday service. In reality, introduction of Sunday service would likely need to include additional public engagement to fine-tune a proposed schedule. Ridership in every possible scenario would be low, likely less than Saturdays.

A Sunday service extension would add at least one new shift for both operators and dispatch. The barrier to introducing Sunday service is likely to be labor availability.

Fixed-Route Expansion

RTS has fielded requests for service to new areas for many years. Figure 67 (page 92) shows a composite of the routes and locations requested by local stakeholders both prior to the start of this plan update and during the public outreach phase.

The map shows only locations within Rapid City limits. RTS has also received repeated requests for service to Box Elder, unincorporated parts of Rapid Valley, and other areas outside city limits. However, providing service to these locations is beyond the ability of RTS and outside the scope of this study.

This section recommends five routes for consideration, shown together in Figure 68 (page 93). They fulfill the requests shown above – under certain constraints, as detailed below. Each route is designed to build off the refresh concept, on the assumption that the first phase of service changes will have been adopted by the time service is expanded.

Constraints

Scheduling

As detailed in the existing conditions section, the new areas under development are largely at the city's edge. This would pose challenges for any system, but it is especially challenging for a system that pulses out of one downtown location every 35 minutes. For this reason, most of the routes proposed in this section either are limited-stop express routes or operate on 70-minute cycles.

New Stop Placement

In order to serve an area, buses must be able to stop safely. The following stop guidelines drove the choice of routing:

- Service planners prefer not to stop buses on high-speed roads above about 40 miles per hour, as this presents potential safety hazards.
- According to ADA bus stop guidelines, boarding and alighting areas must have a firm, stable surface and connect to streets, sidewalks, or pedestrian paths by an accessible route.
- Grass is not a firm surface.

Arterial streets in the growth areas of Rapid City typically do not offer bus stop locations that meet these guidelines. However, major roads are the only efficient routes into growth areas. As a result, serving these areas means frequently diverting off direct paths in order to reach locations with sidewalks.

Each route is described in detail in the next sections.

Figure 67: Requested Transit Expansion Areas within Rapid City Limits

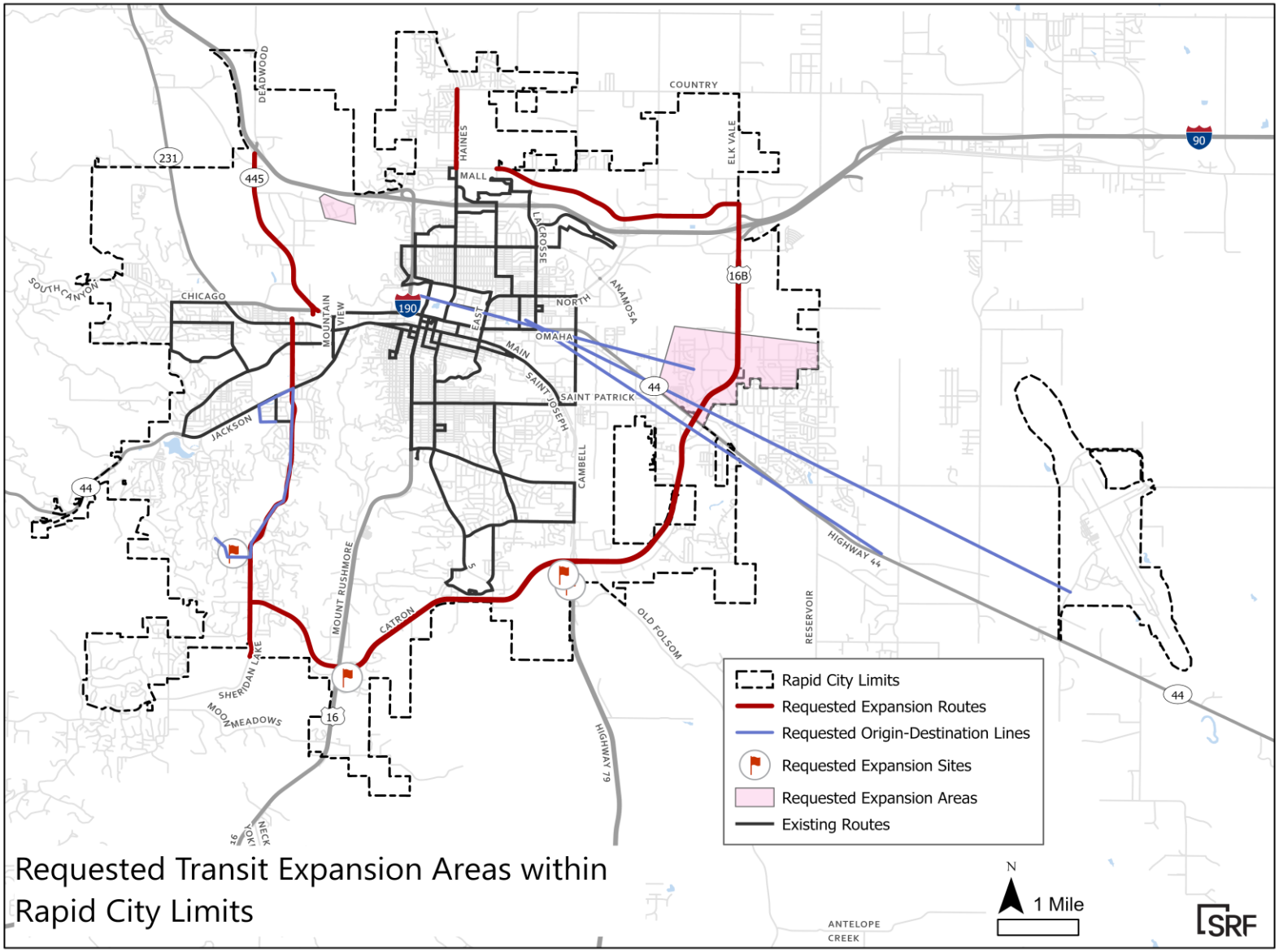
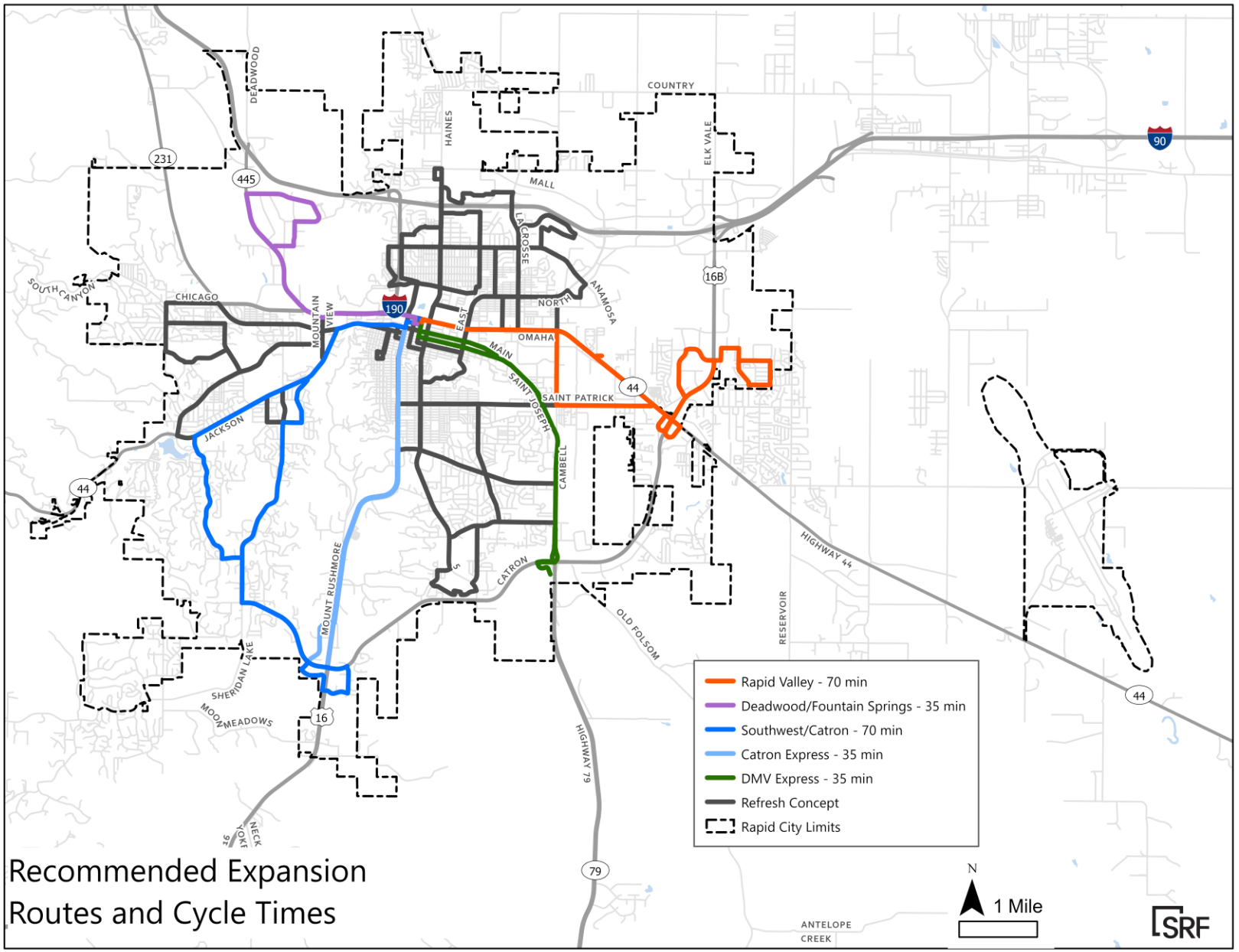


Figure 68: Expansion Routes



Route Descriptions

Rapid Valley

This route leaves MBTC and travel east on Omaha, south on Cambell, east on Saint Patrick, then north on Elk Vale Road. Turning right on Homestead Street, it passes commercial and residential destinations as well as two Rapid Valley schools before looping back across Elk Vale Road and onto Concourse Drive. It returns to MBTC via Highway 44, stopping once at Western Dakota Tech. Even traveling on high-speed roads, this trip cannot be made within a 35-minute cycle time. Therefore, this road was designed for a 70-minute cycle time. In addition to a 10-minute layover at MBTC, operators would also have time for a five-minute layover in Rapid Valley.

Deadwood/Fountain Springs

This lollipop-shaped route fulfills requests for service on Deadwood Avenue and the residential/institutional facilities in Fountain Springs. It serves the DakotaLink office on Deadwood Avenue. This route can be completed in a 35-minute cycle.

Southwest/Catron

This route fulfills requests for service to Catron, Sheridan Lake Road, Southwest Middle School, and the southwest residential growth areas more generally. It travels on Park Drive outbound and Sheridan Lake inbound for maximum coverage, although the route could likely be adjusted to better match local needs. Like the Rapid Valley route, this is also designed for a 70-minute cycle time.

Catron Express

This route serves only the apartments and businesses directly surrounding the intersection of Catron with Mount Rushmore Road/Highway 16. By operating nonstop along Mount Rushmore Road, it can make the trip in a 35-minute cycle.

DMV Express

This route fulfills two requests: service to the Department of Motor Vehicles, and service to a prison reentry center directly next door to the DMV. By operating nonstop along Saint Joseph and Cambell, it can make the trip in a 35-minute cycle.

Selection Criteria

For the sake of comparison, these expansion routes are scored in Table 1. The criteria chosen were based on the service planning objectives used to develop the refresh concept, plus additional considerations for choosing new service areas.

Table 17: Expansion Route Selection Criteria

Criterion	Rapid Valley	Deadwood/ Fountain Springs	Southwest/ Catron	Catron Express	DMV Express
Minimize redundancy	✓	✓	✓	✓	✓
Minimize unproductive time	☒	☒	✓	☒	☒
Legibility for customer	☒	✓	☒	✓	✓
25-minute run time	☒	✓	☒	✓	✓
Maximize directness	☒	✓	☒	✓	✓
Safe, accessible stop locations	✓	✓	✓	✓	✓
Average speed under 20 mph	✓	✓	✓	☒	☒
Serve block groups with high % low-income residents	☒	☒	☒	☒	☒
Serve block groups with high % people of color	✓	✓	☒	☒	☒
Extend service to TSAs	✓	✓	✓	☒	☒
Serve high- growth areas	✓	✓	✓	✓	✓

Cost Estimate

Because the expansion routes operate on the same schedule as existing routes, the incremental cost to add each route can be estimated using the existing operating cost per service hour (Table 18).

This is the cost estimate for one 70-minute route. In the current system, every 70-minute route is operated as two 35-minute loops. In these expansion scenarios, the Rapid Valley or Southwest route would be the cost equivalent of a Jefferson or Borglum, north and south loops both included. The DMV Express, Catron Express, and Deadwood/Fountain Springs routes could be matched in pairs to create a full route. For example, a new "Black Elk" route could alternately serve Deadwood Avenue and Catron.

Table 18: Estimated Annual Cost of Additional Routes

	Hours per Route	Routes	Days	Cost (2019$)	% 2019 Fixed-route Budget	Inflation Rate	Cost (2022$)
Weekday	11.5	1	255	$195,041	14.13	3%	$213,127
Saturday	7	1	51	$23,744	1.72	3%	$25,946
Total	-	1	-	$218,785	15.85	3%	$239,072

Source: SRF analysis of NTD data

Flex Zones

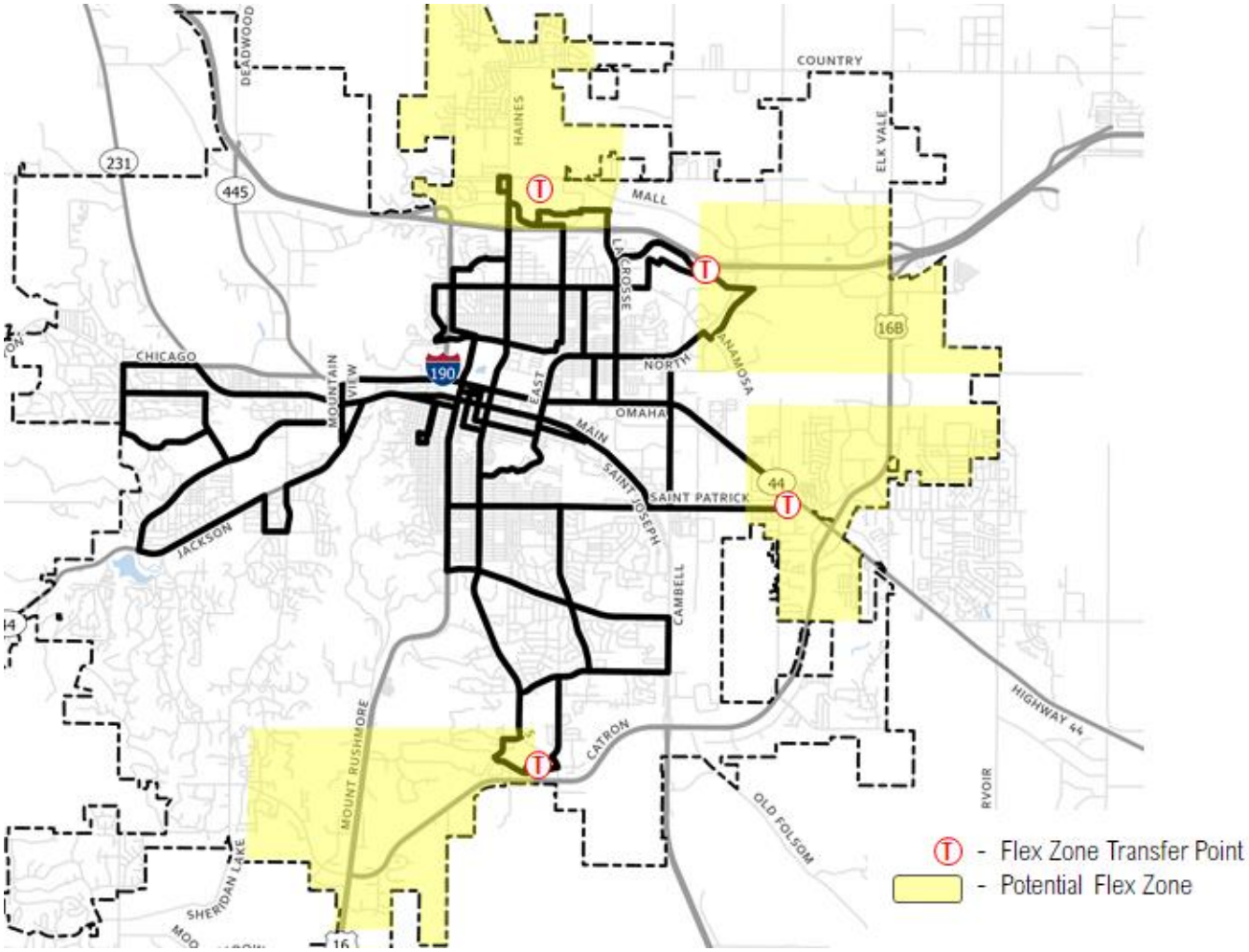
RTS has historically provided only fixed-route service to the general public, and this mode was the primary focus of the TDP. However, many transit agencies have taken advantage of technology advances to pilot a new generation of demand-response service for the general public. Also known as microtransit or flex zone service, demand-response uses smaller vehicles to circulate through a defined zone, doing pickups and dropoffs at more locations than fixed-route service can serve. In a typical system, the process would look something like this:

- A customer living in a suburban neighborhood uses an app on her phone to book a ride from her home to a large grocery store. The app gives her an arrival window 15 to 30 minutes from now.
- 20 minutes after she requested the ride, a van pulls up at the curb where she is waiting. After picking up a second passenger a few blocks away, the van travels to a bus stop in the grocery store parking lot.
- The first passenger gets out to go grocery shopping. The second passenger also gets out – and sits down on the bus shelter bench to wait for the fixed-route bus that serves this stop. Meanwhile, the van driver checks the tablet in the vehicle to see where the routing algorithm will take him next. He will likely be circulating through this suburb throughout his shift, although he might be sent to a separate, nearby zone if things get quiet here. In any given hour, he will see between one and five passengers.

From a planning perspective, the great advantage of demand-response service is that vehicles travel only where they are needed, when they are needed. That can be highly beneficial in a neighborhood with low, sporadic ridership spread out over a large, broken street grid. In Rapid City, an additional rationale is that extending fixed-route service as far as Rapid Valley, Catron, or other far-flung locations results in compromises: a 70-minute loop when 35 minutes is the current standard, or running long, unproductive nonstop segments along major arterials. If each of these locations were instead a flex zone, residents or workers would be able to connect to closer-in fixed routes at designated transfer points.

Several possible flex zones are shown in Figure 69. The yellow areas indicate a zone of four to six square miles in which trips would need to start and end. The red Ts mark locations where customers could transfer to fixed-route service.

Figure 69: Potential Flex Zones



The disadvantage of starting up a flex zone pilot is that it requires flexibility, technology, and marketing. It is difficult to predict how much use a service will attract, so agencies must be open to possibility and willing to adapt on the fly. They must also give careful thought to technology needs. An effective, modern flex zone requires a smartphone app; a web interface; a dial-in dispatch alternative for riders without internet access; routing software with customizable algorithms; reliable in-vehicle hardware; and a technology vendor able to work with the agency to meet unique needs. Finally, because it is a new service without fixed and visible signage, the flex zone should be marketed heavily and continually enhance its success.

Cost Estimate

Table 19 shows the estimated cost of operating a single flex zone for one year. It is based on the operating cost of paratransit service in Rapid City, largely because RTS would prefer to operate flex service with its own employees and vehicles as is currently done with paratransit.

Table 19: Estimated Operating Cost of One-Year Flex Pilot

	Hours per Zone	Zones	Days	Paratransit Cost per Hour (2019)	Annual Cost (2019$)	Inflation Rate	Annual Cost (2022$)
Weekday	11.5	1	255	$55.59	$163,018	3%	$178,134
Saturday	7	1	51	$55.59	$19,846	3%	$21,686
Total	-	1	-		$182,863		$199,820

Source: SRF analysis of NTD data

Table 20 adds to the operating cost all the other costs associated with starting up a new service. "Marketing/other staff time" adds up to the cost of one full administrative FTE, as the time involved in selecting technology vendors, designing the service, training drivers and dispatchers, marketing the service, and coordinating participants would be substantial.

Table 20: Estimated Total Cost of One-Year Flex Pilot

	Funding Source	Annual Cost (2022$)
Operating	General Fund	$199,820
Technology	Federal grants, general fund	$50,000
Vehicle Purchase	Federal grants, general fund	$100,000
Marketing/other staff time	General fund	$60,000
Total (Rounded)		$410,000

Source: SRF research

PART 5: NON-SERVICE RECOMMENDATIONS

Capital Plan

Current Fleet Summary and Condition

Current Fixed-Route and Paratransit Fleet and Condition

RTS operates nine buses in peak service and has 12 paratransit vehicles in the fleet. All vehicles, including the summer trolleys, can accommodate a wheelchair. Vehicles are equipped with radios to communicate with dispatch at the transit center.

Table 21 highlights the general condition of each vehicle in the RTS fleet. In 2013, RTS replaced seven vehicles with medium-duty buses with a useful life of 10 years. Two additional replacements were brought on-line in 2016. Thus, eligibility for replacement of the current fixed-route fleet will begin in 2023. Paratransit vehicles employed in the fleet have useful life of seven years and RTS typically budgets for replacing two paratransit vehicles each year. At this pace, vehicles are replaced essentially at the end of their useful life. Presently, RTS does not include a line item in their annual budget process to replace fixed-route vehicles. Thus, a central element of the capital plan is to understand options and identify a program. Installing a program is critical to operations as vehicle maintenance increases at a faster rate as vehicles age and have more mileage on them.

All but the two oldest vehicles in the fixed-route fleet have ratings of 3 in SDDOT's five-point scale, indicating they have vehicle repairs exceeding $1,500 in the most recent year but only minor damages. The vehicles acquired in 2006 have ratings of 2, indicating they have had a major repair in the most recent year and exceed either the mileage-based or year-based useful life standard.

Table 21: Fixed-Route Vehicle Fleet

Year	Description	Acquisition Date	Current Mileage	Useful Life	Rating	Anticipated Replacement
2006	GMC Glaval Titan	7/27/2006	260,089	10	2	2019
2006	GMC Glaval Titan	7/31/2006	247,985	10	2	2019
2009	GMC Glaval Titan	7/20/2009	237,378	10	3	2020
2009	GMC Glaval Titan	7/20/2009	264,672	10	3	2020
2013	Int Passport-HD	8/5/2013	219,671	10	3	2023
2013	Int Passport-HD	8/6/2013	220,777	10	3	2023
2013	Int Passport-HD	8/5/2013	221,951	10	3	2023
2013	Int Passport-HD	8/5/2013	220,766	10	3	2023
2013	Int Passport-HD	8/5/2013	209,773	10	3	2023
2013	Int Passport-HD	8/8/2013	217,882	10	3	2023
2013	Int Passport-HD	8/5/2013	238,900	10	3	2023

2016	Int Passport-HD	2/3/2016	203,844	10	3	2026
2016	Int Passport-HD	2/1/2016	201,664	10	3	2026
Trolleys						
2007	Ford SVI Trolley	7/2/2007	61,920	10	3	2023
2007	Ford SVI Trolley	7/18/2007	57,615	10	3	2023
2008	Ford SVI Trolley	5/25/2009	48,259	10	3	2023

Paratransit buses have a shorter useful life of seven years, are replaced more frequently, and show more variation in overall condition. Table 22 provides a summary of the current fleet.

Table 22: Paratransit Fleet

Year	Description	Acquisition Date	Current Mileage	Useful Life	Cost	Rating	Anticipated Replacement
2012	Chevy El Dorado	10/1/2012	132,254	5	$86,020	2	2019
2012	Chevy El Dorado	10/1/2012	128,912	5	$86,020	2	2019
2014	Chevy El Dorado	7/22/2014	120,649	5	$85,207	3	2021
2014	Chevy El Dorado	7/25/2014	103,254	5	$85,207	3	2021
2014	Chevy El Dorado	7/22/2014	133,207	5	$85,207	3	2021
2014	Chevy El Dorado	7/25/2014	124,613	5	$85,207	3	2021
2016	Ford ElDorado	7/18/2016	74,029	7	$77,462	4	2023
2016	Ford ElDorado	7/18/2016	78,621	7	$77,462	4	2023
2016	Ford ElDorado	7/18/2016	71,713	7	$77,462	4	2023
2016	Ford ElDorado	7/20/2016	77,648	7	$77,462	4	2023
2017	Ford El Dorado	5/29/2017	54,477	7	$81,901	4	2024
2017	Ford El Dorado	5/29/2017	52,164	7	$81,901	4	2024
2017	Ford El Dorado	5/29/2017	55,122	7	$81,901	4	2024
2017	Ford El Dorado	5/29/2017	74,024	7	$81,901	4	2024
2018	Ford El Dorado	5/16/2018	36,382	7	$79,636	4	2025
2018	Ford El Dorado	5/16/2018	42,383	7	$79,636	4	2025
2008	Glaval/GMC 4500	6/13/2008	111,870	5	$86,290	2	2021
2008	Glaval/GMC 4500	6/16/2008	140,335	5	$86,290	2	2021
2008	Glaval/GMC 4500	6/20/2008	139,787	5	$86,290	2	2018
2008	Dodge Sprinter	8/24/2009	141,445	5	$77,995	2	2019

Support Vehicles

RTS has an inventory of three vehicles used to support operations such as driver relief, investigating breakdowns, and general service support. These vehicles have a useful life of five years, based on FTA guidelines.

Fixed-Route Vehicle Replacement Options and Costs

Table 23 highlights the assumptions for the cost and replacement year of the fleet, including fixed-route vehicles, paratransit vehicles, trolley service vehicles and support vehicles used by RTS.

As part of the transit development plan process, RTS investigated the following options:

- Option 1: Replace all fixed-route vehicles in one year (or when they have reached their useful life). Based on the 10-year useful life of the current fleet, this option would include replacement of seven vehicles in 2023 and two in 2026. Additionally, there is assumption of two spare vehicles are needed. Vehicles in the "spares" inventory would be included in the 2026 purchase.
- Option 2: Replace a part of the fleet every other year to lower the local match impact. While the option would lower the local burden for any purchase year, it would extend the replacement period beyond the useful life of some of the fleet. Extending replacement beyond the useful life likely results in added vehicle maintenance, which needs to be addressed in the alternatives analysis.

Table 23: Fleet Replacement Year and Unit Cost (Fixed-Route)

Vehicles	Eligible Replacement Year	Replacement Cost		Vehicle Age Associated Incremental Maintenance	
		Current Yr.	Escalation	Current Yr.	Escalation
Fixed Route					
1	2023	$375,000	3.00%	$4,950	3.00%
2	2023	$375,000	3.00%	$4,950	3.00%
3	2023	$375,000	3.00%	$4,950	3.00%
4	2023	$375,000	3.00%	$4,950	3.00%
5	2023	$375,000	3.00%	$4,950	3.00%
6	2023	$375,000	3.00%	$4,950	3.00%
7	2023	$375,000	3.00%	$4,950	3.00%
8	2026	$375,000	3.00%	$4,950	3.00%
9	2026	$375,000	3.00%	$4,950	3.00%
Spare 1	2026	$375,000	3.00%	$0	3.00%
Spare 2	2026	$375,000	3.00%	$0	3.00%
Trolley					
1	2027	$300,000	3.00%		
2	2027	$300,000	3.00%		
3	2027	$300,000	3.00%		

Paratransit				
1		$100,000	3.00%	
2		$100,000	3.00%	
3		$100,000	3.00%	
4		$100,000	3.00%	
5		$100,000	3.00%	
6		$100,000	3.00%	
7		$100,000	3.00%	
8		$100,000	3.00%	
9		$100,000	3.00%	
10		$100,000	3.00%	
11		$100,000	3.00%	
12		$100,000	3.00%	
Support Vehicle				
1		$45,000	3.00%	
2		$45,000	3.00%	
3		$45,000	3.00%	

Replacement of trolley vehicles is included in the capital plan at the end of the 10-year useful life. No spare trolley vehicles were included in the analysis as fixed-route vehicles could be used for the short-term period if repairs result in taking a trolly out of service. Holding a trolley as a spare would result in a higher than typical spare ratio of 20 percent.

The cost analysis of the extended replacement purchase (Option 2) includes the assumption of increased annual maintenance costs for more aged vehicles, which is a trend RTS has observed in the fleet. On average, older vehicles have cost RTS an additional $4,950 per vehicle per year to keep them in a state good repair. For each of the replacement options, the maintenance cost increment has been applied to those vehicles that approach or exceed the useful life.

The capital cost analysis assumes going forward, vehicles will be replaced as they reach their useful life, which has been addressed by not including the elevated maintenance cost assumption in replacement after the current fleet is turned over.

The cost difference between Option 1 and Option 2 through 2037, which allows for the current fleet to be replaced twice, is approximately $442,000. The incremental cost for Option 2 is attributed to:

- Extending the elevated annual maintenance costs for a portion of the current fleet for a longer period.
- Inflation applied to extending replacement of the current fleet an additional four years relative to Option 1 and carrying that assumption forward to the next replacement.

As capital needs are cost shared with federal grants, understanding the local responsibility is important in the decision-making process of which alternative to select. Between the two options, there is a local cost differential of $88,300 over the two rounds of replacement period.

Paratransit Vehicle Replacement Costs

The current schedule for paratransit vehicles is to replace two each year, which allows turnover of the fleet on the seven-year useful life schedule. Table 25 documents the assumptions for each vehicle replacement cost and Table 26 documents the annual cost over the next 25 years. The cost responsibility portion of the table assumes a local match of 20 percent of the purchase price.

Support Vehicle Replacement Costs

Support vehicles used generally have a useful life of five years, and the analysis in Table 25 reflects replacement on that schedule.

Table 24: Fixed-Route Vehicle Replacement Cost Options

Replacement Period	FIXED-ROUTE BUSES							
	Rotating Replacement Timing		Cost Share (All at Once)			Cost Share (Every 2-Year Rotating Period)		
	All at Once	Partial Every 2-Years	Local	Federal	Total	Local	Federal	Total
2021	$44,550	$44,550	$8,900	$35,600	$44,500	$8,900	$35,600	$44,500
2022	$45,887	$45,887	$9,200	$36,700	$45,900	$9,200	$36,700	$45,900
2023	$2,784,863	$1,225,021	$557,000	$2,227,900	$2,784,900	$245,000	$980,000	$1,225,000
2024		$32,454				$6,500	$26,000	$32,500
2025		$1,704,977				$341,000	$1,364,000	$1,705,000
2026	$1,738,911	$11,477	$347,800	$1,391,100	$1,738,900	$2,300	$9,200	$11,500
2027		$1,791,078				$358,200	$1,432,900	$1,791,100
2028								
2029								
2030								
2031								
2032								
2033	$3,742,622	$1,603,981	$748,500	$2,994,100	$3,742,600	$320,800	$1,283,200	$1,604,000
2034								
2035		$2,268,885				$453,800	$1,815,100	$2,268,900
2036	$2,336,951		$467,400	$1,869,600	$2,337,000			
2037		$2,407,060				$481,400	$1,925,600	$2,407,000
2038								
2039								
2040								
TOTALS	$10,693,784	$11,135,369	$2,138,800	$8,555,000	$10,693,800	$2,227,100	$8,908,300	$11,135,400

Table 25: Paratransit, Trolley, and Support Vehicle Replacement Cost Options

Replacement Period	PARATRANSIT				TROLLEY				SUPPORT VEHICLES			
	Total Cost	Cost Share (Replace 2 per Year)			Total Cost	Cost Share (10 Year Placement of 2)			Total Cost	Cost Share (5 Year Placement of 3)		
		Local	Federal	Total		Local	Federal	Total		Local	Federal	Total
2021												
2022	$206,000	$41,200	$164,800	$206,000					$46,350	$9,300	$37,100	$46,400
2023	$212,180	$42,400	$169,700	$212,100					$47,741	$9,500	$38,200	$47,700
2024	$218,545	$43,700	$174,800	$218,500					$49,173	$9,800	$39,300	$49,100
2025	$225,102	$45,000	$180,100	$225,100								
2026	$231,855	$46,400	$185,500	$231,900								
2027	$238,810	$47,800	$191,000	$238,800	$716,431	$143,300	$573,100	$716,400	$53,732	$10,700	$43,000	$53,700
2028	$245,975	$49,200	$196,800	$246,000					$55,344	$11,100	$44,300	$55,400
2029	$253,354	$50,700	$202,700	$253,400					$57,005	$11,400	$45,600	$57,000
2030	$260,955	$52,200	$208,800	$261,000								
2031	$268,783	$53,800	$215,000	$268,800								
2032	$276,847	$55,400	$221,500	$276,900					$62,291	$12,500	$49,800	$62,300
2033	$285,152	$57,000	$228,100	$285,100					$64,159	$12,800	$51,300	$64,100
2034	$293,707	$58,700	$235,000	$293,700					$66,084	$13,200	$52,900	$66,100
2035	$293,707	$58,700	$235,000	$293,700								
2036	$302,518	$60,500	$242,000	$302,500								
2037	$311,593	$62,300	$249,300	$311,600	$962,824	$192,600	$770,300	$962,900	$72,212	$14,400	$57,800	$72,200
2038	$320,941	$64,200	$256,800	$321,000					$74,378	$14,900	$59,500	$74,400
2039	$320,941	$64,200	$256,800	$321,000					$76,609	$15,300	$61,300	$76,600
2040												
TOTALS	$4,125,083	$825,000	$3,300,100	$4,125,100	$1,679,255	$335,900	$1,343,400	$1,679,300	$725,078	$144,900	$580,100	$725,000

Table 26: Cumulative Fleet Replacement Costs and Responsibility

	ANNUAL TOTALS					
	Replace Fixed-Route at Same Time			Fixed-Route Partial (3-4 Every 2 Years)		
Replacement Period	Local	Federal	Total	Local	Federal	Total
2021	$8,900	$35,600	$44,500	$8,900	$35,600	$44,500
2022	$59,700	$238,600	$298,300	$59,700	$238,600	$298,300
2023	$608,900	$2,435,800	$3,044,700	$296,900	$1,187,900	$1,484,800
2024	$53,500	$1,605,200	$2,006,500	$60,000	$240,100	$300,100
2025	$45,000	$180,100	$225,100	$386,000	$1,544,100	$1,930,100
2026	$394,200	$185,500	$231,900	$48,700	$194,700	$243,400
2027	$201,800	$807,100	$1,008,900	$560,000	$2,240,000	$2,800,000
2028	$60,300	$241,100	$301,400	$60,300	$241,100	$301,400
2029	$62,100	$248,300	$310,400	$62,100	$248,300	$310,400
2030	$52,200	$208,800	$261,000	$52,200	$208,800	$261,000
2031	$53,800	$215,000	$268,800	$53,800	$215,000	$268,800
2032	$67,900	$271,300	$339,200	$67,900	$271,300	$339,200
2033	$818,300	$3,273,500	$4,091,800	$390,600	$1,562,600	$1,953,200
2034	$71,900	$287,900	$359,800	$71,900	$287,900	$359,800
2035	$58,700	$235,000	$293,700	$512,500	$2,050,100	$2,562,600
2036	$527,900	$2,111,600	$2,639,500	$60,500	$242,000	$302,500
2037	$269,300	$1,077,400	$1,346,700	$750,700	$3,003,000	$3,753,700
2038	$79,100	$316,300	$395,400	$79,100	$316,300	$395,400
2039	$79,500	$318,100	$397,600	$79,500	$318,100	$397,600
2040						
TOTALS	$3,573,000	$14,292,200	$17,865,200	$3,661,300	$14,645,500	$18,306,800

Bus Stops and Amenities

To accommodate modifications to the current routing and route extensions to fringe areas, bus stop additions should be included in the capital planning. To address ADA, stops should have a concrete pad as well as signage that indicates what transit service is available from the stop and the name of the stop. Additional amenities to include at stops may include benches, bus shelters, informational maps, and pedestrian wayfinding signage. Cities have found cost-effective ways to implement these bus stop features by combining construction with pedestrian, bike and roadway capital projects. Bus stop improvement plans can help communicate needs with local organizations that may also assist with relatively small improvements.

Table 27 provides documentation of the basics of a bus stop, including signage and other amenities.

Table 27: Bus Stop and Amenities

Cost Per Element/Amenity	Item Cost (2021)	Basic Stop (Pad and Sign)	Enhanced Stop (Basic Plus Shelter)
Concrete Pad (5 feet by 8 feet)	$2000	$2,200	$11,700 – No Bench $12,450 - Bench
Sign	$200		
Bench	$750		
Shelter (Larger Pad)	$11,500		

Maintenance Facilities/Storage

The current facility has reserve capacity for growth in the fleet for both maintenance and storage of the current fleet and additional vehicles associated with route expansion to fringe areas or operating a limited number of flexible zone vehicles.

Fleet Expansion to Support Service Expansion

Adding routes and/or flex service zones will require adding vehicles to the fleet. Operating cost estimates documented in earlier sections address the personnel and daily service costs, however, fleet vehicles will also be needed. Consistent with existing service, adding a route/area, would require adding one vehicle to the fleet. The class of vehicle varies by the service, with a medium-duty bus, identical to the RapidRide vehicles would be used for expanded fixed-route service and a vehicle consistent with those used for paratransit service would be appropriate for flex service. Table 28 documents the current assumptions in the cost per vehicle.

Table 28: Expansion Vehicle Costs by Type

Service Type	Vehicle Type	Useful Life (Years)	Estimated Cost
Fixed Route	Medium Duty Bus	10	$375,000
Flex Area	Light Duty Bus	7	$100,000

Technology Upgrades

Up-to-date technology helps operations run smoothly, improves customer experience, and provides useful data for future service planning. This section lists recommended technology upgrades in order of priority to RTS.

GTFS/Google Transit

RTS and RCAMPO have already begun the process of creating a General Transit Feed Specification (GTFS) for RapidRide schedules. This will enable users to use Google Transit's trip planner in Rapid City.

Fareboxes

The current fare collection system relies on operators to count cash, passengers, and ticket types by hand. Upgraded fareboxes would automate much of this process, freeing operator attention and generating digital logs that could be used more easily for data analysis. Onboard survey responses indicated that upgraded fare payment options would meet a warm welcome with riders.

Tracking App

Predictability is one of the keys to user experience in transit. RTS should consider developing or purchasing a smartphone app that provides arrival updates for riders waiting for a bus. The first step necessary to achieve this has already been completed, as Automatic Vehicle Location is already installed.

In assessing its options for both farebox upgrades and tracking apps, RTS should give attention to the full range of demands that might be placed on an application. In the future, the fareboxes may need to be integrated with electronic fare payment methods such as smartcards and smartphone apps. Ideally, transit users will be able to download one app and use it for trip planning, arrival tracking, fare payment, and even on-demand trip booking.

Automatic Passenger Counters

Automatic Passenger Counters (APCs) use sensors positioned at each door of a bus to count boardings and alightings by stop. The exact technology varies; one of the most common is an infrared beam that breaks when a rider passes through, but other technologies include three-dimensional cameras and pressure-sending treadle mats.

Once APCs have been installed and calibrated, they generate large amounts of ridership data for very little effort. This is helpful not only when completing annual NTD reports, but also for analyzing stop-level

ridership. If APCs are installed by the time the next TDP is completed, Rapid City will have high-quality data available to understand where its riders are most and least active.