City of Fort Collins

FORT COLLINS TRANSIT MASTER PLAN

PLANNING OUR FUTURE. TOGETHER.

Adopted April 16, 2019

Acknowledgments

The development of this Transit Master Plan would not have been possible without the work and ideas from thousands of individuals: community members, elected officials, City staff, consultants and many more. While we recognize the special efforts of the individuals and groups below, we wish to thank everyone who participated and contributed to this effort.

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EXECUTIVE SUMMARY

We are living in a time of unprecedented change: rapid growth, an explosion of new mobility options, and new people moving into our city. Along with these changes come great opportunities to transform our community in positive ways by making it more livable, sustainable and welcoming.

With these changes in mind that Fort Collins has drafted a new vision for transit in the City—the Transit Master Plan. This plan is deeply rooted in City Plan, the community's long-range vision for land-use and transportation, and is based on extensive community outreach. The predominant message from the community supported expanding the transit system with a combination of fixed-route and on-demand-type services. The key goal of the Transit Master Plan is to provide exceptional, equitable, customer-focused service that meets the community's present and future transit needs.

THE NUMBERS

By 2040, Fort Collins will:

SEE A POPULATION INCREASE 40% FROM 170,000 TO 240,000

SEE JOBS GROW 43% FROM 102,000 TO 146,000

Without a strong land-use and coordinated transportation plan, these new residents and workers would generate more than 300,000 new daily vehicle trips that would result in additional traffic congestion, air pollution and greenhouse gas emissions. In addition to the mobility pressures caused by growth, new technologies and changing transportation trends could put even more vehicles on the road.

AUTONOMOUS VEHICLES

RIDE-HAILING

ONLINE SHOPPING AND RAPID DELIVERY

City Plan defines a strong land-use vision for the future to ensure that Fort Collins in 2040 remains an attractive and thriving place to live, study, work and visit. This land-use vision will concentrate much of the City's population and employment growth along key transportation corridors, while still providing for a mix of different development types across Fort Collins. In support of City Plan, the Transit Master Plan will evolve the transit system as follows:

» **Expand Bus Rapid Transit** in locations with transit-supportive land-uses.

» **Increase Frequencies** to keep up with increasing demand as land-use becomes more dense.

» **Expand Coverage** of the transit network to lower density areas through *mobility innovation zones.*[1]

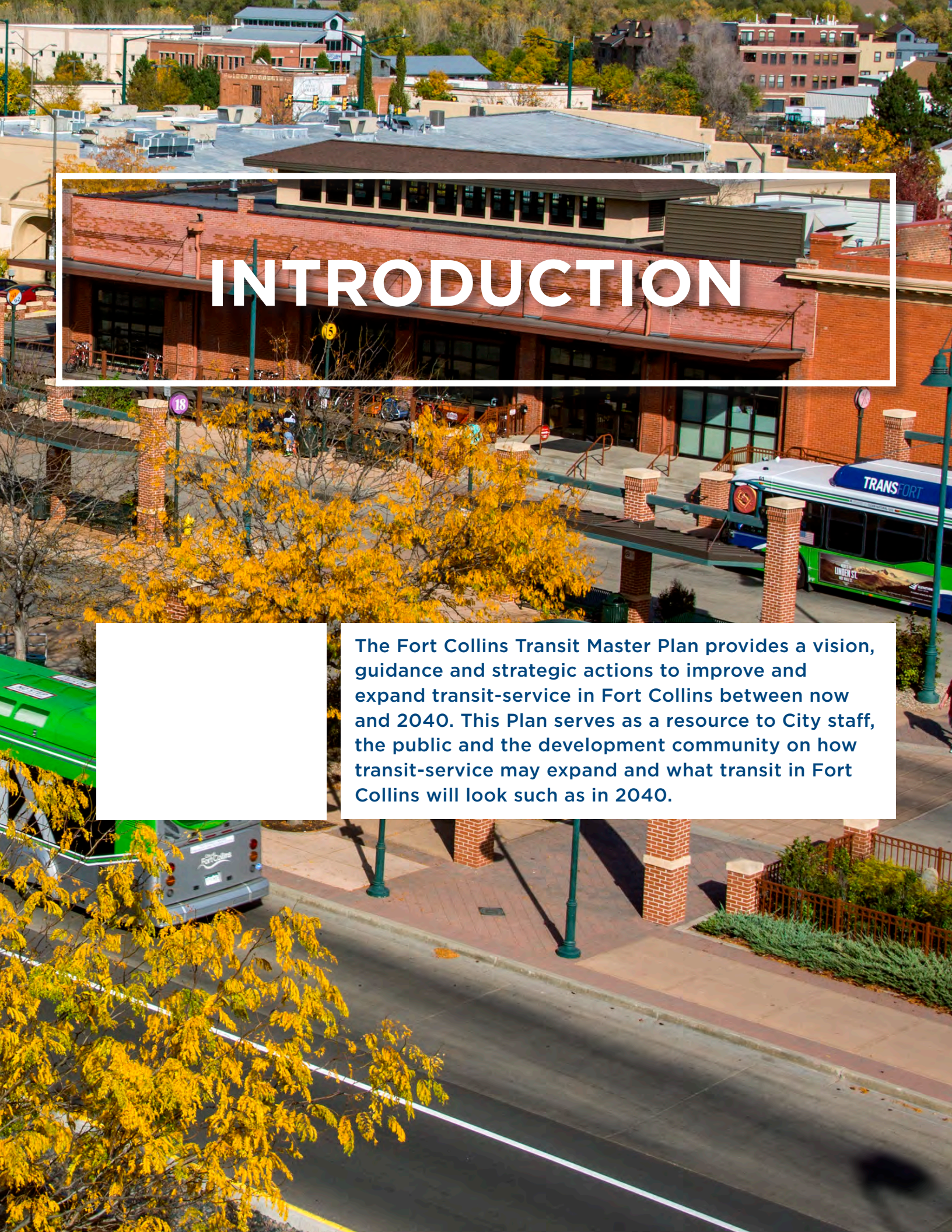
» **Add Regional Routes** to connect Fort Collins to more surrounding communities and provide options for commuters.

» **Improve Connections** to transit by leveraging the layered network from the Transportation Master Plan and developing strategic *mobility hubs* on the core transit network.

» **Modernize** Transfort's operations by adopting new autonomous and electric vehicle technologies, partnerships with mobility providers, and the latest information-sharing platforms.

» **Funding** to support approximately $300 million in capital improvements and doubling the annual operating budget over the next 20 years will be thoroughly explored with a funding study.

Today, 73% of commute trips (60% of all trips) are taken by driving alone in Fort Collins and 1.6% by transit. Significant investments in transit infrastructure are necessary for any notable increases in transit mode share to occur. These transit investments, along with complementary transportation improvements outlined in the Transportation Master Plan, will result in transit trips going up by nearly 120% compared with today and a tripling of the transit mode share. However, perhaps even more significantly, more people in Fort Collins will have access to frequent, reliable and low-cost transportation that supports the City's vision for an economically thriving and environmentally sustainable city.



INTRODUCTION

The Fort Collins Transit Master Plan provides a vision, guidance and strategic actions to improve and expand transit-service in Fort Collins between now and 2040. This Plan serves as a resource to City staff, the public and the development community on how transit-service may expand and what transit in Fort Collins will look such as in 2040.

“The MAX is excellent, there should be a few more MAX corridors. ”

- Community Member Feedback During Visioning Process

INTRODUCTION

TRANSIT VISION

In alignment with changing land-uses and technologies, Fort Collins will provide safe, attractive, efficient, equitable, modern and innovative mobility for people to live, work and play in the City.

PURPOSE OF THE TRANSIT PLAN

The purpose of this Plan is to provide guidance on how Fort Collins will gradually grow and improve transit-service over time in order to achieve the City's vision for transit in 2040.

Key elements this Plan addresses include:

- How the system can strategically expand and adapt to changing land-use and increasing demand for transit.
- Innovative strategies to capitalize on emerging technologies and shifting travel behavior.
- Integration with other Plans, including the City Plan and Transportation Master Plan, Corridor Plans, Sub Area Plans, and Regional Plans.
- Capital and operating improvements to speed, reliability, comfort, safety and frequency of service.
- Strategies to improve equity, first/last mile access and integration with other modes.
- A phased action plan with options to fund future expansion and improvements.
- Performance monitoring and reporting.

Why This Transit Plan Is Needed?

Over the past several years, Fort Collins has successfully grown transit ridership despite a national trend of declining ridership. Recent ridership growth can be attributed in part to the implementation of the highly successful MAX Bus Rapid Transit (BRT) line along the Mason Street corridor in 2014 and strategic investments in services catered to Colorado State University students and staff. The way people use transit and, to some extent, the role of transit as a mobility provider in the community are rapidly changing. These changes can be attributed to both local trends, including changing land-use and demographics, as well as national trends, including new technology and changing travel behavior. In order for transit to continue to provide value to the community and for the City to grow ridership in the future, transit-service in Fort Collins will need to adapt given the dynamic influences affecting mobility.

AFTER MAX WAS IMPLEMENTED, ANNUAL RIDERSHIP GREW FROM ABOUT 2.5 MILLION IN 2014 TO 4.4 MILLION IN 2018.

- **Land-use** – As land-use changes, including densification of certain corridors and regions of the City, it will be important for the City to add or modify transit-service to respond to those changes.
- **Demographics** – The City's population is expected to grow an additional 40 percent by 2040. The senior population, those 75 years of age and older, is expected to triple by 2040. Students, young people, families, seniors and people of various incomes tend to use transit-service differently, so where and how the City's population grows will impact demand for transit.
- **Technology** – The emergence of transportation network companies (TNCs), such as Uber and Lyft, carshare (e.g., Zipcar), bikeshare, electric scooters, micro-transit, smartphones and mobility applications, and electric and autonomous-vehicle technology is rapidly changing service options available to transit agencies and demand for different types of transit-service. Some of these technologies will also emerge as important connections to transit.
- **Travel Behavior** – Technological advances in mobility, online shopping, telecommuting, smartphone use and lifestyle choices are contributing toward a shift in travel behavior. As a result, when and how people use transit are changing and it will be important for transit-service to adapt to these changes.

Implementation of this plan will result in improved transit-service and continued growth in ridership in Fort Collins, which will provide numerous benefits to the community, including:

- **Traffic Congestion Management** - Reduce growth in vehicle miles traveled (VMT) and single-occupant vehicle travel, keeping traffic congestion from growing as quickly as it otherwise would.
- **Sustainable Development** - Support the Structure Plan in the City Plan document by funneling growth to walkable urban neighborhoods along key transit corridors and activity nodes served by high-frequency transit.
- **Equity** – Support affordability and expand mobility options for the community, region and visitors, including walking and biking. Ensure bilingual communications about service changes and how to ride transit.
- **Environmental** - Advance Fort Collins toward achieving its Climate Action Plan and Air Quality Plan goals.
- **Economic** – Support and grow the Fort Collins economy by providing affordable and viable transportation to jobs and reducing household expenses.
- **Health** – Support active transportation and healthy lifestyles. Instill the benefits of transit at an early age through Safe Routes to Schools programs.

Relation to Other Plans

The Fort Collins Transit Master Plan was developed in close coordination with City Plan and the Transportation Master Plan. The Transit Master Plan supports and advances the City's larger land-use, transportation, economic development, environmental, and equity goals.

CITY PLAN

The Transit Master Plan directly aligns with the land-use plan identified within City Plan. Service improvements will be focused on areas of the City where existing and future densities and development types support transit.

TRANSPORTATION MASTER PLAN

The Transit Master Plan identifies transit priority corridors as part of the layered transportation network in the Transportation Master Plan. In addition, operations and capital improvements identified in this Plan support pedestrian, bicycle and vehicle mobility goals identified in the layered network. Lastly, the layered network was used to strategically locate multimodal transfer points (*mobility hubs*) along the future transit network to facilitate seamless travel between multiple modes.

CORRIDOR AND SUBAREA PLANS

The Transit Master Plan builds off of recently completed corridor plans, including the West Elizabeth Corridor Plan and Harmony Road ETC Alternatives Analysis. This Plan provides a framework for the City to develop future corridor plans and subarea plans with key transit elements.

TRANSIT MASTER PLAN

REGIONAL TRANSIT PLANS

Existing regional transit planning efforts (such as the NFRMPO Transit Element) were used to inform the future regional transit network. Guidance is provided on several corridors from which the City is or will be seeking partnerships with neighboring communities to expand regional transit.

SHORT-RANGE AND TRANSIT OPERATIONS PLANS

The Transit Master Plan provides high-level guidance and an aspirational vision for improving transit system operations. Elements of this Plan were informed in part from findings of the recently developed Transfort Route Improvement Project (TRIP). The Transit Master Plan can also be used as a framework for developing future short-range and more detailed operations plans, BRT plans and detailed capital-improvement plans.

Transit Specific Principles and Policies

This section summarizes the primary transit principle and related policies from City Plan. The Transit Master Plan articulates the strategies and actions necessary to advance the principle and implement the policies.

Principle T 5: Transit is a safe, affordable, efficient and convenient travel option for people of all ages and abilities.

- **POLICY 5.1: TRANSIT SYSTEM** - Expand the City's public-transit system in phases, as funding and partnership opportunities are secured to provide integrated, high-frequency, productivity-based transit-service along major transportation corridors, while providing coverage in lower-density areas through emerging technologies.
- **POLICY 5.2: BRT AND HIGH-FREQUENCY TRANSIT SERVICE** - Plan to implement BRT and high-frequency transit-service as shown in the Transit Master Plan along major transportation corridors as land-use densifies and mobility demands increase, providing links between major activity centers, transit-oriented development and mobility hubs.
- **POLICY 5.3: INTEGRATE AND EXPAND TRANSIT SERVICE TYPES** - Plan to integrate fixed-route transit-service with mobility innovation zones to serve lower density areas of the City with nontraditional transit-service, including microtransit, partnerships with Transportation Network Companies, Mobility-as-a-Service (MaaS) technologies and other innovations.
- **POLICY 5.4: RELIABLE TRANSIT SERVICE** - Plan to provide fast and reliable transit-service throughout the City with emphasis on high-frequency routes through the use of various design and operating strategies including bulb-outs, signal priority, bus-only lanes, access to mobility hubs and streamlining of route patterns to minimize deviations and appropriately spaced bus stops.
- **POLICY 5.5: TRANSIT STOPS** - Plan and implement the expansion and modernization of the transit infrastructure, including bus stops/shelters, expanded and upgraded transit centers with elements such as adequate lighting, ADA accessibility, protection from the elements, on- and off-board security and cameras, per the Transfort Bust Stop Design Guidelines.
- **POLICY 5.6: REGIONAL TRANSIT LEADERSHIP** - The City will continue to be a leader in the region by efficiently operating transit-services in smaller partner communities and leading the development of new regional transit connections in the greater North Front Range Region.
- **POLICY 5.7: TRANSIT TECHNOLOGY** - The City will continue to pursue technology innovations such as integrated fare payment and mobility information, pedestrian blind-spot detection, autonomous and connected vehicles, electric and low-emission buses and on-demand vehicles.
- **POLICY 5.8: CONNECT TRANSIT TO OTHER MODES** - Connect public-transit to other modes of travel through strategically located mobility hubs, to be located near activity centers, where one or more transit routes and bicycle facilities intersect. These hubs will provide shared multimodal facilities and may include elements such as bicycle parking, bikeshare and carshare, multimodal information, park-n-rides, and curbspace for shuttles and drop-off vehicles.
- **POLICY 5.9: TRANSFORT SERVICE STANDARDS** - Transit-service shall be provided in accordance with the Transfort Service Standards.
- **POLICY 5.10: PARATRANSIT** - Paratransit will be provided in accordance with federal requirements and the City will look for ways to improve customer service, ensure cost-effective coverage and improve outreach and education for paratransit customers who would receive better mobility services on the fixed-route network.
- **POLICY 5.11: TRANSIT MAINTENANCE FACILITY** - To support the additional transit-service identified in the Transit Master Plan, the City will need to explore how to expand and potentially relocate the Transit Maintenance Facility to store and maintain a larger fleet of buses and support vehicles.

EXISTING SERVICE

Transfort is the City's transit operator, operating 22 fixed-routes across the City, including one Bus Rapid Transit (BRT) route, the MAX, which offers 10 minute frequencies throughout much of the day. Historically, Transfort has operated a coverage-based transit system with most routes operating at 30- to 60-minute frequencies. Recent investments have been geared toward a productivity-based system, with the introduction of the MAX in 2014 and restructuring of routes around the CSU campus. Those investments have resulted in ridership growth since 2013.

“The bus goes where I want, but not when I want.”

- Comment from Future of Transit Panel Survey Results

EXISTING SERVICE

Existing fixed-route service can be divided into four service types: BRT, high-frequency, Local with 30-minute frequency, and Local with 60-minute frequency, illustrated in the table below. Many routes split service between peak- and off-peak-hours which are provided based on demand by employee and student commuters. Transfort also provides several other services, including regional service on the FLEX to Loveland, Longmont and Boulder, paratransit-service and specialty routes (e.g., CSU Game Day bus service).

SERVICE TYPE	CHARACTERISTICS	ROUTES	PERCENT 2018 SYSTEM SERVICE HOURS[1]	PERCENT 2018 SYSTEM RIDERSHIP[1]
BRT	» 10-15 minute weekday daytime frequency » Dedicated bus-only, BAT (business access and transit only), or queue jump lanes » Off-board fare payment » Unique branding	MAX	23%	33%
High Frequency	» 15-minute or better daytime weekday frequency	3, 31, Horn	16%	26%
Local (30 min frequency)	» 30-minute daytime weekday frequency	2, 7, 8, 16, 32, 81	25%	21%
Local (60 min frequency)	» 60-minute daytime weekday frequency	5, 6, 9, 10, 12, 14, 18, 19[2], 33	26%	14%
Specialty Routes	» Regional » Late night » School trippper » Special event » Dial-A-Ride » CSU Game Day	FLEX (regional), GOLD (late night), 92 (school tripper), special event, on-demand (DAR)	10%	6%

[1] Excludes regional, special late night, event and paratransit-service.
[2] Route 19 operates 30-minute peak and 60-minute off-peak service.

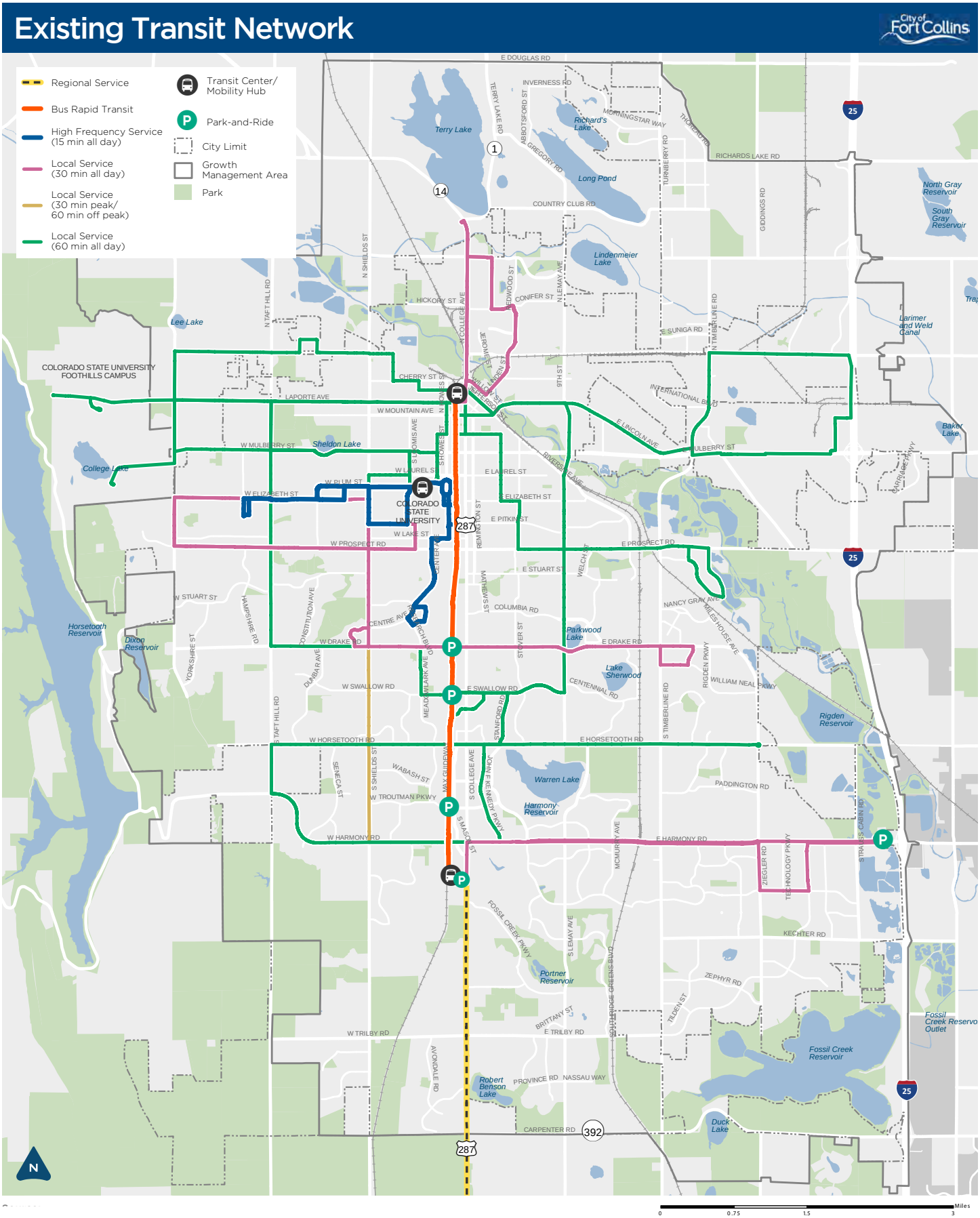


Figure 1 – Existing Transit

Paratransit

In addition to fixed-route service, Transfort operates its Dial-A-Ride service, which provides transit access to people who cannot take fixed-route transit (because of a physical or mental impairment). Dial-A-Ride is a type of transit-service more generally known as paratransit that is required by the Americans with Disabilities Act (ADA). While there are numerous ADA requirements for paratransit, the most fundamental requirement is that all public-transit operators must provide paratransit to any *qualifying* person that lives within ¾ of a mile of the fixed-route system for no greater than twice the fixed-route fare. Paratransit must operate during the same time period as the fixed-route system and must generally provide door-to-door service and some sort of reservation system. Transfort meets all these basic requirements and goes beyond federal requirements in the following ways:

- The Dial-a-Taxi program provides an on-demand paratransit-service that allows for one end of the trip to be outside of the typical Dial-A-Ride boundary. Long trips are subsidized up to $20 by Transfort.
- Foothills Gateway Shuttle provides four trips per weekday to the Foothills Gateway facility, which is outside of the fixed-route service area.
- 42 clients have "grandfathered" access to the Dial-A-Ride program even though they do not live within the service area. These are the clients that were impacted by a 1997 service change.

While Dial-A-Ride provides an important connection for those who depend on the service, it is one of the highest-cost-per-ride (lowest-productivity) services that Transfort provides. The high cost is related to the fact that one or more vehicles must be on-call when the fixed-route service is operating, in case there is a request for service. Additionally, the door-to-door service provided by (and often required by the riders) takes time, which limits how many rides per hour can be offered by the Dial-A-Ride system. Currently, Dial-A-Ride averages about 2 rides per hour at a cost of about $34.58 per ride. This compares with a cost of $2.12 per trip on MAX.

Ridership

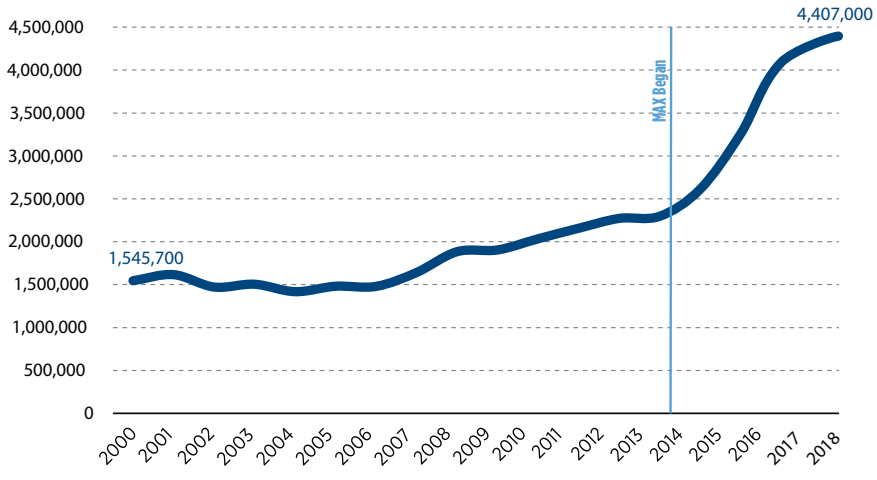
Transit ridership in Fort Collins has grown by about 160% since 2007 and by 87% between 2013 and 2017. Ridership has significantly outpaced population growth, which has grown by about 20% since 2007 and 7.5% since 2013. The recent rapid increase in ridership directly coincides with a 65% increase in revenue service hours[3] since 2013. Revenue service hours were added primarily through several specific improvements:

- The opening of MAX in 2014.
- Route restructuring and additional frequencies related to partnership with CSU, which improved reliability for CSU students, faculty, and staff.
- Increased service on CSU game-days.
- Sunday/holiday service expansion in 2017.

IMPACT OF MAX

The addition of MAX, which was Fort Collins' first BRT route, was a main driver in the rapid increase in ridership from 2013-17. The frequency and reliability of the service, achieved through a primarily dedicated right-of-way, as well as its route alignment serving key activity centers (including downtown, CSU, South Fort Collins and the College Avenue corridor) have attracted many new transit riders and positively changed the perception of transit for many residents of Fort Collins.

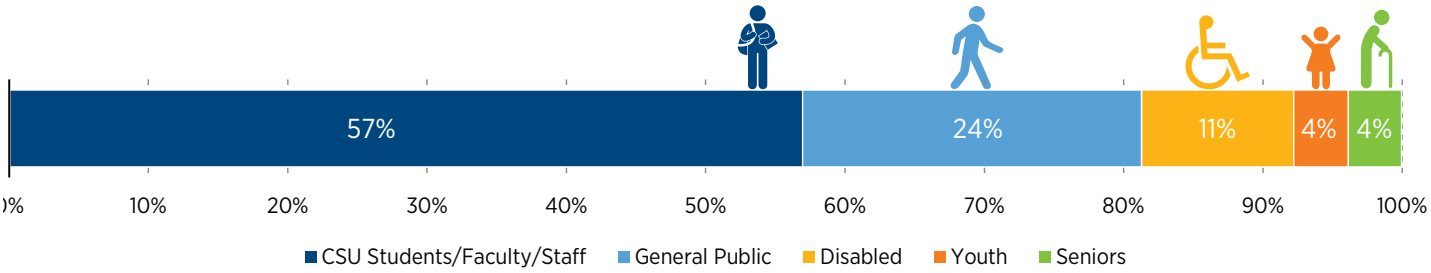
Transfort Annual Ridership
Fort Collins, 2000-2018



[3]Revenue service hours includes the numbers of hours every bus is operating in service.

Who Rides Transit?

CSU students, faculty and staff accounted for more than half of Transfort ridership in 2018.



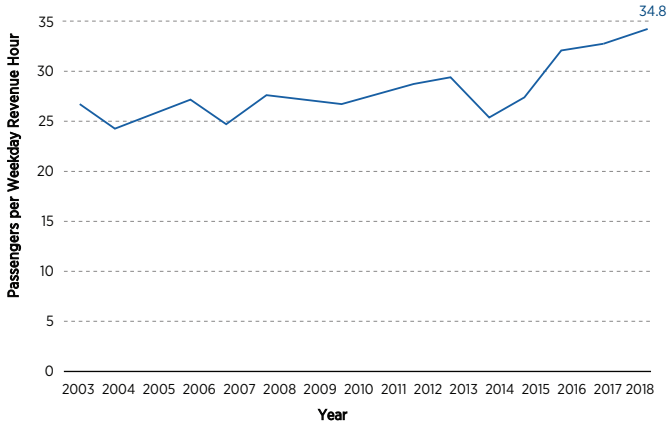
Transit Productivity

Productivity is a measure of ridership divided by service hours and is a good indicator of the cost efficiency achieved. In 2018, Transfort averaged about 35 riders per bus revenue hour, which was a 20% increase since 2013. This increase in productivity over time is particularly remarkable when considering the major expansion of service hours in 2014. Again, with MAX and the CSU service revisions, ridership has grown faster than service hours, which shows that people are strongly attracted to frequent, reliable transit-service.

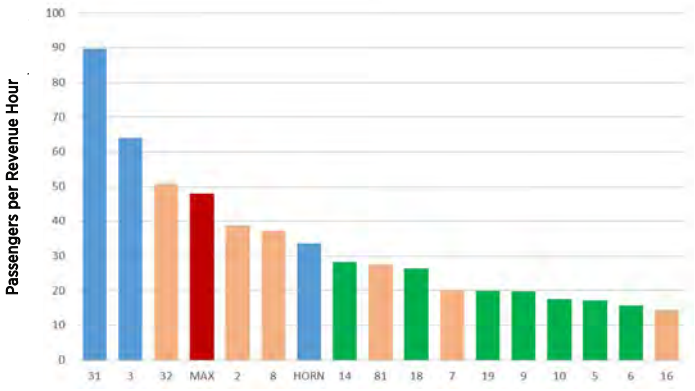
Transfort's three high-frequency routes (3, 31, HORN) and one BRT route (MAX) account for four of the six most-productive routes in the system. These routes account for about 39% of the weekday bus revenue service hours within the City and 59% of ridership. Additionally, five of the six least-productive routes in the system are routes that operate at 60-minute frequencies. These routes account for 26% of the transit system's revenue service hours but only account for 14% of system ridership.

In summary, high-frequency routes have exponentially greater ridership and are thus more productive. Implementation of high-frequency routes has a better return on investment in terms of ridership per revenue service hour.

Transit Productivity
Fort Collins, 2003-2018



Transfort Productivity by Route
Fort Collins, 2018



Case Studies: Where Is Transit Ridership Growing?

Over the past several years, there have been numerous reports of declining transit ridership across the United States. As shown in the chart below, national transit ridership peaked in 2014 and has been declining for the past four years, despite population and employment growth. There are a number of reasons that have been cited for the national decrease in transit ridership, including competition from ride-hailing services, an improving economy that allows more people to be able to afford a car, and relatively stable and low fuel costs.

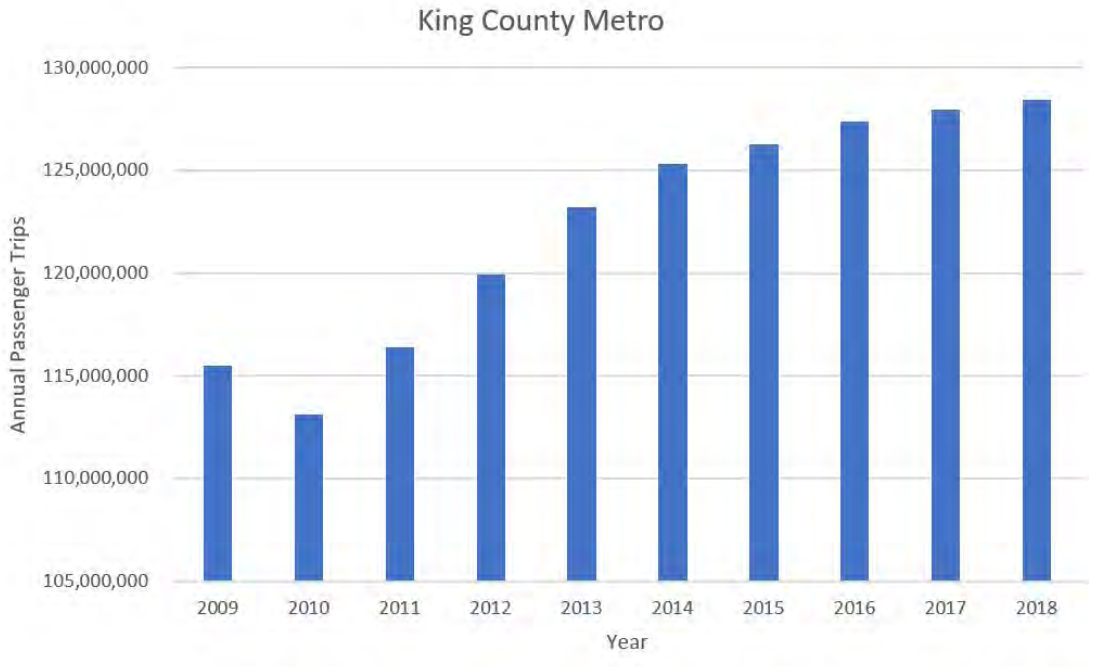
While transit ridership is decreasing for most agencies across the country, there are a few notable exceptions, such as Transfort. This section highlights some of the strategies that these agencies that are seeing growth in ridership are using.

Sound Transit – Seattle, WA:

Sound Transit has seen rapid ridership growth over the past several years. This ridership growth has generally been fueled by voter-approved tax increases to build out the regional transit system, largely focused on new rail lines that serve the densest portions of the region.

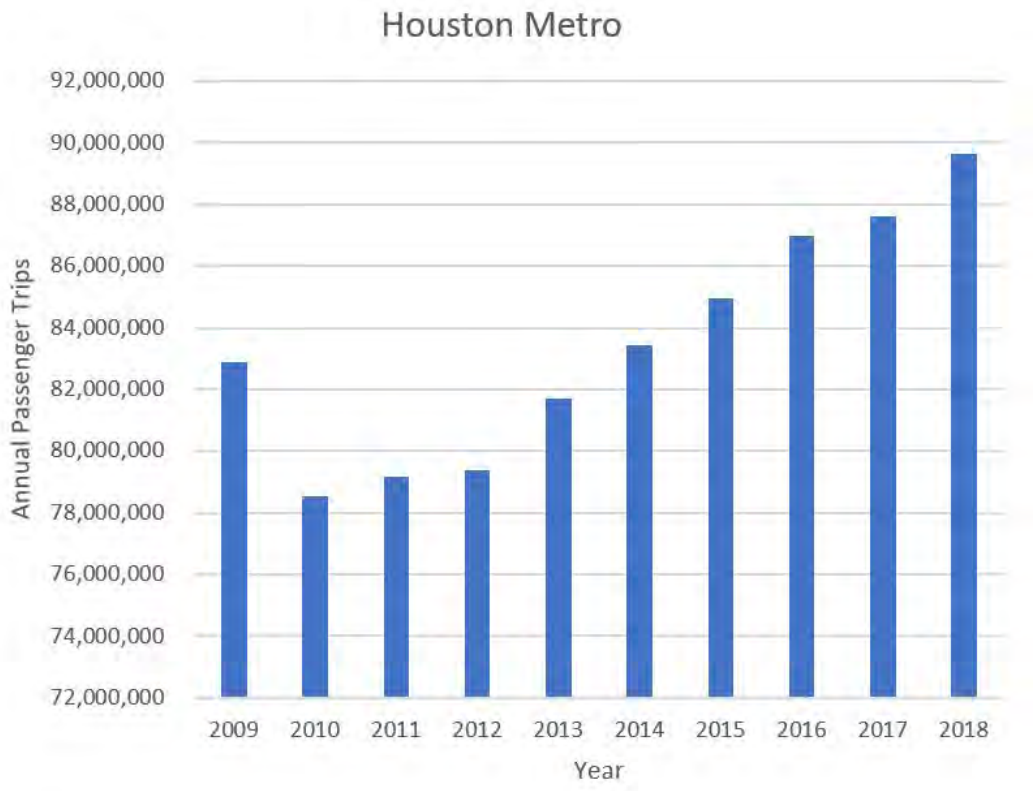
King County Metro – Seattle, WA:

King County Metro is the largest transit agency in Washington State (moving nearly three times as many passengers as Sound Transit). While not as dramatic as Sound Transit, Metro's increase in ridership has also been steady for the past several years. This increase in ridership is not fueled by major system expansion, but rather improvements to transit frequency, speed and reliability. Given the Seattle region's rapid growth over the past decade, Metro has focused its additional resources on the denser areas of the region and along key commuter routes to major employment centers.



Houston Metro – Houston, TX:

Houston Metro has seen steady ridership increases over the past eight years during a period when nearly every other Sun Belt city has seen ridership declines. The ridership increases are due to a mix of additional build out of the light rail system, and also a major bus restructure in 2016 that focused on a grid of high-frequency routes rather than a hub-and-spoke model. The grid pattern allowed Houston Metro to redeploy its resources to the densest areas with the highest transit propensity, which boosted ridership.



The takeaway from the three examples above is that transit systems that focus on providing reliable, frequent service to the denser areas of the region are seeing ridership increases. Agencies with more sprawling networks that focus on coverage are seeing ridership decrease as other modes are more attractive than transit for some riders. Transfort's ridership increases over the past few years follow the model described above—new MAX service through the densest corridor in the city and additional CSU-focused service on other high-demand routes. The future transit network proposed in this plan would keep this focus moving forward.

Peer City Comparison

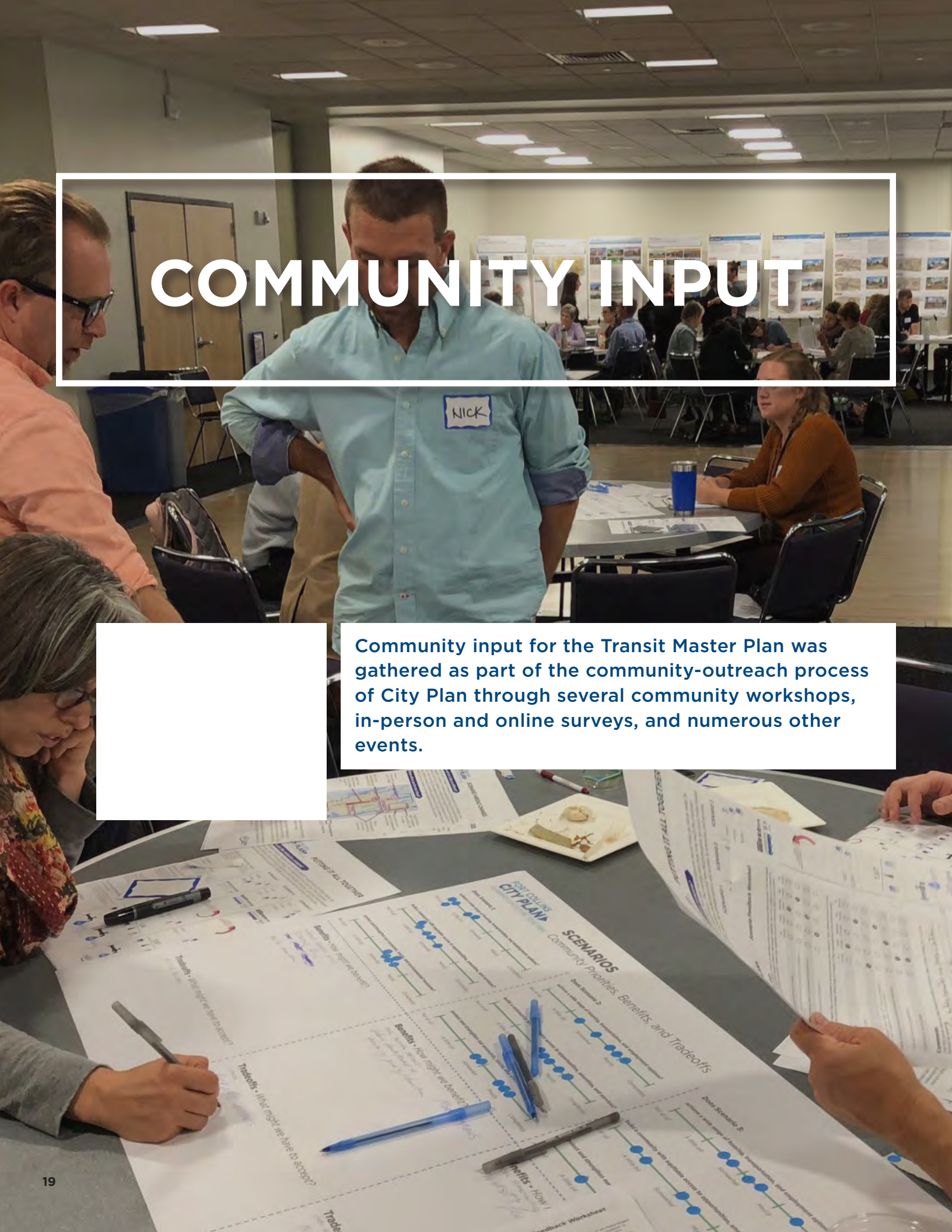
The table and chart below provide a comparison of ridership and investment per capita in Fort Collins as compared with several peer cities of similar size with major universities. All of the peer cities have city-run transit agencies, with the exception of Davis, CA and Missoula, MT which are operated (either fully or in part) by the local university. Data shows that while Fort Collins has made tremendous progress in growing ridership over the past several years, it is on the low end of the spectrum compared with many peer cities, and there is opportunity for future growth. In general, communities that have invested more in transit per capita also have proportionally higher ridership per capita, with the notable exception of Davis, CA, where the service area is much smaller and much denser thus greater efficiency.

REGION	SERVICE AREA (SQ MI)	SERVICE AREA POPULATION	DENSITY (SQ MI)	RIDERSHIP PER CAPITA	INVESTMENT PER CAPITA
Champaign-Urbana, IL	40	137,000	3,100	84	$244
Chapel Hill, NC	62	80,000	1,900	79	$221
Ann Arbor, MI	110	225,000	1,900	58	$194
Gainesville, FL	76	164,000	2,200	57	$147
Davis, CA	13	73,000	5,200	56	$69
Madison, WI	72	256,000	2,700	52	$210
Lawrence, KS	29	92,000	2,900	37	$79
Eugene, OR	482	302,000	2,900	34	$172
Fort Collins, CO	**54**	**144,000**	**2,400**	**30**	**$106**
Missoula, MT	70	72,000	1,800	26	$85
Asheville, NC	45	89,000	1,100	23	$99

BEST PRACTICES

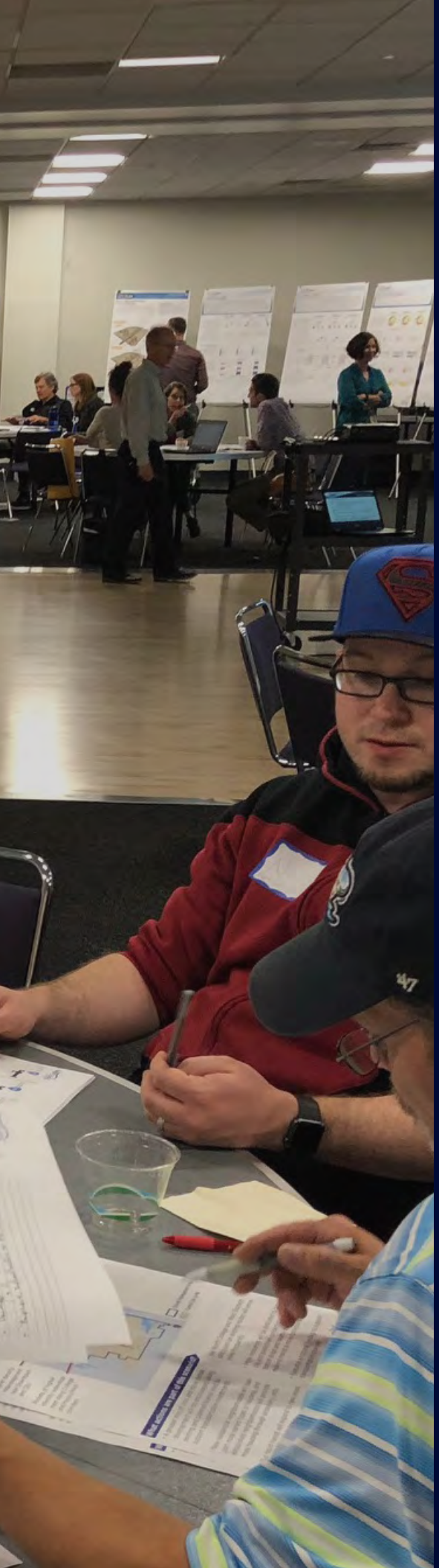
Fort Collins currently applies several transit best practices either systemwide or on particular routes that have contributed to recent growth in ridership:

- **Operate in rights-of-way that minimize delay (example: MAX)**
- **Off-board fare payment (example: MAX)**
- **Level boarding (example: MAX)**
- **Partnerships (examples: CSU routes, FLEX)**
- **Easy-to-remember schedules (example: most routes operate at consistent frequencies – 10, 15, 30 or 60 minutes - throughout the day)**



COMMUNITY INPUT

Community input for the Transit Master Plan was gathered as part of the community-outreach process of City Plan through several community workshops, in-person and online surveys, and numerous other events.



“Increase public transportation.”

- Comment from a Community Member

COMMUNITY INPUT

KICKOFF EVENT

More than 500 community members attended the City Plan kickoff event to learn about the Plan process and provide initial input on their experiences and priorities.

Key transit takeaway: Desire for more high-frequency transit-services such as MAX and improved regional transit

FUTURE OF TRANSIT PANEL

About 120 attendees participated in a Future of Transit panel discussion to provide direction on the preferred transit scenario and how the transit network should respond to new technologies and mobility services. Panelists included representatives from the project transit consulting team, Chariot (microtransit), Easymile (autonomous transit) and Lyft (ride hail).

Key transit takeaway: Strong support for the proposed future transit network, including high investment in high-frequency service on major corridors and piloting innovative mobility services in low-demand areas.

VISIONING WORKSHOP

About 150 community members attended four visioning workshops held throughout the City. Participants prioritized their community values and provided guidance on the Plan's vision and objectives.

Key transit takeaway: Investment in public-transit consistently rose to the top of the list, with desires for more nondriving transportation options, improved transit infrastructure/amenities, new regional transit connections, high-frequency transit, and increased east-west connections.

SCENARIO REFINEMENT WORKSHOP

Nearly 1,300 participants provided feedback in-person or online on three different future land-use and transportation scenarios, with the majority preferring the scenario with the greatest concentrations of corridor infill development, high-frequency transit-service and mobility options.

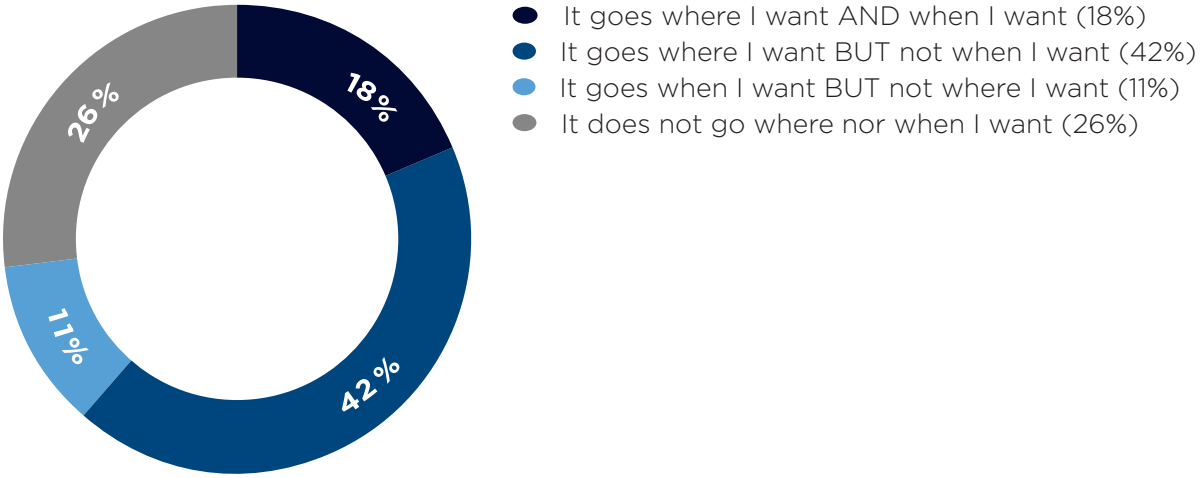
Key transit takeaway: Enhancing transportation and mobility received the greatest support of all scenario elements, with the majority of people wanting the greatest transportation investments to be toward transit.

What the Community Expressed About Transit

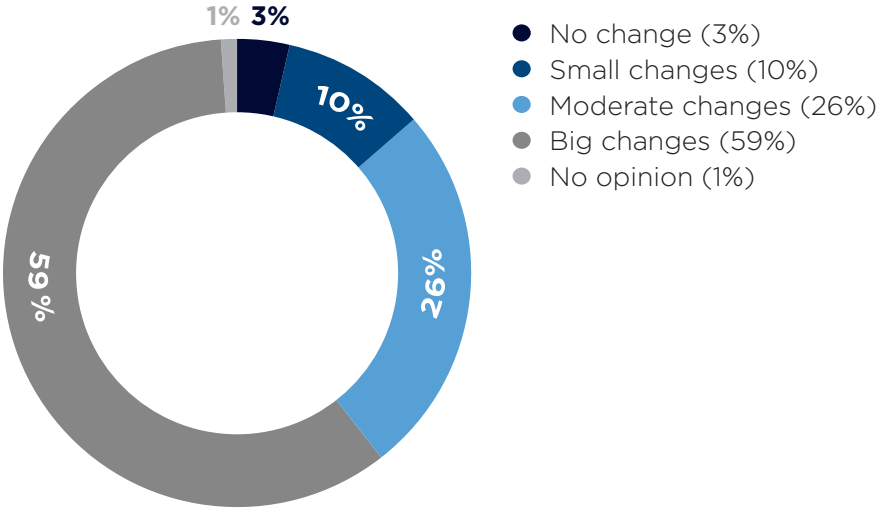
Hundreds of participants participated in surveys and workshops throughout the planning process to express their desires related to transit. The following high-level themes summarize the transit elements that received strong and consistent support from the public:

- **Faster and More-Frequent Service,** including expanded BRT and high-frequency service on major corridors paired with innovative mobility services in lower-density areas.
- **Better Multimodal Connections,** including pedestrian amenities, bicycling supportive infrastructure and emerging mobility services (on-demand, microtransit, carshare, etc.).
- **More Regional Service** to neighboring communities.
- **Willingness to Invest in Transit** through taxes and other fees.

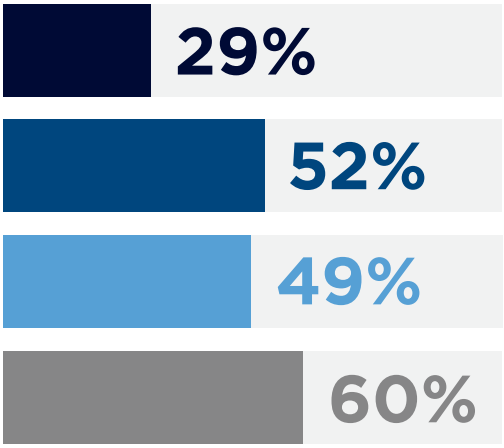
How do you perceive public-transit in Fort Collins? (Source: Future of Transit Panel)



Considering impacts and trade-offs how much change do you support for enhancing transportation and mobility to meet Fort Collins goals and priorities? (Source: Scenario Questionnaire)

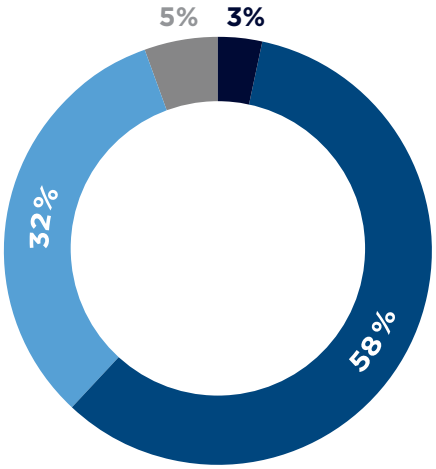


Where would you prioritize additional transportation funding for the future? (Pick top two) (source: Scenario Questionnaire)



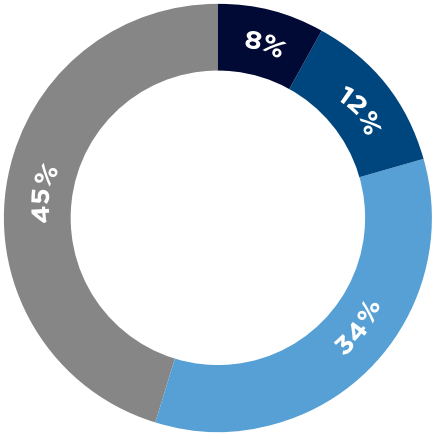
- Roads/Cars (29%)
- Bikes (52%)
- Sidewalks/Trails (49%)
- Transit (60%)

What is the right balance between fixed-route service (traditional bus) and on-demand service? (Source: Future of Transit Panel)



- All bus service, no public on-demand (3%)
- Expand system with buses and on-demand *(as shown in Future Transit Network)* (58%)
- High-frequency buses on major corridors, other areas on-demand (32%)
- Replace most of bus system with on-demand (5%)

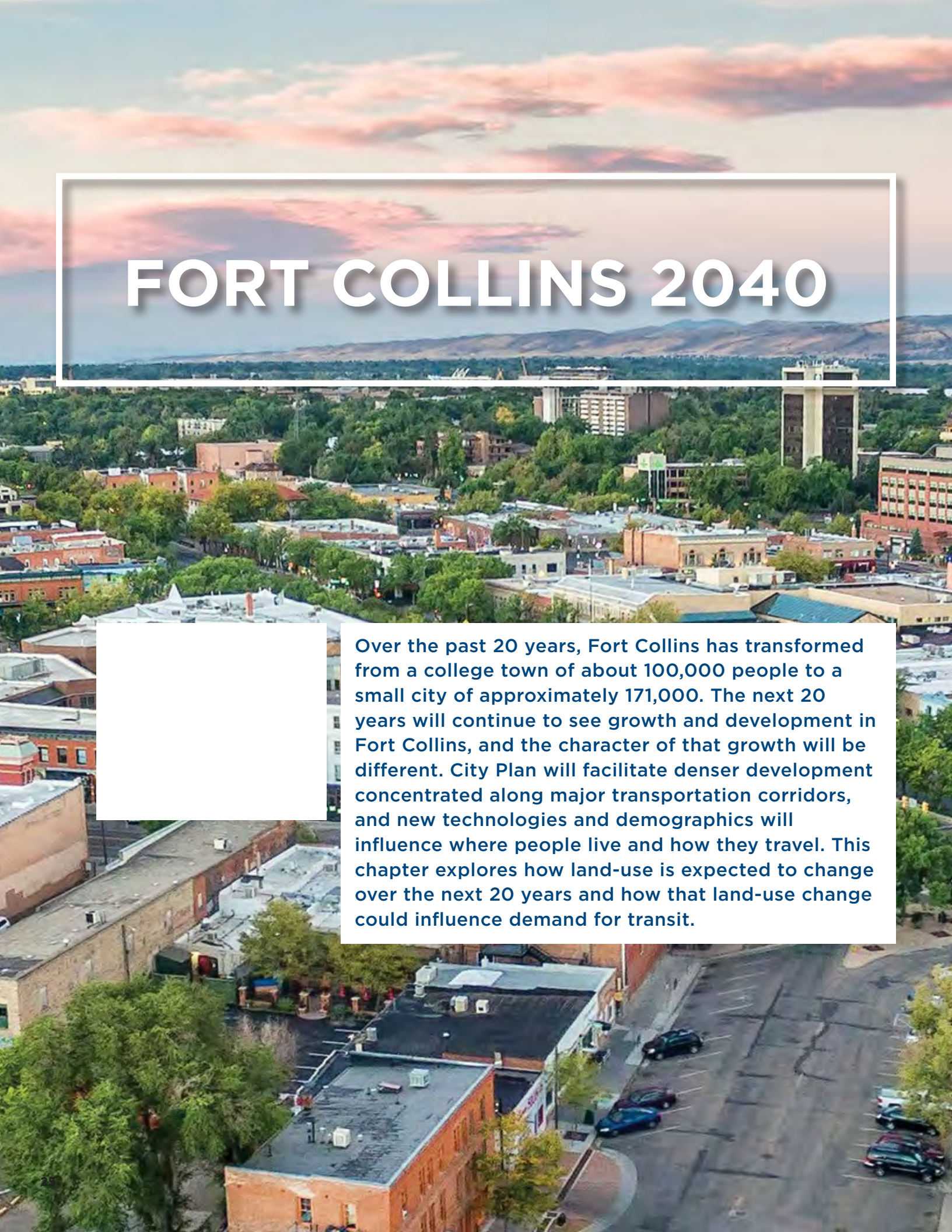
What is the right level of investment you would support for increased transit-service? (Source: Future of Transit Panel)



- None ($0 mo.) no expansion (8%)
- Low ($5/mo.) +1 BRT, 1 frequent route (12%)
- Medium ($10/mo.) +2 BRT, 2 frequent routes (34%)
- High ($15+/mo.) +3 BRT, 3+ frequent routes (45%)


EPSON
City of Fort Collins
max
FUTURE OF TRANSIT: Panel Discussion

FORT COLLINS 2040



Over the past 20 years, Fort Collins has transformed from a college town of about 100,000 people to a small city of approximately 171,000. The next 20 years will continue to see growth and development in Fort Collins, and the character of that growth will be different. City Plan will facilitate denser development concentrated along major transportation corridors, and new technologies and demographics will influence where people live and how they travel. This chapter explores how land-use is expected to change over the next 20 years and how that land-use change could influence demand for transit.

"Growth demographics will need to be represented in our plans and characteristics of future populations considered."

- Community member

FORT COLLINS IN 2040

CITY PLAN

City Plan is the comprehensive plan for the City of Fort Collins. It articulates the community's vision and core values, and establishes the overall policy foundation that will be used by the City of Fort Collins organization, its many local and regional partners, and the community at large to work toward that vision over the next 10 to 20 years. City Plan includes a section specifically dedicated to transportation, and the Plan is supported by a number of more-detailed functional plans and department-level strategic plans, including this Transit Master Plan.

A core element of the City Plan is the Structure Plan map, shown in Figure 2, which illustrates how the community will grow and change over time, serving as a blueprint for the community's desired future. It focuses on the physical form and development pattern of the community, illustrating areas where new greenfield development, infill and redevelopment are likely to occur, as well as the types of land-uses and intensities to encourage. The Structure Plan:

- Guides future growth and reinvestment and serves as official Land-use Plan for the City;
- Informs planning for infrastructure and services;
- Fosters coordinated land-use and transportation decisions within the city and region; and
- Helps implement principles and policies.

The Structure Plan, in conjunction with the Transportation Plan and other supporting elements, will be used to guide future development decisions, infrastructure improvements, and public and private investment and reinvestment in Fort Collins.

Fundamentally, the Structure Plan supports compact development that is more amenable to transit, walking and bicycling, while recognizing the need for a variety of different development forms in the City. Much of the new development will occur in Mixed Neighborhoods and Mixed-Use Districts focused along the City's major transportation corridors. In turn, these transportation corridors form the backbone of the transit network. In this way, City Plan and the Transit Master Plans are reflections of each other and support a sustainable development pattern and transportation network.

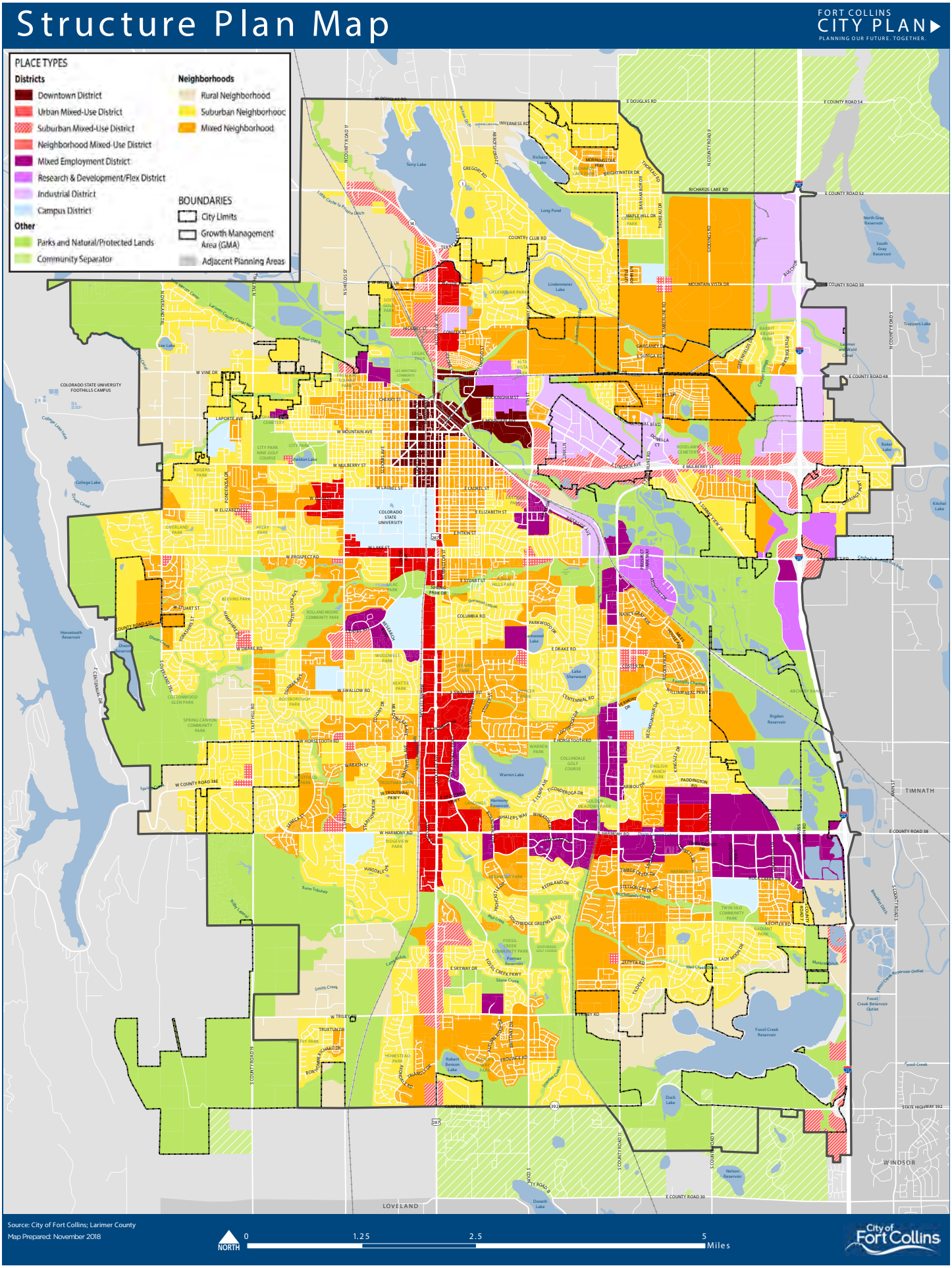


Figure 2 – Structure Plan Map from City Plan

Population Growth

As noted earlier, Fort Collins is expected to grow steadily into the future, with population increasing by about 40% to 240,000 by 2040. **Figure 3** shows the change in population density between 2012 (the most recent year the regional travel demand forecasting model was updated) and 2040.[1] Consistent with City Plan, much of the growth is expected to take place in Downtown, and mixed-use districts along North College Ave., the Mason Corridor, Harmony Road, and South College Ave. In addition, proposed development in the northeast, continued growth in the West Central Area and the Hughes Stadium redevelopment are all evident on the map.

[1]Population density is emphasized in this section because transit does best at serving relatively dense concentrations of people; high population growth spread out across a large area is not necessarily consistent with strong demand for transit.

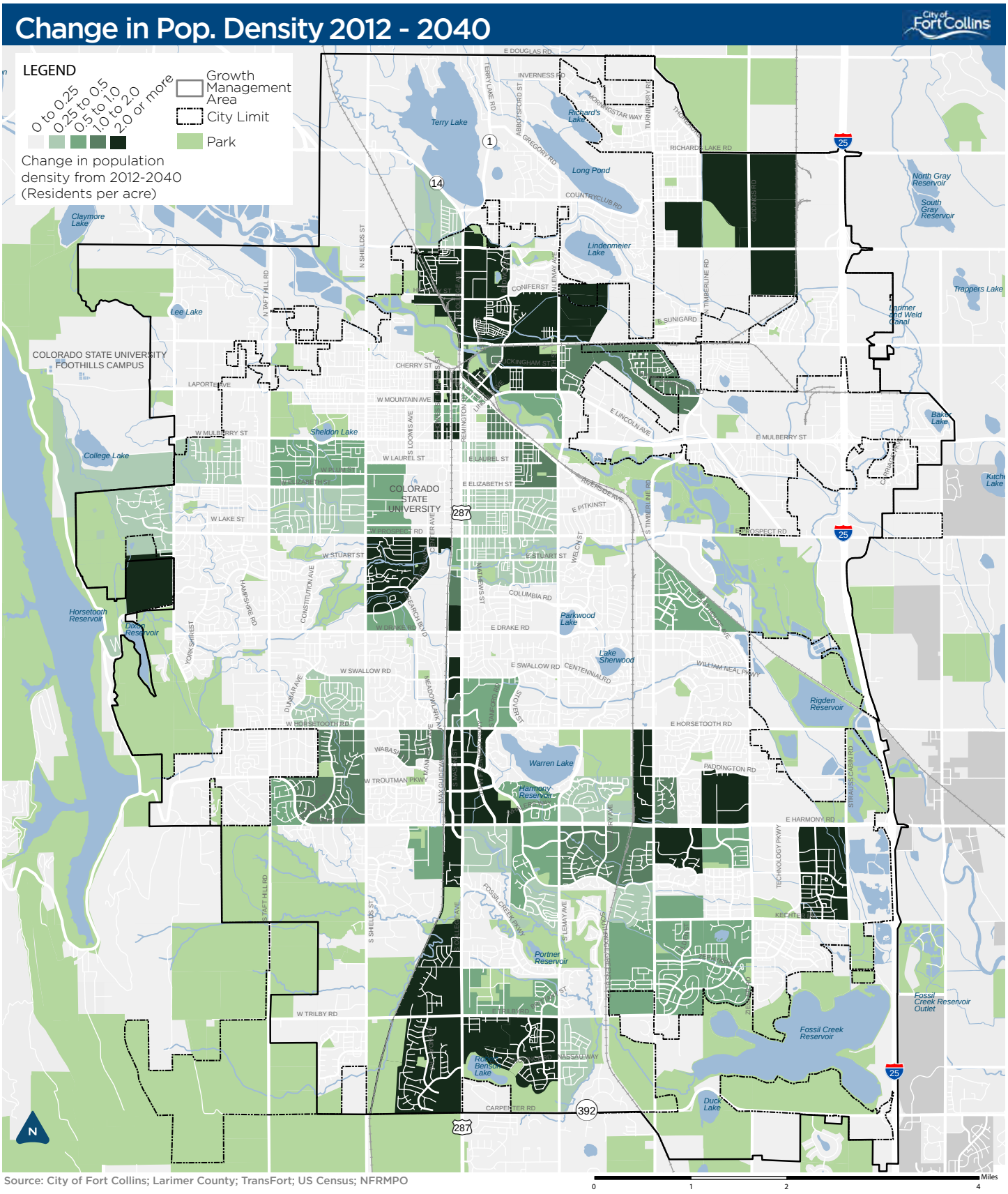


Figure 3 – Change in Population Density

Employment Growth

Employment growth is also expected to be significant in the future, with the number of jobs increasing about 43% between 2012 and 2040. **Figure 4** shows the change in employment density between 2012 and 2040. Overall, the pattern of where employment growth is expected is similar to population growth. Namely, Downtown and the mixed-use districts along College Avenue (north and south), the Mason Corridor and Harmony Road. Strong growth is also expected in the northwest and the West Central Area Plan (east of Shields Street). In addition, there is substantial employment growth anticipated along Timberline Road and near I-25 at Vine Drive and Prospect Road.

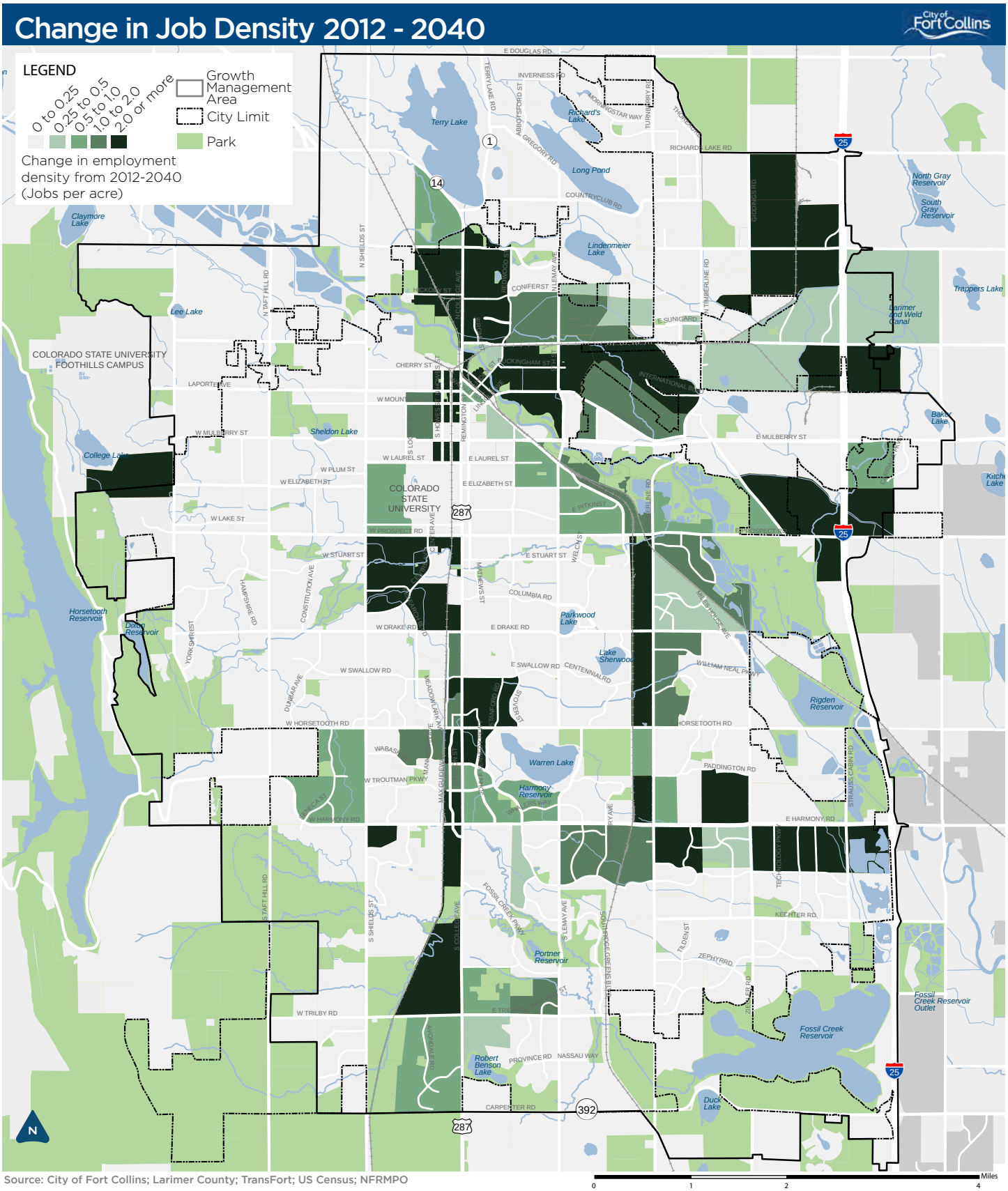


Figure 4 – Change in Employment Density

Transit Propensity in Fort Collins

Understanding the existing and future dispersion and density of population and employment in Fort Collins is a fundamental component of designing the City's transit-service so it best meets the evolving needs of the community. When considering how the transit system could change to meet new demand for service, population and employment density will determine the underlying demand for transit more than any other factor. This is because:

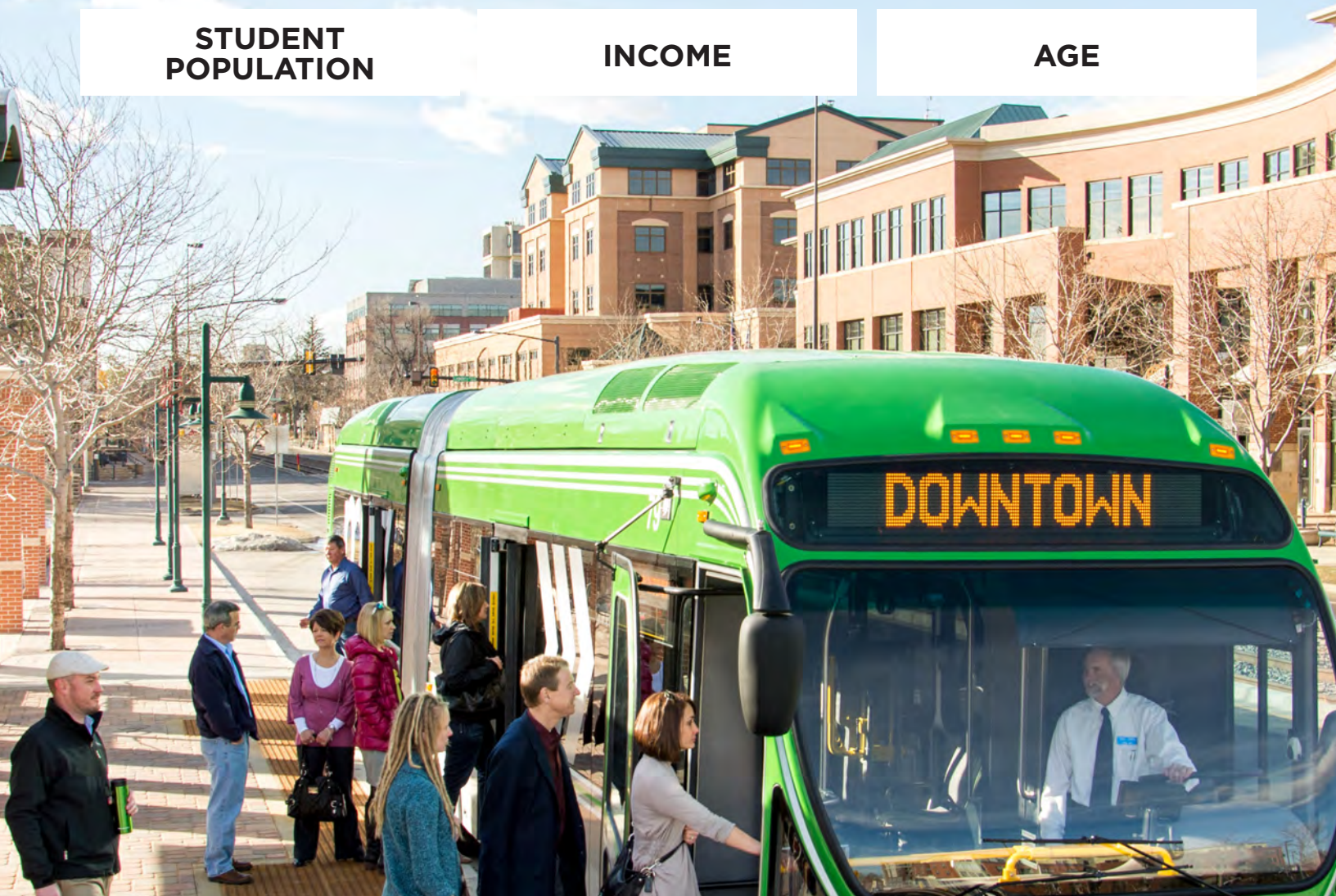
- In the absence of facilities such as park-n-ride lots or connecting shuttles, the reach of transit is generally limited to the distance from a bus stop that people are willing to walk, typically about one-quarter to one-half mile. As a result, the size of the travel market (the number of people who can access transit) is directly related to the density of development in that area.
- Transit-service frequencies, in turn, are closely related to market size. Bigger markets support more-frequent service, while smaller markets can support only less-frequent service.
- To attract travelers who have other options, such as private automobiles or access to ride-hailing services, transit-service must be relatively frequent and direct to get riders to their destination in a time and at a cost competitive with other modes.

However, density alone does not determine demand for public-transit. Certain groups of the population, particularly households with zero-vehicles available, people with lower incomes, people with disabilities, students, and youths, tend to use transit to a greater degree than other groups. In contrast, populations with higher incomes and access to two or more cars tend to use transit less than the underlying population and employment density would suggest. To account for these differences, a measure called the transit propensity adjustment factor was developed to measure relative demand for transit in different areas as compared with the region. These factors measure the likelihood of certain demographic groups to use transit to commute to work relative to the study area's general population and are based on national surveys of transit usage. In simple terms, the transit propensity adjustment factor scales the underlying population density up or down based on the socioeconomic and demographic characteristics of the area.

In Fort Collins, such as many smaller cities in the United States, the transit propensity adjustment factor tends to adjust population and employment densities up in downtown areas, areas with a large amount of college-student housing, lower-income areas, and areas with older populations. While areas with larger, newer single-family homes (which tend to be near the edge of town) tend to have a downward adjustment from the transit propensity adjustment index. Appendix A provides additional details on the transit propensity adjustment factor. **Figure 5** shows the existing transit demand, when considering transit propensity. **Figure 6** shows the 2040 transit demand forecast, when accounting for transit propensity.

KEY ELEMENTS THAT INFLUENCE TRANSIT PROPENSITY

- POPULATION DENSITY
- EMPLOYEE DENSITY
- VEHICLE OWNERSHIP RATES
- STUDENT POPULATION
- INCOME
- AGE



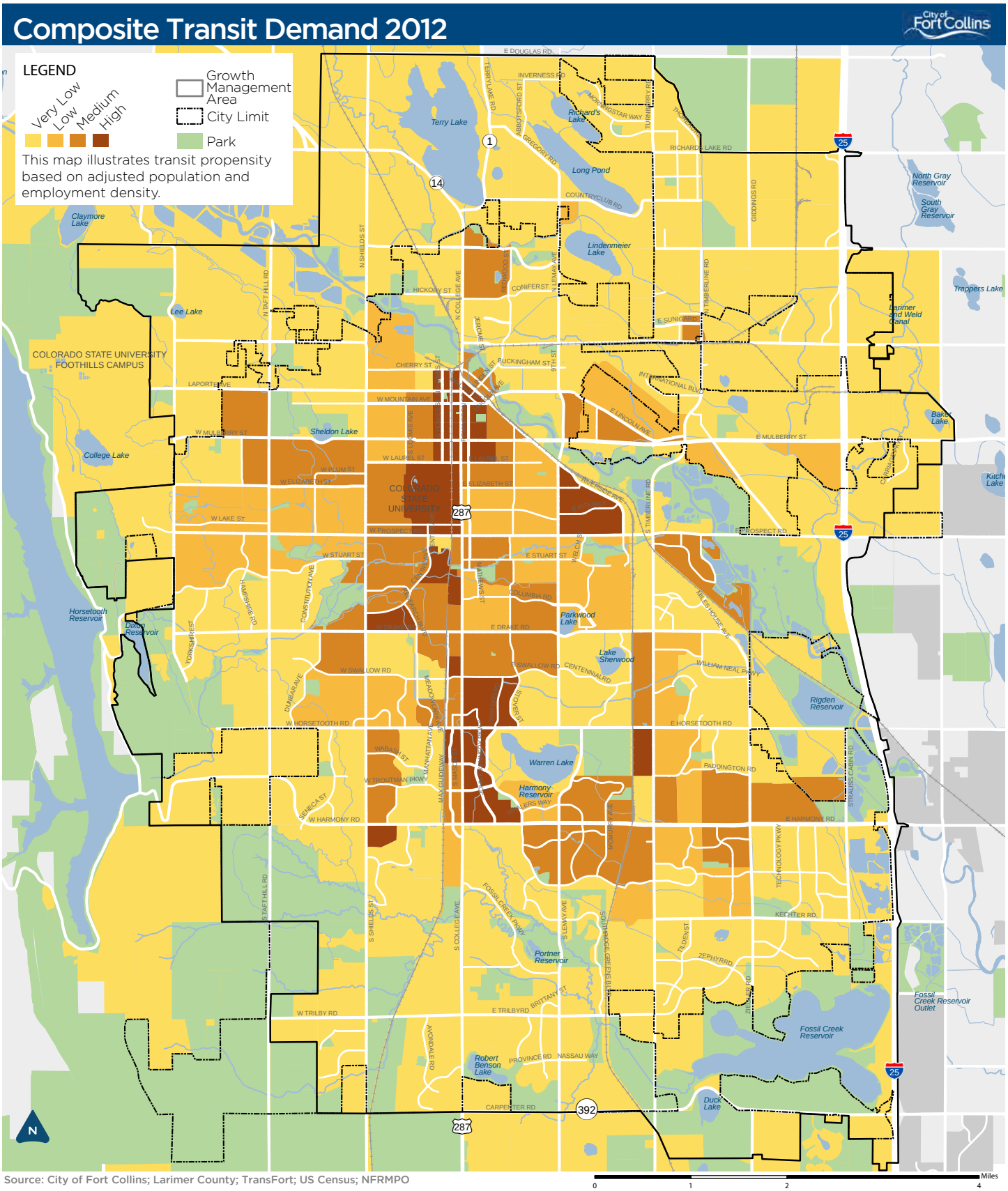


Figure 5 – Composite Transit Demand 2012

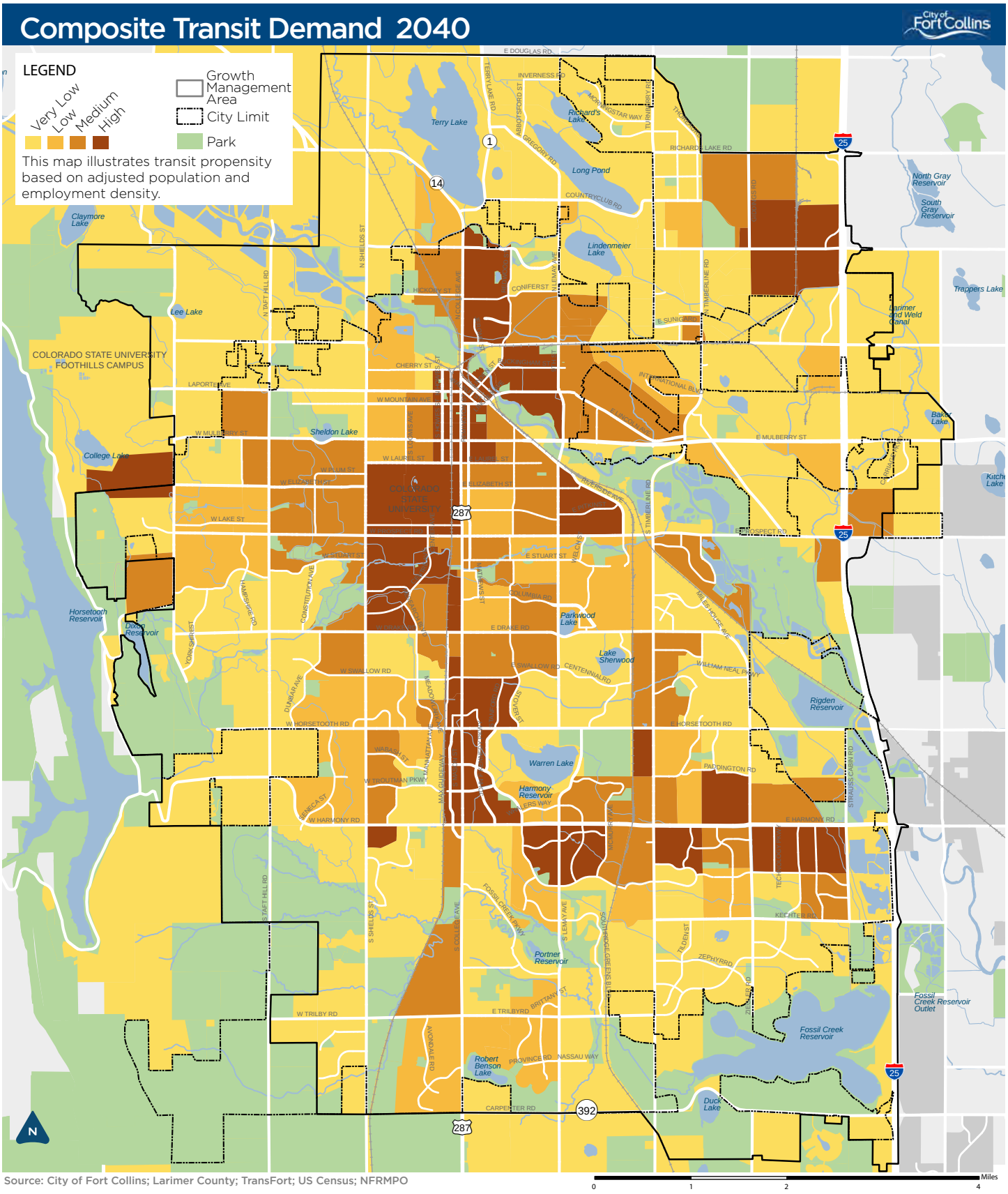


Figure 6 – Composite Transit Demand 2040

Matching Transit-services to Transit Demand

The preceding analysis of existing and forecasted transit demand is the foundation for how to plan a successful and sustainable transit system. As a fundamental rule, when densities (and, thus, transit demand) increase, more transit-service can be supported in terms of higher frequencies and longer spans of service. To show how land-uses are linked with service, see **Figure 7** on the following page. This relationship is the foundation for the Transit Master Plan.

Figure 7 – Land-use Densities and Supported Transit-service

As shown in **Figure 7**, to support 30-minute service, there generally must be at least 10 residents per acre or more than 5 jobs per acre, or a combination thereof. These densities broadly indicate demand across contiguous and nearby areas. Clusters of density throughout an area or along a corridor are strong indicators of transit demand, while a dense but small block in an isolated area would not produce sufficient demand in and by itself. Demand can also accumulate along corridors to produce demand for more frequent service than the densities alone would indicate. For example, long corridors where most blocks have the density to support 15- to 30-minute service will often produce accumulated demand for 15-minute or better service. This pattern emerges because demand from other corridors tends to coalesce along these higher density areas. For example, the Harmony Road Corridor is expected to have enough blocks of high-density population and employment in 2040 to warrant high-frequency or better transit-service.

It is important to recognize that areas that do not have at least 10 residents or five jobs per acre, or a combination thereof—generally lower-density communities made up of single-family neighborhoods—do not provide an environment where fixed-route transit can generate enough ridership to succeed. At these low densities, only infrequent transit-service can be sustained, which is so uncompetitive with other forms of transportation that it is not practical to operate. In these instances, this Transit Master Plan is calling for new, emerging types of transit—specifically microtransit, rideshare and shared mobility solutions—to connect low density areas to the core transit network. These emerging technologies and services are being tested across the country and will be described in more detail in the next chapter.

Providing appropriate levels of transit-service that match demand in different density environments is more efficient, and cost effective and results in better service for residents.

The Future of Transit - How Will Transit Look in 2040?

We live in a time in which transportation is rapidly evolving: from emerging mobility solutions such as ridesharing, bike and scooter sharing, and microtransit, to new technologies such as autonomous-vehicles, battery technology, intelligent-transportation systems, expanding access to live/real time information, and the technology and services that the public and private sector employ to provide mobility. This Transit Master Plan is a forward-looking vision of how to provide integrated, innovative and sustainable transit for Fort Collins in 2040. Therefore, it is important to consider the features of transit that will be critical for success. This chapter outlines key features that are critical to consider when planning for future transit and focuses on the following topics:

» Ride-hailing and autonomous-vehicles
» Transit-service design and supportive street networks and technologies
» Integrated mobility platforms and Mobility-as-a-Service (MaaS)

Ride-hailing, Microtransit and Autonomous-vehicles

The rise of the Transportation Network Companies (TNCs)—notably Uber and Lyft—has ushered in a discussion of "the end of transit" by some people who see these ride-hailing companies as a more-convenient and less-expensive way to provide transit-services in cities such as Fort Collins.

Uber and Lyft want to replace public buses

Joshua Brustein

Pinellas Park, Fla., isn't the kind of place you'd expect to gain insight about the future of mass transit. The suburb of Tampa is as car-crazy as your average stretch of Floridian sprawl — the local landmarks include the Tampa Bay Automobile Museum and a drag racing strip — and anyone who can avoid the bus does. But recently the agency responsible for the area's public transportation began a novel experiment: It stopped running two bus lines and started paying for a portion of Uber rides instead.

In Uber's early days, it said it wanted to be "everyone's private driver." Now the company and its main U.S. competitor, Lyft, are playing around with the idea of becoming the bus driver, too. Uber has partnered with a handful of local public transportation agencies to strike deals like the one in Pinellas Park, which it expanded earlier this month.

*https://www.bloomberg.com/news/articles/2016-08-15/uber-and-lyft-want-to-replace-public-buses

The idea is that with ubiquitous ride-hailing and microtransit[4] services or (in the future) fleets of shared autonomous-vehicles, traditional fixed-route transit will not be necessary. People can simply request or schedule a point-to-point trip and a car will come and take them to their final destination. Anyone who has used Uber or Lyft can understand the appeal of the service–no need to wait outside at a bus stop, no need to wait for a transfer and no need to walk to your final destination. However, as discussed at Fort Collins' Future of Transit Panel Discussion held in November 2018, a future without fixed-route transit is not feasible or efficient due to several challenges:

1. **Cars use more space than buses to move people** - **Figure 8** below shows the amount of space used by cars to carry a busload of people. Whether the cars are privately owned or part of a ride-hailing or autonomous-vehicle fleet, they still take up more space. This additional space results in traffic congestion and crowding of the curb in front of destinations. Without a significant number of people taking buses, there would be substantially more traffic congestion in areas such as Downtown, around the CSU campus, and some key corridors including College Avenue or Prospect Road. As the city becomes denser over time, this problem would grow worse.

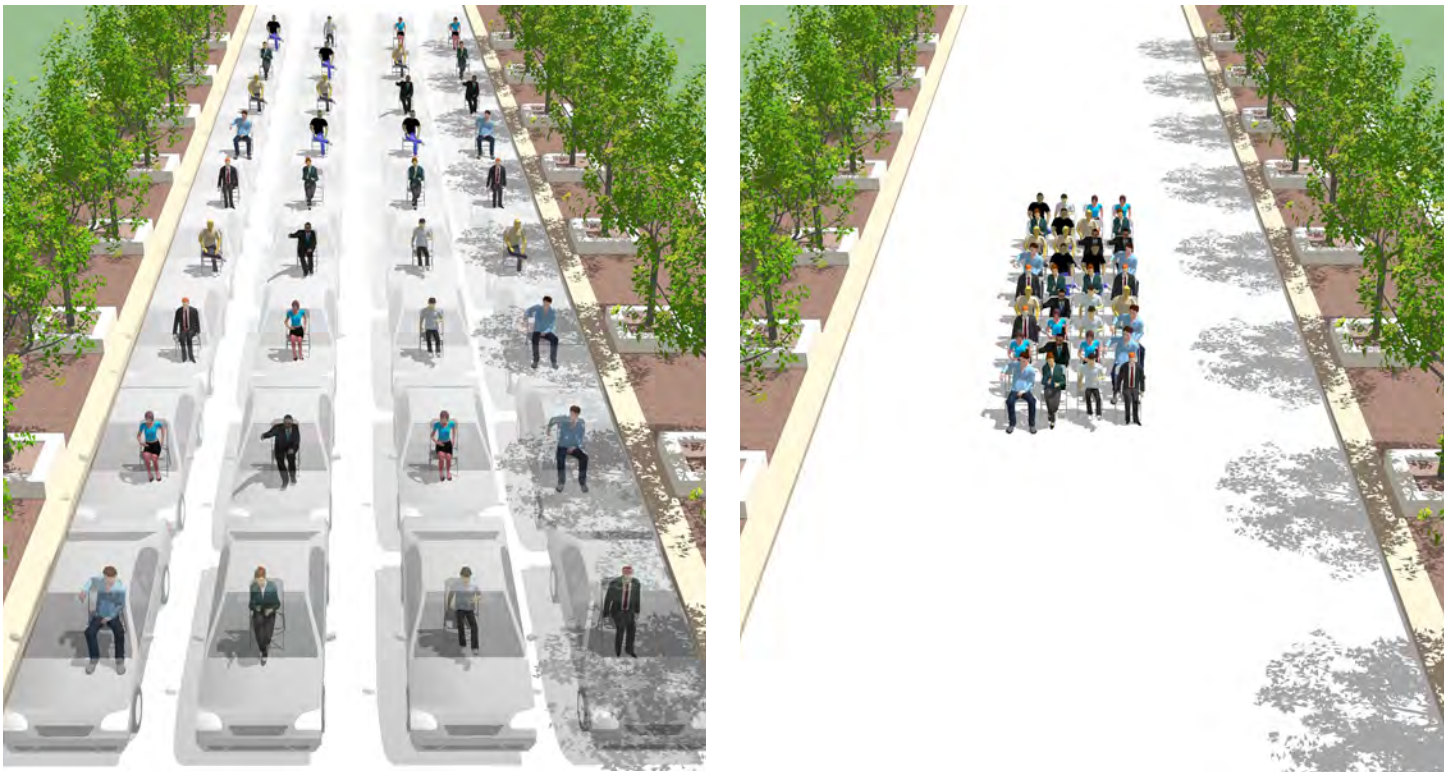


Figure 8 – Space Used by Cars Versus a Bus

[4]Microtransit is a concept similar to ride-hailing except that instead of hailing a dedicated vehicle, you request a ride in a shared vehicle, typically a van or small shuttle bus. Microtransit providers sometimes run on a schedule, but with a flexible route based on who is requesting the ride, and sometimes offer on-demand pickups. Several companies, including Bridj, Chariot, Lyft Shuttle and EasyMile (which has an autonomous shuttle), are microtransit providers.

2. **Individual cars cost more to own and operate than an efficiently utilized bus** – Today, the average cost per passenger trip across all of Transfort's fixed-route bus services is $3.99, and $2.12 for MAX.[5] Taking a TNC for a similar-length trip would cost the passenger $7.65 in fares and service fees.[6] It is worth noting that both Uber and Lyft currently operate their services at a loss and that there is an additional company subsidy that should be added to the TNC costs. While the value of this subsidy is not reported by either company and the data in the literature varies widely, it is reasonable to assume that the transit agency subsidy is at least 30% based on a comparison of TNC rates to taxi rates[7] and published financial data from Uber and Lyft. This would mean that the actual cost for a comparable TNC ride would be about $9.95.

In the future, the costs for ride-hailing services could decrease as autonomous-vehicles replace the expense of the driver. However, Transfort could also benefit from reduced labor costs as the agency transitions to an autonomous bus fleet. Ultimately, it is unlikely that core transit-service could be replaced in a cost-effective manner with ride-hailing or microtransit-services. Moreover, these services certainly cannot match the space efficiency of buses. Therefore, while ride-hailing services and autonomous-vehicles will have a strong role in future mobility in Fort Collins, they cannot, by themselves, replace fixed-route transit.

In a future with autonomous-vehicles and ride-hailing, high-capacity and high-frequency transit-service will be more important than ever to move people where they want to go without widespread traffic congestion and over-crowded drop-off areas.

[5] https://www.transit.dot.gov/sites/fta.dot.gov/files/transit_agency_profile_doc/2017/80011.pdf

[6] http://uberestimate.com/prices/Fort-Collins/

[7] Note that taxi rates are more than twice as high as TNC rates in Fort Collins: $2.25 per mile for a taxi and $1.10 for an UberX

MAKING TRANSIT MORE USER-FRIENDLY

While fixed-route transit will continue to fill a strong role in the mobility ecosystem, there are lessons that can be learned from the success of TNCs. Below are a few key areas where many fixed-route providers can improve to better match the convenience and rider experience of TNCs:

INFORMATION

While transit agencies are providing better real-time transit information, the ability to track the location of a TNC in real-time and in an intuitive smartphone platform helps to reduce the stress of travel. Accurate and reliable time-of-arrival estimates is another area that transit agencies can improve on. The current Transfort smartphone app and web portal are better than most transit agencies with real-time tracking available on the Transfort app, but it's not as intuitive or feature-rich as what people have become accustomed to from TNCs.

PAYMENT

Transit agencies such as Transfort typically have easy to use monthly or annual passes, which are convenient if you have them. However, for the occasional rider (particularly if they do not carry much cash), transit fareboxes can seem such as something from another era. Some transit agencies have built smartphone payment apps (that are sometimes integrated with trip planning and real-time bus information-Transfort is rolling out an e-fare option in 2019), but they still tend to be less intuitive than paying for a TNC.

WAITING TIMES

Research has consistently shown that more-frequent transit-service has a strong influence on growing ridership, particularly where land-use is relatively dense. Increased transit frequencies is a core element of the 2040 Transit Master Plan.

There are few areas where typical bus service are more convenient compared with TNCs and ride-hailing services. Transit agencies should regularly evaluate if they can modify service, vehicles or performance to better accommodate these needs, but in some instances, they are a different market that TNCs or private autos are better at matching. Some of the areas where TNCs and ride-hailing are strong include: transporting bulky items (it is hard to move lumber or boxes on the bus), moving large groups of people (it can be less expensive for a group to share a TNC compared with the total bus fare), and connecting two low-density areas where transit would require a transfer and significantly longer travel times.

Leveraging On-Demand Services and Partnerships

While ride-hailing services and similar on-demand types of transit (which can be operated by private partners or the transit agency) may not be cost competitive for higher-demand transit routes, they can be a cost-effective way to connect lower-density areas to the core transit-service network. This is because the cost per rider for low-ridership, long-headway, fixed-route services begins to increase to the point where it can exceed the cost of on-demand transit-service.

Partnership opportunities are evolving and can be guided by lessons learned from TNCs and other "first generation" partnerships with private mobility service providers. The first microtransit and on-demand pilots operated by transit-services are underway, and autonomous shuttles that connect transit hubs to employment and residential centers are starting to be introduced. These offer higher potential efficiency than TNC partnerships - but must be assessed carefully.

Key partnership opportunities include:

- Extending the reach and duration of transit-service – providing transit-service to low-density areas or low-demand (late evening, early-morning) periods can be more efficient through partnerships.
- Faster response times compared to infrequent fixed-route or traditional paratransit-services.
- Operating cost savings compared with the least-productive fixed-route and paratransit-services.

Several agencies and cities (including the nearby City of Centennial) have tested the first generation of partnerships, typically with TNCs[8], and the industry is now better positioned to analyze the many partnership pitches they receive from private mobility operators each year. Moving forward, Transfort will work to pilot on-demand services and potential partnerships with private mobility providers in an effort to expand transit coverage while also investing in more-productive core transit routes.

Ride-hailing and microtransit partnerships cannot replace core transit-services to date, but they can effectively provide paratransit and on-demand services in low-density areas.

[8] https://www.apta.com/resources/mobility/Pages/Transit-and-TNC-Partnerships-.aspx

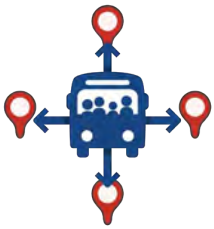
Transit-service Design

For the foreseeable future, most transit-service will continue to be provided along a fixed-route with published schedules. This type of transit-service is simply more efficient and has higher ridership and lower costs for most areas, particularly as density of population and employment increases in the future. With this in mind, there are several strategies that have been proven to maximize the performance of fixed-route transit systems. These best practices are summarized below.

Best Practices in Transit Service Design

BE DIRECT

Ideally, transit routes should avoid time-consuming turns and deviations and go in straight lines, making them both faster and easier to understand and remember.

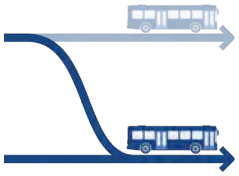


SERVE A VARIETY OF DESTINATIONS

The most efficient and cost-effective routes are useful to a variety of people at different times of day.

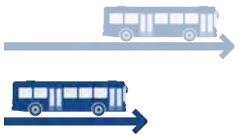
TERMINATE AT STRONG ANCHORS

When there are major demand generators at both ends of the route, buses or trains are rarely empty.



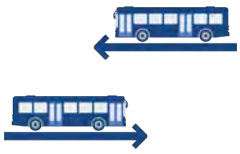
AVOID DUPLICATION

Rather than having routes operate on parallel streets less than a half -mile apart, have them overlap so that more frequent service can be provided in the combined segment.



AVOID ROUTES THAT ARE TOO LONG

The longer the route, the more prone it is to delay; reliability may suffer.



BALANCE DEMAND IN EACH DIRECTION

Routes are also more cost-effective when they carry roughly the same number of passengers each way rather than, for example, carrying a full load of commuters in one direction and running empty in the other.

OPERATING FEATURES

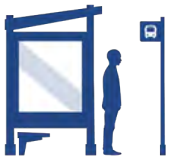
This could include transit-only lanes, streets with transit signal priority, or simply streets on which there are few conflicts with other modes. It also includes elements that reduce dwell time, such as level boarding, multiple doors, and off-board fare payment, and elements that reduce ingress and egress into stations such as bus stop bulb-outs.

MINIMIZE TRANSFER PENALTIES

Transfers are sometimes necessary and even desirable from a network design perspective; however, they should be made as seamless as possible, spatially, time waiting, and payment mechanism.

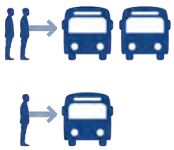
BALANCE SPEED AND ACCESS WHEN LOCATING STOPS

Stops should be far enough apart to minimize delay but close enough to provide reasonable access for those with limited mobility. They should also be close to destinations, connecting routes and access points—such as crosswalks, bike lanes, and park-and-ride lots. Customers will walk further to better transit, and the stop spacing can be longer on these services.



PROVIDE A HIGH-QUALITY WALKING AND WAITING ENVIRONMENT

Stops should be comfortable, safe, dignified, provide important information, and located near safe pedestrian crossing and be connected into the sidewalk network.



MATCH SERVICE LEVELS TO DEMAND

While comfortable stops and stations are important, providing "walk-up" frequencies of 15 minutes or less enables people to avoid consulting a schedule and supports spontaneous trips. Very frequent service should be provided where demand supports the investment.

MAKE SCHEDULES EASY TO REMEMBER

Ideally, routes should operate on "clockface" headways, such as every 10, 15, or 30 minutes.

In addition to the basics of the transit-service design, several key roadway and technological investments can be made to leverage the inherent efficiency benefits of transit.

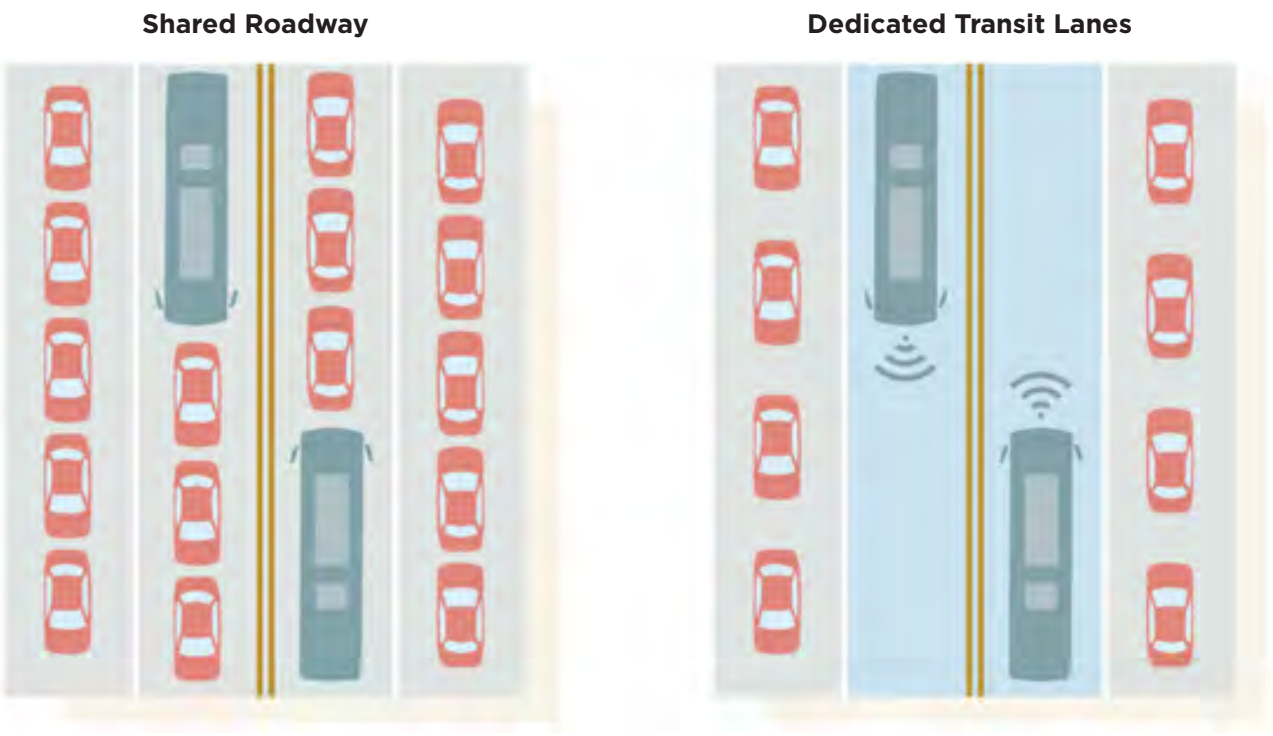
1. DEDICATED RIGHT-OF-WAY

Transit-only lanes — but, ideally, physically separated rights-of-way — will become more important to the success of transit as congestion associated with urban growth and ease of vehicle use increases. A hybrid of dedicated right-of-way is the business access and transit (BAT) lane used on several corridors in the Puget Sound region of Washington state. The BAT lane allows right turns to businesses and other streets, but only transit vehicles are allowed to travel through major intersections.

Repurposing a general-purpose travel lane to a dedicated transit right-of-way is justified where it increases the person carrying capacity of the roadway and improves the average person travel time in the corridor.

Some autonomous-vehicle and TNC lobbyists are trying to gain access to separate transit lanes. Allowing this could set a poor precedent that ultimately degrades transit performance. Creating and preserving dedicated travel lanes for high-capacity transit is one of the most important ways to leverage city and agency strengths in an autonomous future. Fort Collins already has one of the best-performing dedicated transit facilities in the country with its MAX line and has proven the success of preserving key transportation infrastructure for high-frequency transit. Additional opportunities to provide dedicated right-of-way are on Harmony Road or other future BRT corridors.

Travel-time savings: 34%-43%.[9]



[9]Transit Cooperative Research Program, Transportation Research Board, and National Academies of Sciences, Engineering, and Medicine. 2010. TCRP Synthesis 83: Bus and Rail Transit Preferential Treatments in Mixed Traffic. Washington, D.C.: Transportation Research Board. http://www.nap.edu/catalog/13614.

2. QUEUE JUMP LANES

Queue jump lanes are short, dedicated transit facilities with either a leading bus interval or transit signal priority (TSP) to allow buses to easily enter traffic flow in a priority position. Sometimes queue jump lanes allow right turns for cars, but buses are allowed to travel through. Applied thoughtfully, queue jump treatments can reduce delay considerably, resulting in time savings and increased reliability.

Two existing examples of transit queue jump lanes are currently used along the MAX route on Mason Street at West Laurel Street and on McLelland Drive at West Drake Road. In addition, both the West Elizabeth Enhanced Travel Corridor Plan and Harmony Road Enhanced Travel Corridor Master Plan identify transit queue jump lanes to enhance bus travel speeds.

Travel-time savings: 5%-15% at intersections.[10]

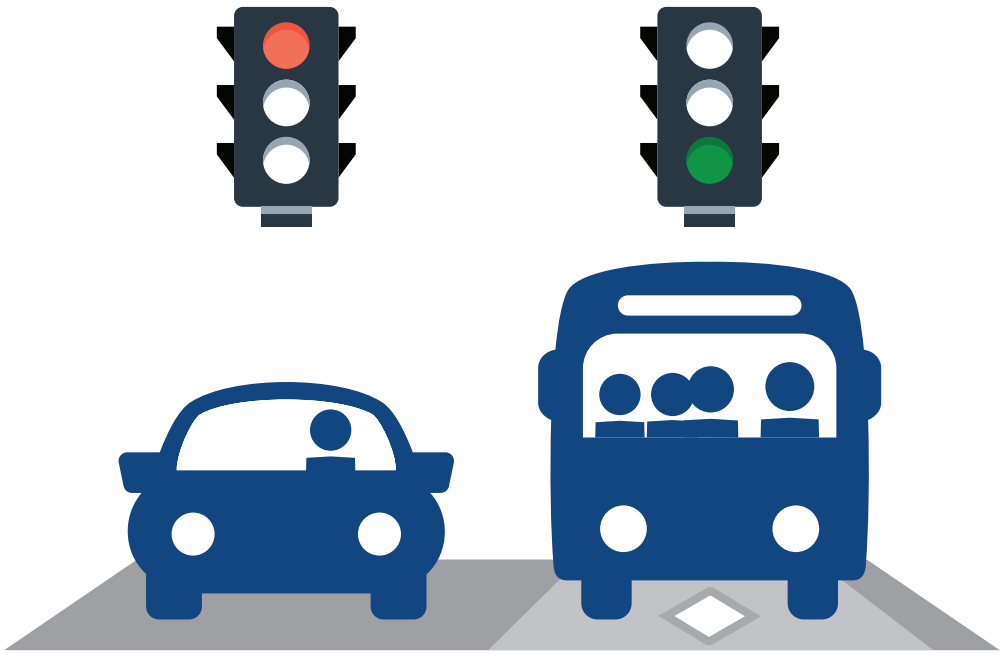


Figure 9 – Queue Jump Lanes

[10]Transit Cooperative Research Program, Transportation Research Board, and National Academies of Sciences, Engineering, and Medicine. 2007. TCRP Report 110: Bus Rapid Transit Practitioner's Guide. Washington, D.C.: Transportation Research Board. https://www.nap.edu/catalog/23172.

3. TRANSIT SIGNAL PRIORITY

TSP is an operational improvement that uses technology to reduce time at traffic signals for transit vehicles by holding green lights longer or shortening red lights. When a bus is approaching an intersection, the intersection can detect the bus and modify the traffic signal timing to reduce the delay for the bus. TSP is even more effective when combined with queue jump lanes.[11]

Travel-time savings: 8%-18% is typical.[12, 13]

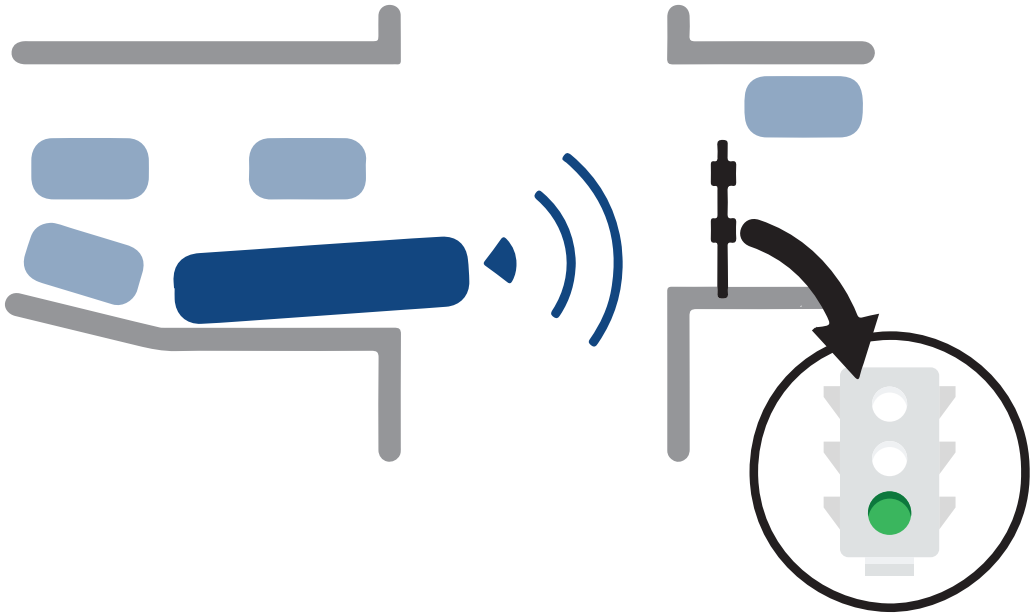


Figure 10 – Transit Signal Priority

[11] Zhou, Guangwei, and Albert Gan. 2009. "Design of Transit Signal Priority at Signalized Intersections with Queue Jumper Lanes." Journal of Public Transportation 12 (4). https://doi.org/http://doi.org/10.5038/2375-0901.12.4.7.

[12] Transit Cooperative Research Program, Transportation Research Board, and National Academies of Sciences, Engineering, and Medicine. 2010. TCRP Synthesis 83: Bus and Rail Transit Preferential Treatments in Mixed Traffic. Washington, D.C.: Transportation Research Board. http://www.nap.edu/catalog/13614.

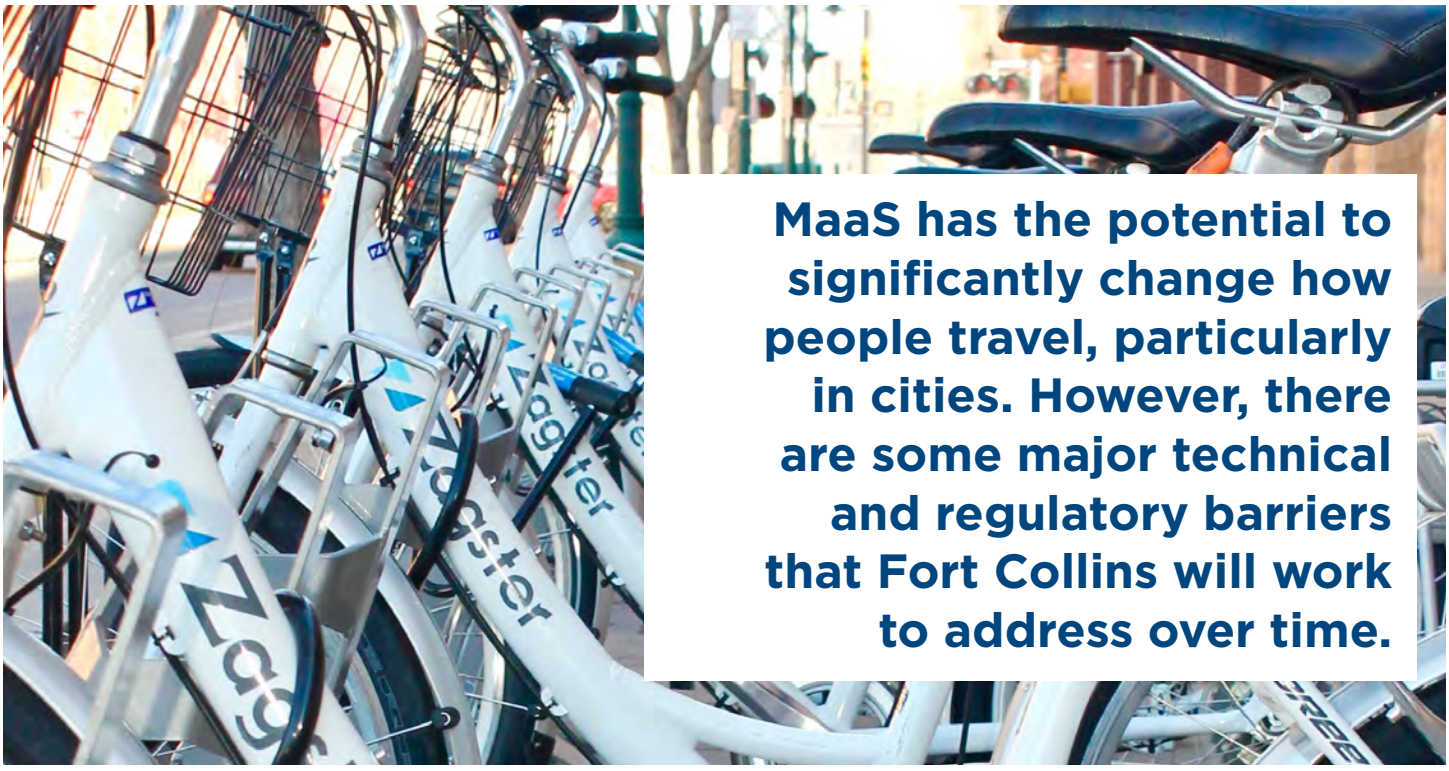
[13] Transit Cooperative Research Program, Transportation Research Board, and National Academies of Sciences, Engineering, and Medicine. 2007. TCRP Report 110: Bus Rapid Transit Practitioner's Guide. Washington, D.C.: Transportation Research Board. https://www.nap.edu/catalog/23172.

Mobility-as-a-Service (MaaS) and Integration of Transit with Other Modes

As transportation has evolved over the past several years, ride-hailing companies and shared mobility companies, including carsharing (Zipcar, Car2Go), bikesharing (Jump, Lime), scootersharing (Bird, Lime, Razor), have spread the idea that mobility (provided by public and private entities) could be packaged together and provide a viable alternative to owning a car. The concept of combining the information, trip planning, and payment for mobility has been called Mobility-as-a-Service (MaaS).

Increasingly, most people do not make distinctions between public and private transportation options; rather, they assess modes by cost, convenience, comfort and travel time. Many people are comfortable taking a bus to work and then hailing a TNC to go to dinner. However, today, you might have to consult several different smartphone apps to compare different options and prices, and it can be difficult to combine modes for a single trip. MaaS offers an opportunity to make the overall transportation network more efficient and user-friendly (see **Figure 11**). MaaS involves the ability to plan, book and pay for trips on a variety of modes using a single interface–helping to improve access, convenience, while providing cost-effective travel options. MaaS offers transit agencies the ability to create increasingly attractive incentives to take transit (for at least a portion of the trip) by providing more information on first/last mile access modes and more transparent information on things such as traffic congestion, parking costs and greenhouse gas emissions (which could discourage people from driving). One day, it is possible public agencies can use MaaS to change fares/fees in real time in response to traffic congestion, emergency-access needs or major travel-demand changes. This would allow the transportation system to be used more efficiently by sending price signals for people who can to switch to modes that have less of an impact on the system's capacity (e.g., taking transit or a bike rather than riding in a car).

MaaS has the potential to fundamentally reshape how people travel, and in the long-run, Fort Collins should strive to bring MaaS to reality in the City. In the near term, Fort Collins will work with all public and private mobility partners to freely share information on trip planning and fares/fees so that entities such as Transfort and private app developers can begin to aggregate data and make travel more intuitive for the public. The City is currently working on a data-sharing program encouraging all public and private mobility partners to participate.



MaaS has the potential to significantly change how people travel, particularly in cities. However, there are some major technical and regulatory barriers that Fort Collins will work to address over time.

This type of data sharing may require new regulations that require private mobility providers to share data such as wait times, fares and trip-planning details. The Colorado Public Utilities Commission regulates taxis and ride-hailing companies, while the City of Fort Collins regulates bikesharing and carsharing companies. Current state and City regulations do not require the sharing of trip-planning or fare details and private mobility companies have been resistant to sharing this type of information outside of their own platforms. In addition to these regulatory hurdles, there are technical challenges related to an integrated payment platform since it can add overhead to manage payments to many mobility partners. While these barriers currently exist, several communities, including Portland, Oregon and several European cities are working to implement part or entire MaaS solutions (see more detail in case study on page 51).

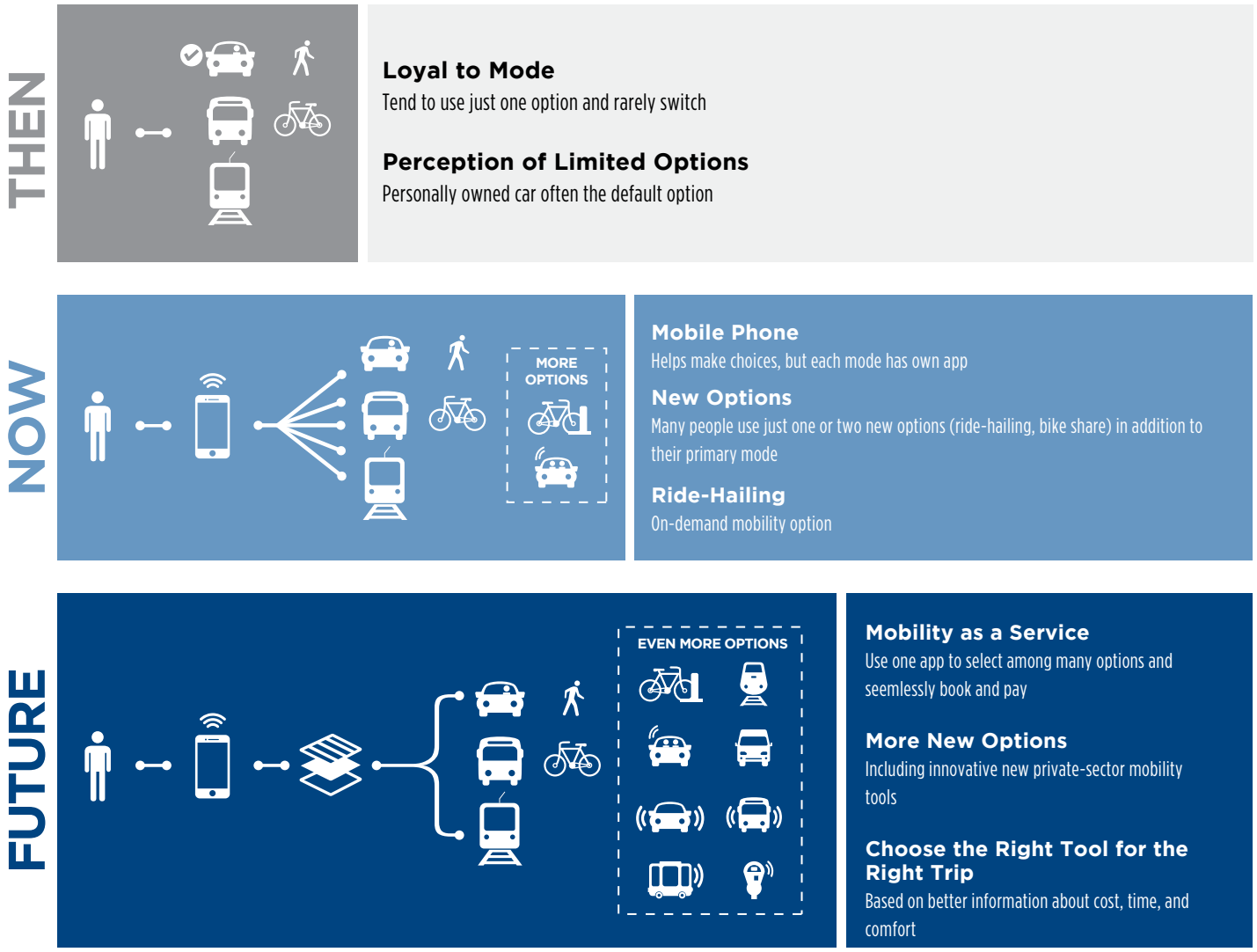


Figure 11 – Evolving Toward MaaS

Case Study: MaaS and Transit Integration

MaaS has not been implementated in the United States, although earlier and ongoing applications that partially implement some elements of MaaS. Examples include:

- GoDenver and GoLA: Xerox partnered with the cities of Denver and Los Angeles to develop and build an integrated trip planner for these regions. The trip planner had the ability to identify multiple mobility options between a user-specified origin and destination, including transit, bikeshare and ride-hailing services. While the application had many valuable components, it was criticized for having incomplete information (for example, Lyft was included but not Uber; there was no information on carsharing or park-n-ride). Additionally, there was no ability to identify fares for all the modes nor pay for many of the modal options in the app. Ultimately, the app was terminated after Denver and Los Angeles decided not to pay the ongoing costs to maintain and update the apps.
- TriMet in Portland, OR is building out an integrated trip planner that blends transit, driving, park-n-ride, scooter-share, bike-share, Uber and Lyft into a single mobility planning and booking app. The app, which is still in development, is scheduled for initial release in 2019. The app will show exact prices, calories burned and greenhouse gas emissions of each option. While the app will facilitate booking and allow the purchase of a transit ticket, the integration with Uber and Lyft still requires people to go through their apps to complete the booking.
- A private company, Whim (https://whimapp.com), has launched commercial MaaS in several European cities including Helsinki, Finland, Amsterdam, Netherlands; and Birmingham, U.K. The MaaS services in these cities have been in operation for about two years, so they seem to be relatively viable for the local governments and private operators, although no studies were identified about how these programs change how people travel or if they encourage nonauto travel.


MAX SOUTHBOUND
2 min & 5 min

2040 TRANSIT PLAN

The previous chapter described how Fort Collins and the overall transportation landscape are likely to change over the next 20 years. In order for transit to remain an important travel mode in Fort Collins, it must also evolve. This chapter outlines the vision for what transit will look such as in Fort Collins in 2040. The vision responds to the future land-use plan, feedback from the public and stakeholders, the influences of emerging technologies, shifting travel behaviors, funding opportunities, and transit best practices.

"Ridership develops where service is dependable, reliable and frequent."

- Community Member

2040 TRANSIT PLAN

The 2040 Transit Plan is organized into the following sections:

- 2040 Transit Network Map
- 2040 Transit-service Metrics
- The 2040 Transit Fleet and Key Technologies
- Major 2040 Transit Capital Projects
- Access to Transit
- Equitable Transit-service
- Complementary Policies to Support Transit

2040 Transit Network

The 2040 Transit Network is fundamentally driven by the anticipated 2040 land-use densities and the transit-service best practices described in the previous chapter. These best practices guide how to link different types of transit-services to the underlying land-use densities (**Figure 7**). In addition, the transit network is informed by public feedback to achieve a balance of both expanded coverage and increased productivity. In general, areas of the community served by existing transit will continue to have transit-service, albeit with potentially improved and/or different type of service in some cases.

How the Plan will achieve productivity?

Investments to expand **high-frequency** transit-service, BRT and maybe even light rail along key corridors throughout the City is recommended. This type of service will be spaced to operate along several trunk corridors connecting major activity centers and with higher population and employment densities. These BRT and high-frequency services will also operate over more hours of the day and on more days of the week compared with other services. Local routes will be realigned to provide more-direct, reliable service with shorter end-to-end run times and fewer route deviations. Service will rely more heavily on transfers from local service or other modes to the high-frequency core network. Fixed-route service with 60-minute frequencies will be gradually phased out, replaced by service with at least 30-minute frequency or on-demand-type services.

How the Plan will achieve coverage?

Areas of the city with smaller activity centers and more-moderate densities will be served by **local bus** service with either peak frequencies (high-frequency during peak hours) or 30-minute all-day frequencies. Lower density areas of the City will be served by **mobility innovation zones**, which will capitalize on new mobility technologies. Service may include on-demand, microtransit, private shuttles, or other emerging technologies that allow for more-flexible routing than fixed-route transit and may be provided through partnerships with the private sector. *Mobility innovation zones* will be connected into the core transit network at strategically spaced **mobility hubs** that will serve as multimodal transfer points between transit, bicycles, cars, scooters, shuttles, on-demand and other mobility services. See **Figure 12** for a map of proposed locations for future *mobility innovation zones* and *mobility hubs*.

Transit-service TYPES

SERVICE TYPE	ALL-DAY FREQUENCY (6AM - 7PM)	EVENING AND WEEKEND SERVICE	OTHER CHARACTERISTICS	PLANNED 2040 CORRIDORS/ SUBAREAS
BRT	10-minute	Yes	Uniquely branded service with speed and reliability improvements (queue jump lanes, off-board fare payment, level boarding, bus bulbs, transit signal priority, longer-spacing between stops)	Mason Street (MAX), West Elizabeth Street, North College Avenue, Harmony Road
High Frequency	15-minute or better	Yes	Local service that may include some speed and reliability improvements	CSU campus (HORN), Drake Road, Lincoln Avenue
Frequent Peak	15-minute peak/ 30-minute off-peak	Routes that have higher demand or connect to key destinations	Local service with direct route alignments and higher peak period frequencies	Prospect Road, Timberline Road, Shields Street, northeast Fort Collins, CSU Foothills Campus Redwood Street
Local	30-minute	Routes that have higher densities or connect to key destinations	Local service with direct route alignments	East Mulberry Street, Laporte Avenue, Taft Hill Road, Horsetooth Road, Lemay Avenue, JFK Parkway, South College Avenue,
Mobility Innovation Zones	On-demand	To be determined	May include on-demand, microtransit or other services with flex routes and partnerships with the private sector	Northwest, Northeast, Southwest and Southeast

Regional Transit-services

Community members voiced strong support for improved regional transit connections. Transfort is already working with Greeley-Evans Transit on providing new intercity transit-service to Greeley and Windsor. There are also discussions underway to provide new intercity transit-service to Wellington and fare integration/ reciprocity between Greeley, Loveland and Boulder. Transfort will also explore transit-service options to Timnath. Beyond these items are other regional transit issues that Transfort will consider over the next several years:

- Explore consolidating transit-services in Fort Collins and Loveland (Transfort currently operates the Loveland transit system). Loveland is beginning a transit plan in 2019 that may help to resolve this question.
- Work with CDOT on more transit-service to Denver, either through expanded Bustang service or future commuter rail.
- Consider the viability and benefit to Fort Collins residents of a Regional Transportation Authority (see text box on page 98).

Given the size of Fort Collins and Transfort's high transit ridership, Fort Collins will serve as the leader in exploring future regional transit-services in the North Front Range region. By working collaboratively with other cities, CDOT and the NFRMPO, Fort Collins could work to not only improve regional transit connections but improve transit access across communities throughout the region.

RAIL SERVICE

PASSENGER RAIL

The 2011 North I-25 Environmental Impact Statement (EIS) identified three potential short-range rail projects. One project is a $1.35 billion (estimated) commuter rail line between Fort Collins and Denver. In 2017, a Colorado Senate Bill was passed to perform a feasibility study to implement passenger rail from Fort Collins south to Loveland, Longmont, Boulder, Denver, and onto Pueblo or Trinidad. This potential rail line would be contracted with Amtrak and use existing rail infrastructure. Conclusions from a feasibility study determined that high speed rail along the I-25 corridor is feasible, and further study should be conducted. Fort Collins is actively seeking opportunities to be directly involved in the efforts to bring rail to the North Front Range. Transfort and other City staff will be actively engaged in CDOT's Transit and Rail Advisory Committee and Southwest Chief and Front Range Passenger Rail Commission.

LIGHT RAIL

Light rail is an effective way to move a large number of people in relatively dense areas and can be more cost effective to operate than frequent bus or bus rapid transit when ridership levels are high. However, light rail costs much more to build than a bus system because an entirely new set of infrastructure is required to be built. Light rail costs approximately $120-250 million per mile in contrast to bus rapid transit projects that can cost in the $5-30 million per mile range (total cost for MAX BRT $85M). Light rail operating at 10-minute headways with a four-car train can carry 4,800 passengers per hour in the peak direction. A bus rapid transit vehicle operating at the same headways can carry about 600 passengers per hour in the peak direction. In other words, the higher costs of light rail provide much higher capacity and can result in lower operating costs if the trains are sufficiently full. However, if the light rail vehicles are lightly used, the high capital costs and higher costs to purchase and operate the vehicles results in this mode being more costly to both build and maintain compared to a bus network. In the case of Fort Collins, density is not sufficient over a large enough corridor to justify light rail transit as a cost-effective alternative to the successful MAX BRT system, as was discussed during the initial visioning for the Mason Corridor.


CITY PROPERTY
NO TRESPASSING
MAX STC
EMERGENCY
max
A SERVICE OF TRANSPORT
79
616 LGO

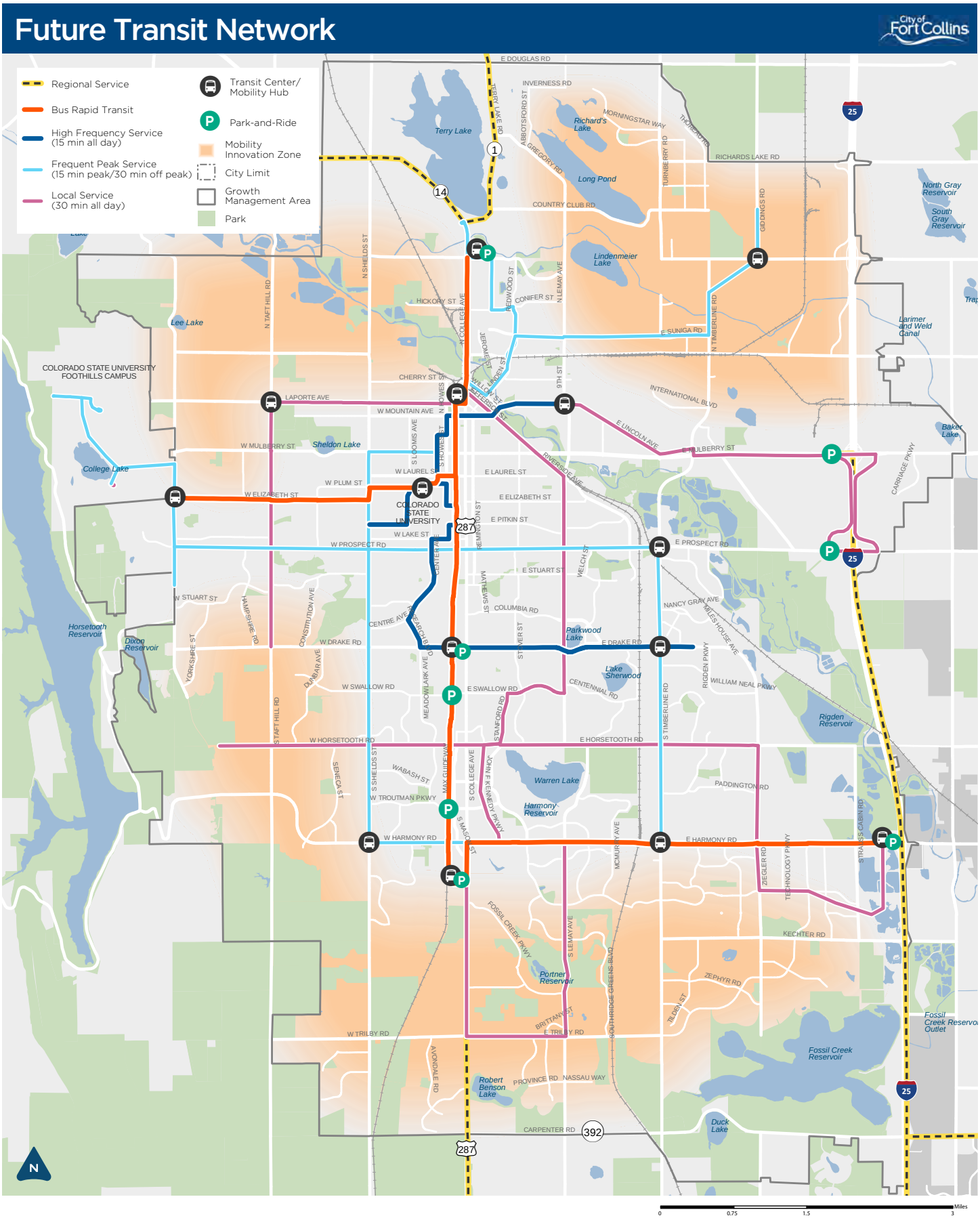


Figure 12 – Future Transit Network (2040)

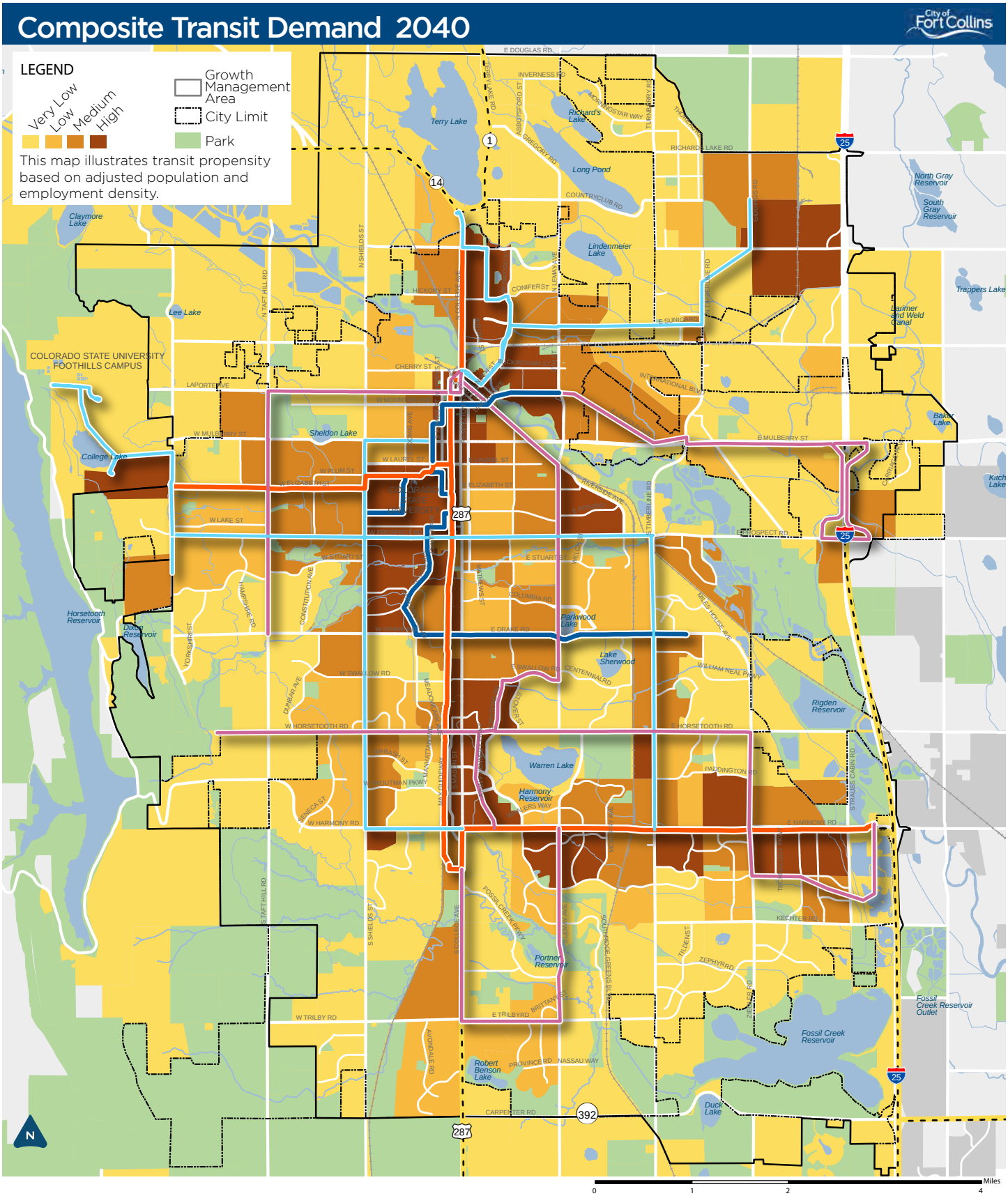


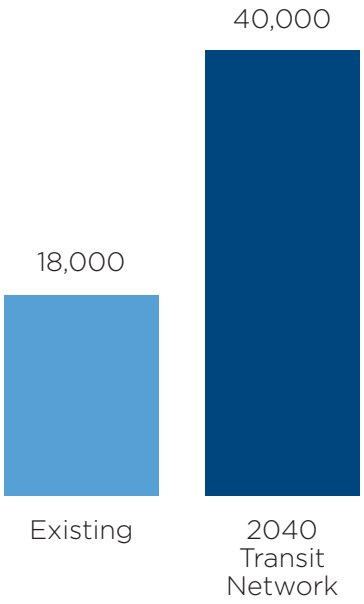
Figure 13 – Future (2040) Composite Demand and Future Transit Network (2040)

2040 Service Metrics

The charts on this page describe the projected outcomes in 2040 if the land-use plan and transit network are implemented. Data shows that the 2040 Transit Plan would achieve a 120% increase in transit ridership, including a 10% increase in productivity (passengers per service hour).

122% INCREASE IN TRANSIT RIDERSHIP

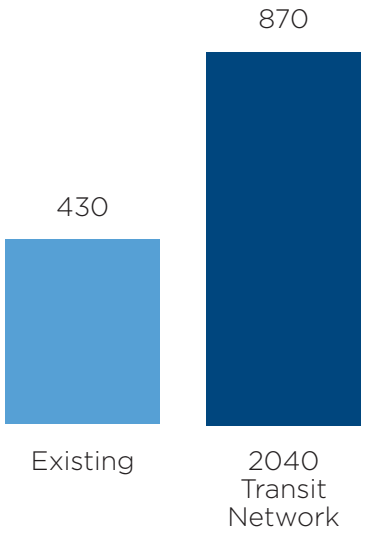
Weekday Ridership



102% INCREASE IN REVENUE SERVICE HOURS*

Weekday Service Hours

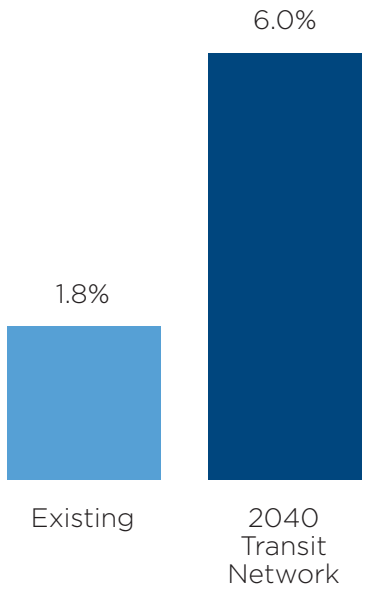
* Revenue service hours includes the numbers of hours every bus is operating in service.



10% INCREASE IN PRODUCTIVITY

Productivity (Ridership per Weekday Service Hour)

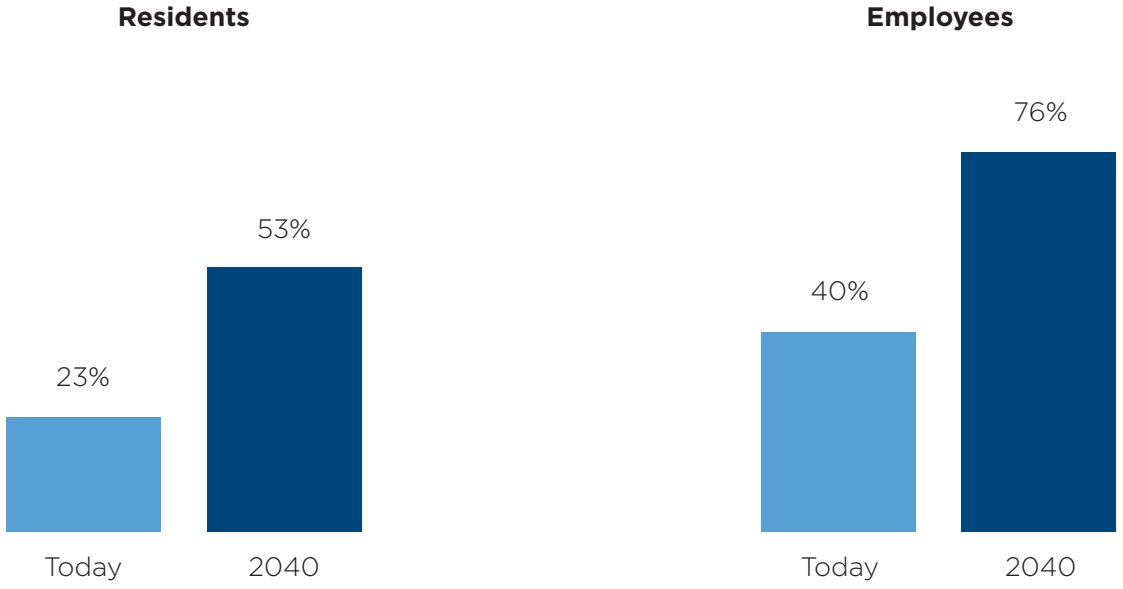
233% INCREASE IN TRANSIT MODE SHARE



Transit System Coverage

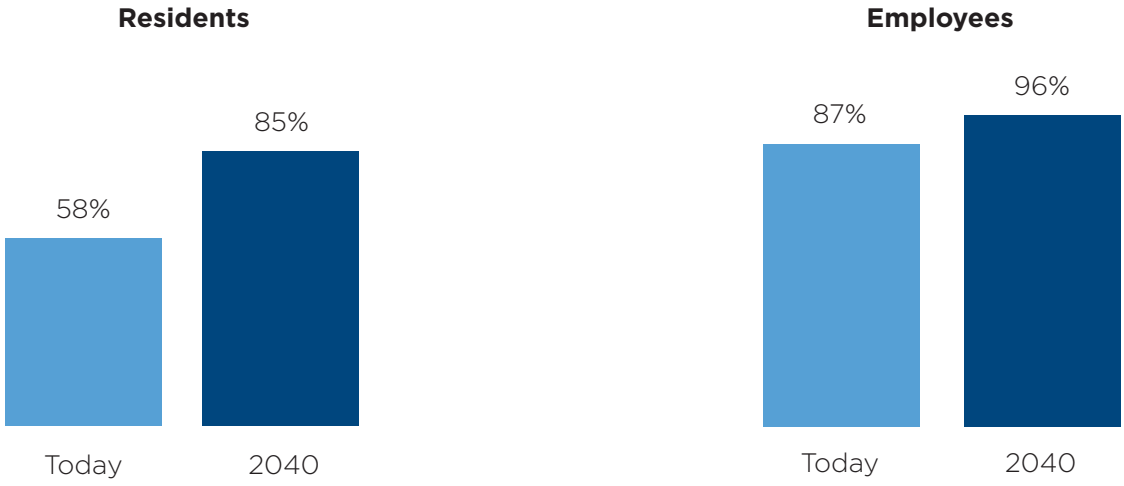
Transit system coverage is a measure of residents and employees that are within close walking distance of transit-service. Under the Future Transit Network, coverage for all types of transit would increase from today's service. However, coverage of high-frequency transit would exhibit a greater increase. The number of employees and residents within a half mile of a BRT or high-frequency route, would increase by 90% for employees and 130% for residents. By 2040, about 76% of workers in Fort Collins would have BRT or high-frequency transit line within a half mile of their work and about 53% of residents would have a BRT or high-frequency transit line within a half mile of their home.

PEOPLE WITHIN ½ MILE OF BRT OR High-frequency TRANSIT



SYSTEMWIDE COVERAGE

Within ¼ mile of local transit OR ½ mile of BRT/high-frequency transit OR within a mobility innovation zone



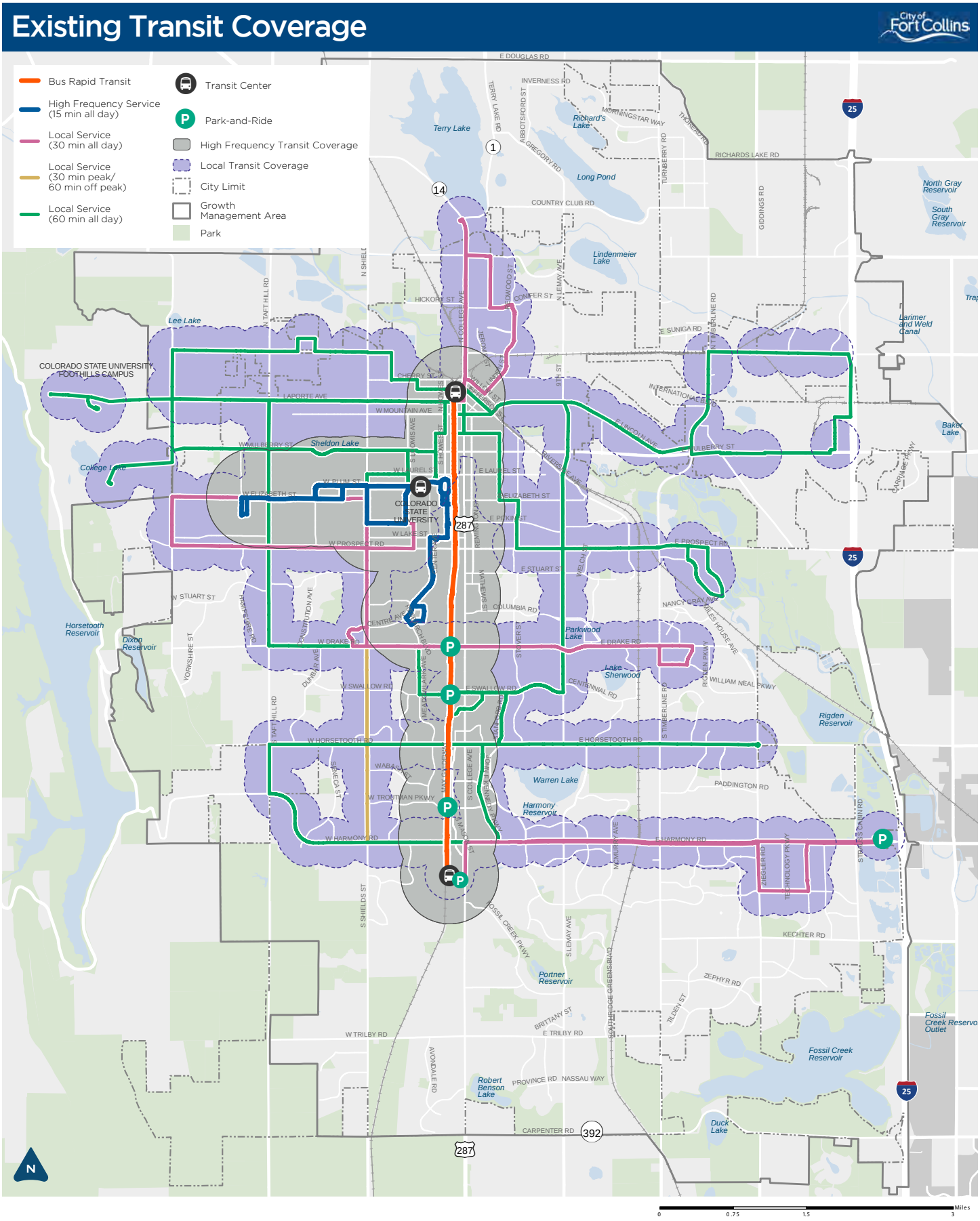


Figure 14 – Existing Transit Coverage

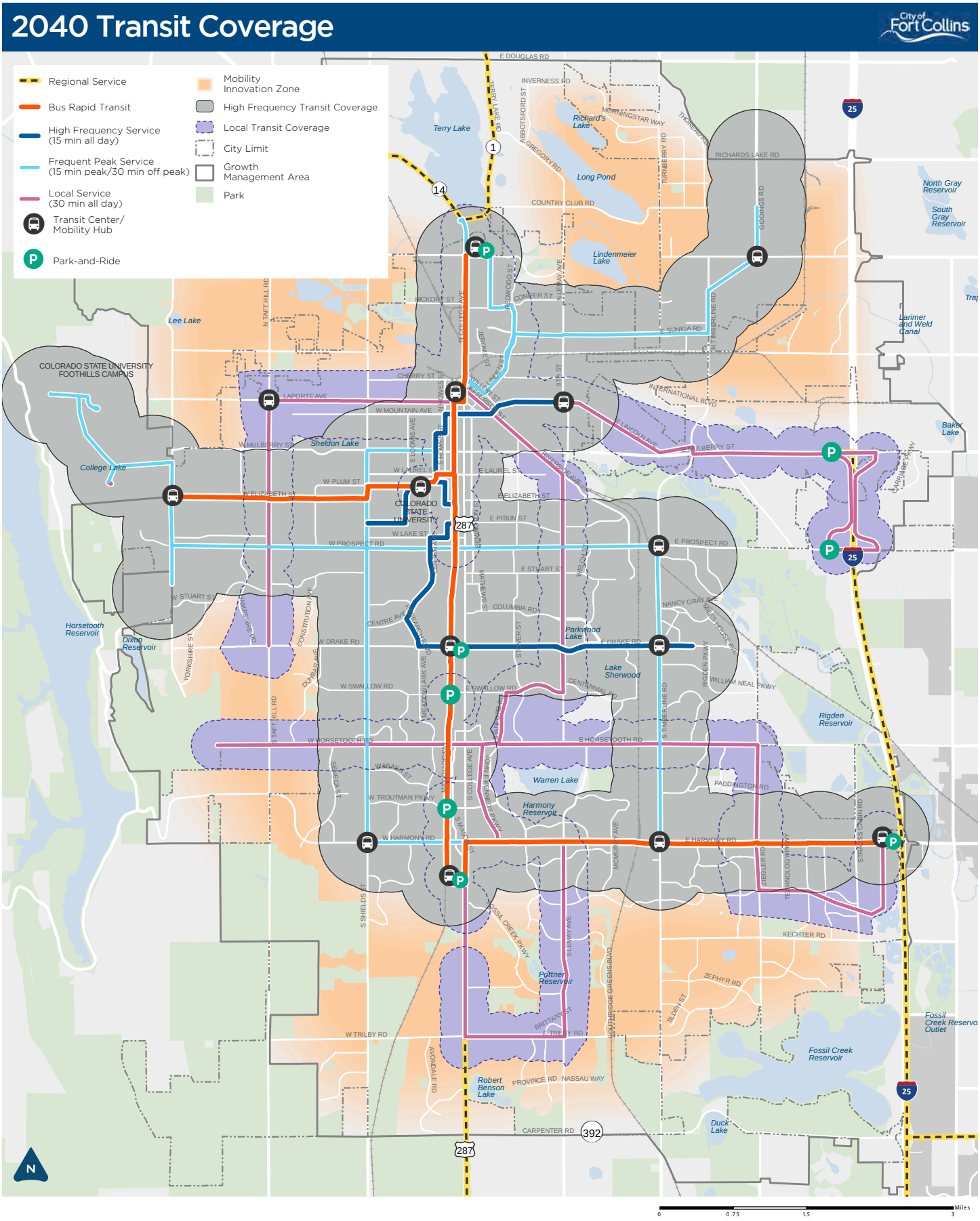


Figure 15 – 2040 Transit Coverage

Future of Paratransit

As noted earlier in this Plan, Dial-A-Ride provides a critical mobility service to some members of the community who otherwise cannot ride on the fixed-route network. However, Dial-A-Ride is a relatively expensive and inefficient service. As technology improves, there is the potential for Transfort to provide Dial-A-Ride with a better customer interface and at a lower cost, either through new partnerships with service providers or better technology integration and fleet procurement by Transfort. Presently, Transfort is working with the North Front Range Metropolitan Planning Organization (NFRMPO) and other service agencies on a centralized call center to enhance paratransit-service. Below are some key areas where Transfort can improve the Dial-A-Ride service:

- **Improved reservation system:** Services such as Uber and Lyft have set a new standard for how people request a door-to-door ride. While many current Dial-A-Ride patrons may be unwilling or unable to use a smartphone to hail a ride, this will change over time as the technology is more widely adopted. Transfort can work to build more-modern technologies into its Dial-A-Ride reservation system to allow for spontaneous reservations, vehicle tracking and other customer-friendly benefits.
- **New partnerships:** While further exploration would be required, many transit agencies have successfully reduced their paratransit costs by partnering with a wider variety of service providers. For example, not all transit patrons require a wheelchair-enabled vehicle or direct door to door services. In these cases, less costly services can be procured (through taxis or ride-hailing services), reserving the more specialized services and vehicles for those who need a higher level of service.
- **Lower-cost services:** An improved reservation system could increase the number of rides per day offered per Dial-A-Ride vehicle, which would reduce the cost per trip. Additionally, autonomous-vehicles could also reduce cost of the service by allowing the use of a more general-purpose vehicle whose cost could be shared by a much larger user base. However, it is important to note that even with autonomous-vehicles, there will still be a need to assist some Dial-A-Ride patrons from door-to-door.
- **Mobility Innovation Zones:** While federal guidance is unclear at this time, implementation of mobility innovation zones could expand the footprint where Dial-A-Ride operates. While this has benefits in terms of providing increased accessibility for more patrons, it also could potentially increase the cost to operate Dial-A-Ride services. Therefore, in conjunction with the mobility innovation zone implementation, Transfort should perform a study to confirm that Dial-A-Ride service need not extend beyond the boundary of the mobility innovation zone. Additionally, Transfort should explore if it has the existing capacity to expand Dial-A-Ride access and assess the potential for the mobility innovation zone operator to serve at least a portion of the Dial-A-Ride patrons (specifically, those who do not need as extensive escort services or a specialized vehicle).


Transfort
221-6620
NOT RESPONSIBLE FOR LOST,
STOLEN, OR DAMAGED BICYCLES

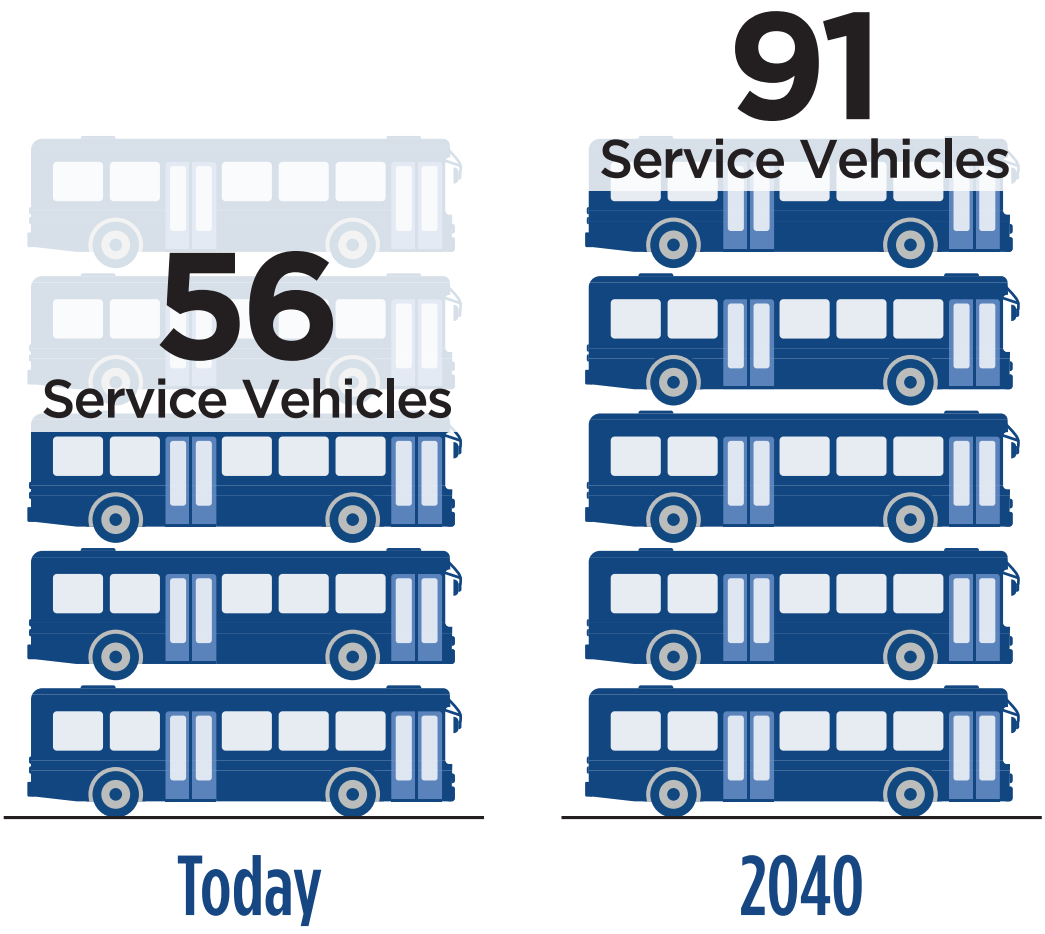
The 2040 Transit Fleet and Key Technologies

As noted in the previous section, transit-service by 2040 is planned to double, as measured by the number of annual service hours.[14] To accommodate this service expansion, Transfort will need to expand the number of buses it owns and operates, which is one of the most-significant costs of transit-service expansion. In addition, the current fleet of buses will need to be replaced over time to ensure reliable, modern, clean and attractive service for riders. This section describes how the fleet is likely to evolve over the next 20 years. In addition, this section summarizes some new technologies that Transfort will pursue to improve rider convenience. This new technology is a mix of equipment (GPS, communications, fare payment) that would be needed in the vehicles and other equipment and services at the Transfort offices.

Fleet Size

As of 2019, Transfort operates a fleet of 56 service vehicles: buses and Dial-A-Ride vehicles. To accommodate the planned 2040 service network, the fleet will need to expand to approximately 91 service vehicles: buses, Dial-A-Ride vehicles and mobility innovation zone vehicles. Note that this number also includes roughly 13 buses needed to provide regional transit coverage as identified in the 2040 service map.[15] As new BRT buses are added to the fleet to support expanded BRT service, standard buses previously dedicated to those routes could be used for expanded service on local routes.

In terms of vehicles to serve the mobility innovation zones, there are many potential ways that this could be accommodated. Transfort could own and operate the vehicles (either small shuttles or vans), own but contract out operations and maintenance, or contract out ownership, maintenance and operations. These options would impact the ultimate fleet size, but for the purposes of this Plan, it is assumed that Transfort would own the vehicles.



[14] Revenue service hours includes the numbers of hours every bus is operating.

[15] As new regional services come online, Transfort will work with regional partners on who owns and maintains the regional buses, so this total could differ in the future.

Fleet Characteristics

Today, Transfort operates a mix of 30-foot standard buses and 60-foot articulated buses on its routes. The higher-capacity articulated buses operate on the MAX BRT line. Most of the current buses use compressed natural-gas engines for reduced air-pollution emissions.

As with other vehicles, buses are seeing rapid change in how they are powered and how they are operated.

» **Battery Electric Buses** – Buses powered by batteries and electric motors have transitioned from pilot tests to mainstream use in many communities across the United States. Battery electric buses can match the travel range of fossil-fuel buses and are significantly more energy efficient. A downside is that battery electric buses cost significantly (about 50% to 100%) more to purchase than natural-gas or diesel buses, although operating costs are less. Transfort currently has funding for the purchase of one electric bus to be ordered in 2019/2020. Additionally, Transfort has received a CMAQ grant for the purchase of an additional five electric buses in 2022 and 2023.

» **Fuel Cell Buses** – These buses are powered by hydrogen fuel cells and electric motors. Fuel cell buses are still in the testing phase, but may one day offer superior range and performance compared with battery electric buses. The cost to purchase and operate these buses is not yet known.

» **Autonomous Buses** – Such as other autonomous-vehicles, an autonomous bus has the ability to drive itself, offering safety benefits and the ability to reduce operating costs and mitigate for labor shortages. Autonomous shuttle buses (smaller vehicles that typically travel less than 30 mph) are already in limited service—Denver will have an autonomous shuttle in 2019—but, fully autonomous transit buses are still in the prototype and testing phases.

As Transfort's fleet is renewed and expanded over time, the agency will pursue electric and clean fuel technologies and autonomous-vehicles as soon as they are proven to be safe and reliable, with the goal to eventually transition the entire fleet to electric or other clean energy technology. These types of vehicles will improve the environmental and financial sustainability of Transfort moving forward.

The total estimated cost to refresh and expand the Transfort fleet is between $85 million and $95 million over the life of this Transit Master Plan (by 2040).

Key Technologies to Make Transit Easier to Use

As noted in the previous chapter, public expectations are driving technology companies to set an increasingly high bar related to information, data availability and payment. In order to keep pace, Transfort will continually review its information technology (IT) systems and make regular but financially prudent upgrades to its IT infrastructure. While there are numerous IT systems that are integral to Transfort, this plan focuses on two that have a very visible public face and need to be considered in conjunction with fleet expansion and renewal.

» **Fare Automation and Integration** – Today, you can use a smartphone or even a watch to pay for and access a wide variety of goods and services. However, to board transit, you have to pay a cash fare, or show a transit pass or MAX ticket. Also, a rider from Boulder cannot use their MyRide card to pay for a trip on Transfort. Transfort is currently developing a fare-reciprocity program with partners of the FLEX route and the future Poudre Express (Loveland, Greeley, Windsor). In the future, Transfort will work to improve its IT systems to make it easier to pay for transit. This could include a mobile-payment app (similar to an app used by RTD) or the ability to use contactless payment cards/devices (ApplePay, Google Pay) to pay for fares. In addition, Transfort will explore a common fare-payment system for the transit agencies in the North Front Range. Under a common fare-payment platform, users could use a single transit pass or smartphone app to pay for and board multiple systems, making transit easier to use.

» **Information Sharing and Aggregation** – As described in the Mobility-as-a-Service (MaaS) section in the previous chapter, sharing and aggregating mobility information is helpful for people to make informed mobility decisions. Transfort already pushes information about bus routes, schedules and vehicle locations to the public. A next step toward integrated mobility information would be for Fort Collins to either work with a partner (e.g., Pace, Google or an independent app developer) to consolidate all the publicly available information on transit, bikeshare and scootershare. In addition, Fort Collins should work with other private mobility providers such as Zipcar, Uber and Lyft to share their availability and pricing information to a common platform. Eventually, Fort Collins residents and visitors would benefit from integrated trip planning and ultimately a common payment platform. However, these outcomes will take time to negotiate and the roles of the public and private partners will need to be identified to ensure an efficient, intuitive, and user-friendly interface. Earlier attempts by the public sector to act as the aggregator of mobility information have stumbled because of lack of investment in the user interface and lack of data-sharing agreements for mobility companies that operate within the city.

A review of major technology upgrades pursued by other transit agencies as part of fare-integration and data-management projects indicates costs of $2 million to $5 million every five to seven. This results in a total cost of major technology upgrades of $10 million to $20 million over the life of the plan.

Major Capital Investments

In addition to the fleet and technology expansions identified in the previous section, Transfort will need to make other substantial capital investments to implement the 2040 Transit Network. This section outlines several other major fixed-cost items.

Operations and Maintenance Facility

Transfort currently owns and operates a bus maintenance facility off Trilby Road. As of 2019, the facility is operating at capacity, with 51 buses stored on site and several others stored off site at a contractor facility. Any significant expansion of transit-service would require a larger maintenance facility. Based on projected fleet needs by 2040, a facility roughly double the size of the current facility would be needed, although it could be phased in over time. Based on discussions with maintenance staff, the following items would be needed as part of the maintenance-facility expansion:

» Covered area for bus storage to reduce wear and tear from hot and cold weather.

» Need for two to four additional stalls for maintenance.

» Expansion of fueling area.

» Expansion of administration space.

» Expansion for staff parking.

The current facility has room to expand, but a full site assessment will need to be prepared to determine if the existing parcel is of adequate size or if a new site with additional land is required. Based on a review of similar maintenance facility expansions, the cost of this expansion is expected to be about $20 million to $30 million, which could be phased in over time. With expansion, there would also be an opportunity to consolidate Transfort staff into one centralized location.

Another potential option to consider instead of expanding the existing maintenance facility is adding a second maintenance facility in North Fort Collins. The capital cost is likely to be higher than expanding the existing facility, but would allow for operational efficiencies that may reduce operations costs.

Transit Centers and Bus Stops/ Stations

As the transit system grows, buses need places to stop and pick-up/drop-off passengers. While some types of bus stops can be added with minimal capital investments, others require substantial planning and investment. Below, several significant capital investments related to bus pick-up/drop-off are identified.

» **Transit Centers** – Transfort currently operates three transit centers that have significant boarding and transfer activities: Downtown Transit Center, CSU Transit Center and South Transit Center. The Downtown Transit Center currently operates at capacity, and as service expands, more bus stops will be needed at this location. Transfort will prepare a study on how to expand or relocate the Downtown Transit Center since a simple expansion is difficult when considering the constrained site and the historic building that is part of the center. Determining a cost for this type of project is difficult at this stage since the need to purchase additional land or to substantially reconfigure the current site is not yet known. For the purposes of this plan, costs are estimated at $3 million to $10 million.

» **Mobility Hubs** – As the transit system expands mobility hubs will be a key focal point for access by a variety of modes. Mobility hubs are described further and mapped in the Access to Transit section. This plan identifies 14 mobility hubs, which also include the three existing transit centers (described above) and the Harmony Transfer Station. While future study will be necessary to more clearly define what is to be included in a mobility hub and each hub could have substantially different final costs due to land cost, utilities and other factors, for the purposes of this plan, costs are estimated at $3 million[16] for each hub.

» **Bus Stations** – The new proposed BRT routes on North College Avenue, West Elizabeth Street and Harmony Road would be built with Bus Stations, as identified in Transfort's *Bus Stop Design Standards and Guidelines* (July 2015). Bus stations include more-robust passenger amenities than other types of stops, including "unique shelter" designs, ticket-vending machines and next-bus-arrival information. While space constraints may dictate that not all stops along the new BRT routes meet the bus station design standard, it can be anticipated that at least 25 new bus stations will be built along the new BRT corridors. Based on analysis in the *Harmony Road ETC Master Plan*, costs for bus stations are estimated at $300,000 for each station. The future Foothills Station on West Elizabeth Street and Overland Trail is estimated to cost $4 million based on analysis complete as part of the West Elizabeth Enhanced Travel Corridor Plan. Actual costs per station will vary depending on site-specific factors such as land availability and design choices for the stations.

» **Enhancing Existing Bus Stops** – The *Bus Stop Design Standards and Guidelines* document provides guidance on what type of bus stop is appropriate given the adjacent land-uses and ridership characteristics of a stop. The objective of the Bus Stop Improvements Program is to bring all Transfort bus stops into Americans with Disabilities Act (ADA) compliance so that transit is accessible and comfortable to people of all abilities and ages. Transfort's Bus Stop Design Standards and Guidelines, adopted by City Council in 2015, is the guiding document for establishing ADA bus stops and accessible connections. Dedicated funding for ADA upgrades became available starting in 2016. Currently, 67% of bus stops are ADA-compliant and in 2019 Transfort was awarded an FTA grant to improve an additional 60 stops. The goal is for all Transfort bus stops to be ADA compliant by 2026. Transfort will periodically review the usage and surrounding land-uses of its existing bus stops to determine if upgrades (or downgrades) are warranted. As the transit system expands, it is also important to keep in mind that more-elaborate bus stops require increased maintenance, which should be accounted for when considering whether it is appropriate to upgrade a bus stop. This item could have a wide range of costs, but for the purposes of this plan, an estimate of $5 million over the life of the plan is assumed.

[16]Mobility hub cost estimate is based on land cost (assumed at one acre for each hub) and site improvements including bike parking areas, curb improvements, carshare parking, kiosks and other amenities.

Bus Rapid Transit Corridors

A major element of the 2040 Transit Master Plan is the expansion of BRT service on three new corridors:

- North College Avenue between the Downtown Transit Center and Willox Lane.
- West Elizabeth Street between the CSU Transit Center and Overland Trail.
- Harmony Road between the South Transit Center and I-25.

These new BRT corridors are strongly aligned with current land-uses, high transit generators and future growth as outlined in City Plan. Corridor studies have already been completed for the West Elizabeth and Harmony Road corridors to identify the type of roadway, traffic signal and transit stop/station enhancements needed to make BRT work on those corridors. A similar corridor study will need to be prepared for North College Avenue to determine more specifics about the types of capital improvements and operational characteristics needed to implement BRT on this corridor.

It should be noted that for the West Elizabeth Street and Harmony Road corridors, BRT is not planned to travel in a separate guideway as MAX does along much of the Mason corridor. Rather the new BRT corridors would utilize features such as queue jump lanes, transit-signal priority, and bus bulb-outs to achieve reasonable travel times but at a much lower cost than widening the street. While not yet studied, the North College BRT would also probably use these types of features to implement BRT service.

Even though the new BRT corridors are not expected to involve substantial street widening, they are still major capital projects. Based on studies prepared for Transfort, the estimated cost to implement the roadway, transit-signal priority, pedestrian and bicycle access, queue jumps and more for these projects (excluding operations costs) is as follows:

- North College Avenue - $10 million
- West Elizabeth - $28 million
- Harmony Road - $53 million

The above costs do not include buses or bus stations. A phased approach beginning with "rapid bus" service could prove to be a practical first step.

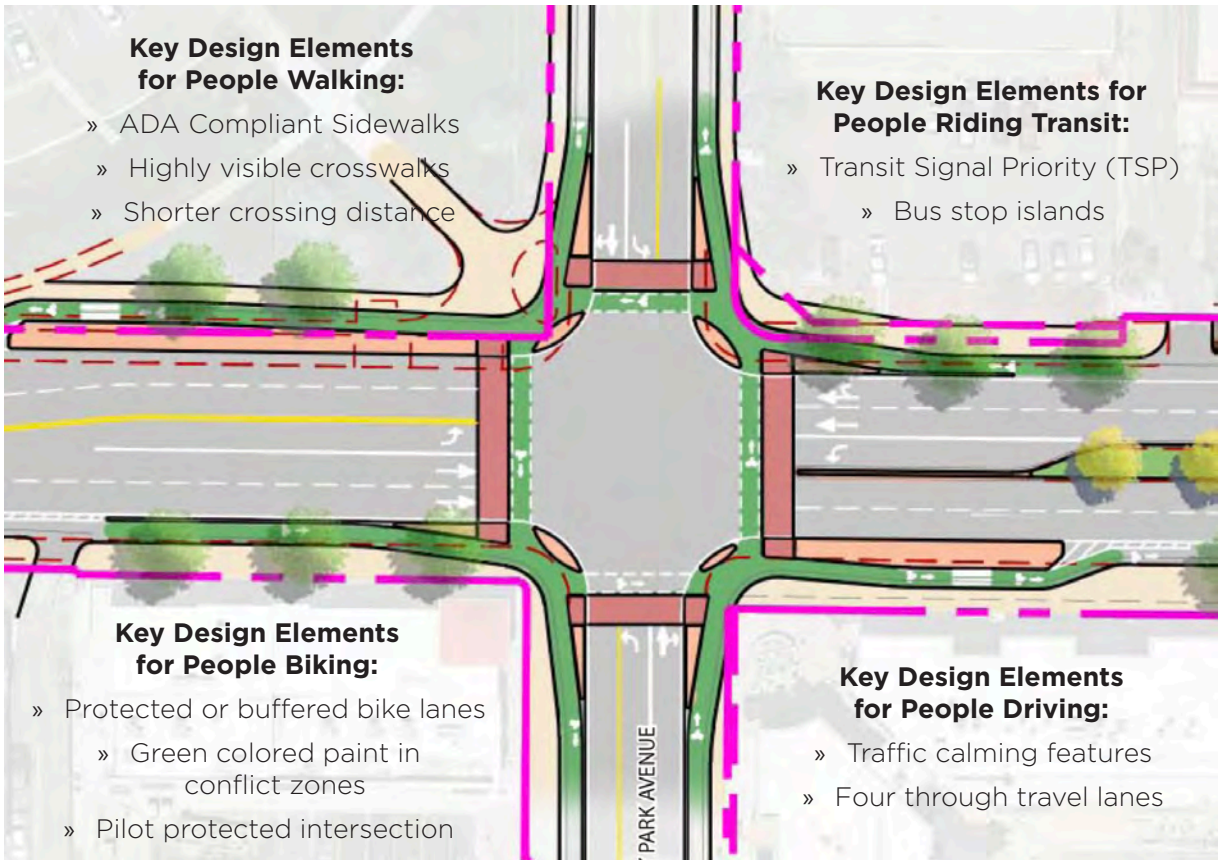


Figure 18 – Recommended Intersection Design for West Elizabeth Corridor

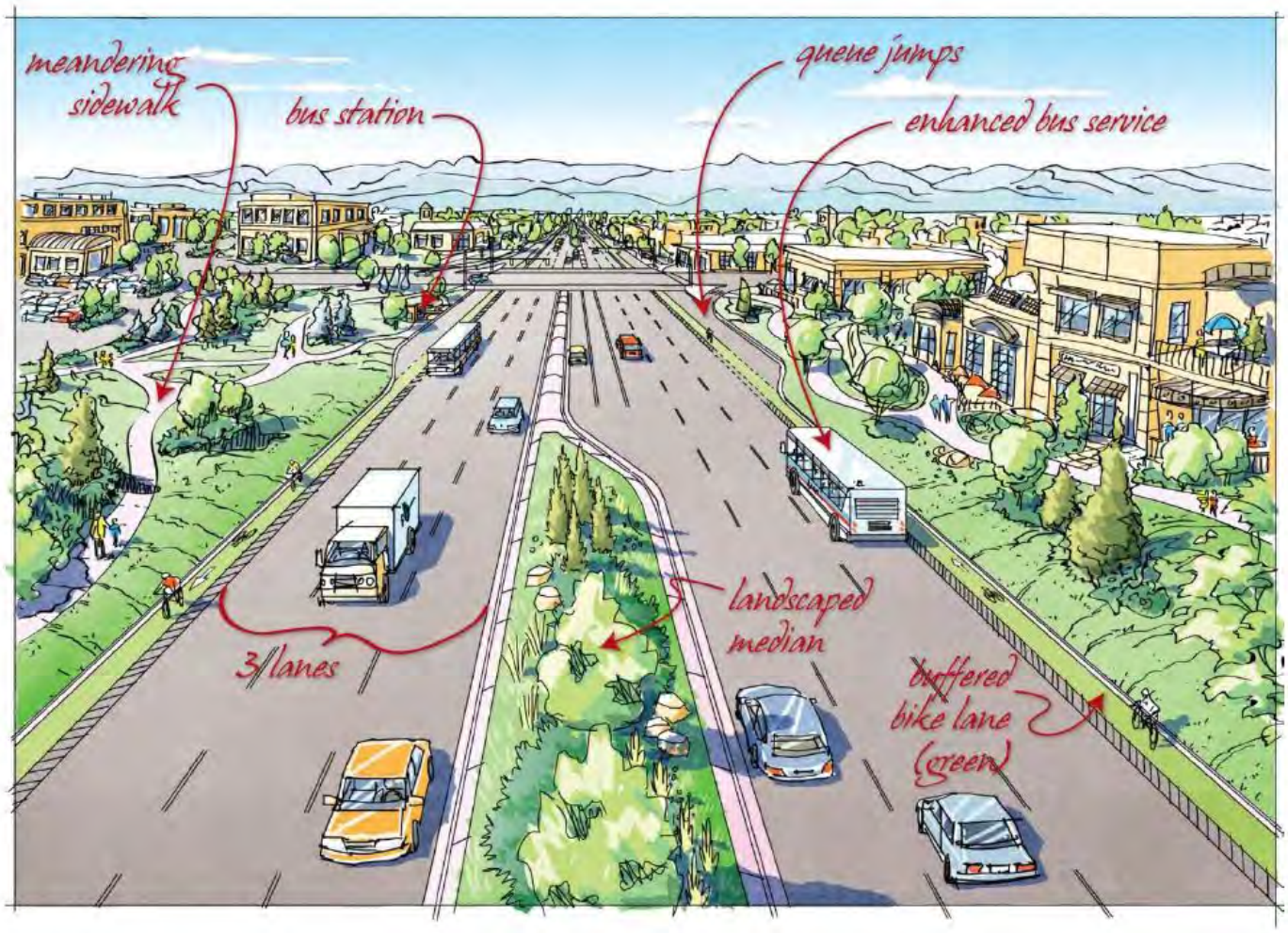


Figure 19 – Recommended Configuration for Harmony Road Corridor

Speed and Reliability Improvements for Non-BRT Corridors

In addition to enhancements for the three BRT corridors, Transfort will invest in speed and reliability improvements on the high-frequency corridors as service levels grow into the future. Typical with other "rapid bus" corridors, most of the speed and reliability improvements on the high-frequency bus corridors will involve transit-signal priority, strategic queue jump lanes and refinement of bus stop locations to balance access to the route and overall travel times. Transfort will need to prepare a future study to more specifically identify speed and reliability-improvement costs for non-BRT corridors. However, for the purposes of this plan, it is assumed that speed and reliability improvements will cost $10 million for all non-BRT corridors combined over the life of the plan.

Summary of Major Capital Projects

The table on the next page summarizes the major capital projects that will be required to implement the Transit Master Plan. In addition, notes on potential funding sources are listed for each cost item.

DESCRIPTION	FULL IMPLEMENTATION COST (2019 DOLLARS)	POTENTIAL FUNDING SCORES
Transit Fleet Expansion and Renewal	$85 million to $95 million	Federal and state grants, local funds, resale of retired buses
Information Technologies/Fare Integration Technologies/MaaS	$10 million to $20 million	Federal and state grants, local funds, partner agency funds
Operations and Maintenance Facility	$20 million to $30 million	Federal and state grants, local funds, bonds
Downtown Transit Center Upgrades	$3 million to $10 million	Federal and state grants, local funds, bonds, transportation capital expansion fees
Mobility Hubs	$3 million each, $33 million for 11 new hubs	Federal and state grants, local funds, transportation capital expansion fees
Bus Stations	$300,000 each, $9 million total (total can vary based on BRT corridor design)	Federal and state grants, local funds, bonds, transportation capital expansion fees
Bus Stop Enhancements	$10 million (cost could be higher or lower depending on how quickly stops are upgraded)	Advertising funds, federal and state grants, local funds, developer contributions, transportation capital expansion fees
North College BRT Corridor	$10 million	Federal and state grants, local funds, bonds, transportation capital expansion fees
West Elizabeth BRT Corridor	$28 million	Federal and state grants, local funds, bonds, transportation capital expansion fees
Harmony Road BRT Corridor	$53 million	Federal and state grants, local funds, bonds, transportation capital expansion fees
Speed and Reliability Improvements for High-Frequency Routes	$10 million	Federal and state grants, local funds, bonds, transportation capital expansion fees
Total Costs of Items Above	$271 million to $308 million	

More details on local funding options are provided in Chapter 6: Implementation Strategies.

Access to Transit

Transit is only a successful mode when people can easily access the stops and feel safe while waiting for a bus. The Transportation Master Plan introduces the concept of a "layered transportation network," which is an extension of the idea of "complete streets." The layered network recognizes that not all streets can safely and comfortably accommodate all modes. For example, a street that is great for cars and buses might be too busy and fast for comfortable bicycling. Similarly, pedestrian priority areas will typically have slower vehicle speeds, which could be frustrating for long-distance travel, but create a good environment for buses with high transit demand and a lot of visibility and security at bus stops. The layered network was carefully considered when identifying the transit network to ensure easy and safe access to transit.

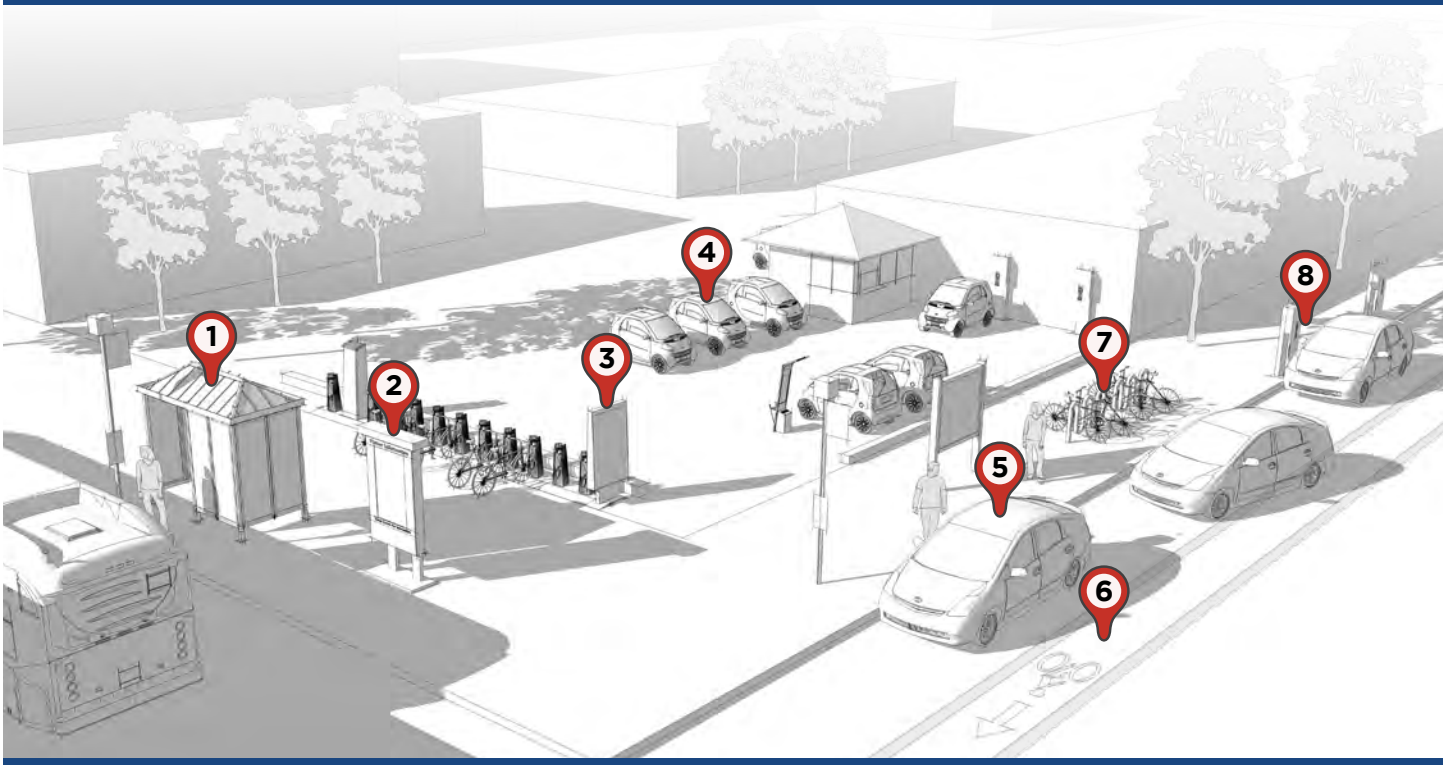
Mobility Hubs

A key feature of the 2040 Transit Master Plan is the idea of a Mobility Hub. Mobility hubs seek a seamless connection between transit and other modes of transportation and have been strategically located where the transit network intersects other major components of the layered transportation network. Mobility hubs have gained popularity in recent years as an increasing number of mobility options have emerged.

Figure 20 – Mobility hub in Hamburg, Germany (see **Figure 21** for description)

The key features of a mobility hub are summarized in **Figure 21**. Mobility hubs are best located along frequent transit routes, near activity nodes (mixed-use developments, employment centers, colleges, etc.), and in areas where there is a good opportunity to connect with other modes (e.g., near a major bicycle route, near a mobility innovation zone, at the terminus of a BRT or high-frequency route). In some but not all locations, mobility hubs may also include park-n-rides. To highlight the interplay between mobility hubs and other modal connections, **Figure 22** shows a map of the mobility hubs overlaid with the transit network and **Figure 23** shows the mobility hubs overlaid with the bicycle network. It's important to note that the new mobility hubs identified in this plan are preliminary and are intended to be flexible depending on future land development, land availability and other criteria. The mobility hubs shown as part of this Plan were chosen as they are in locations that meet most of the following criteria: activity/employment centers, along a future high-frequency bus route or intersecting bus routes, at a future intersecting bike lane or path, well spaced, and serve as a focal point for one or more mobility innovation zones.

Mobility Hub



1 **Bus shelter**

2 **Information and fare payment**

3 **Scootershare and bikeshare (Pace)**

4 **Carshare**

5 **TNC/microtransit drop-off/pick-up**

6 **Intersecting bike lane or bike paths**

7 **Bike parking**

8 **Car-charging station**

Figure 21 – Features and Elements of a Mobility Hub

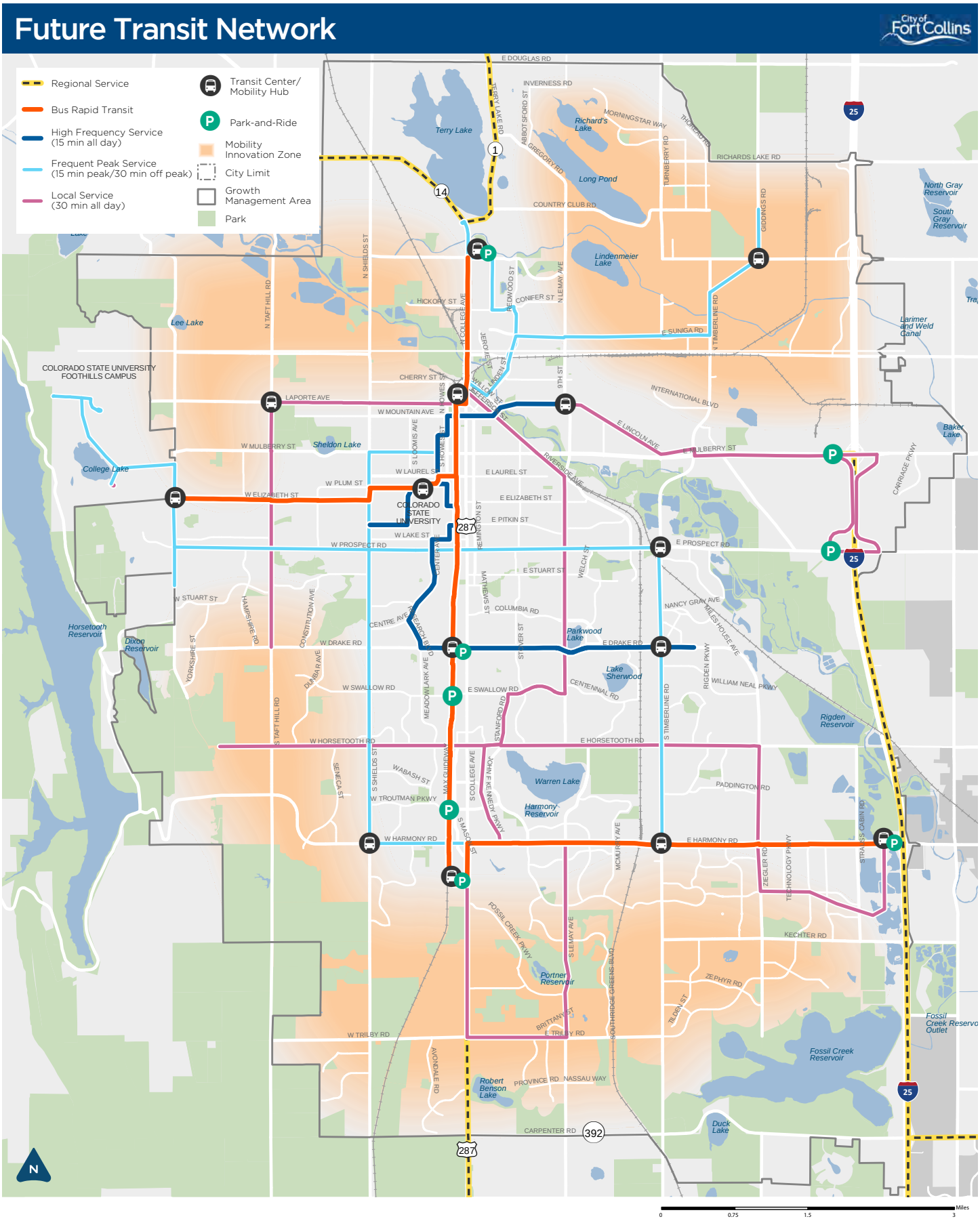


Figure 22 – Map of Future Transit Network

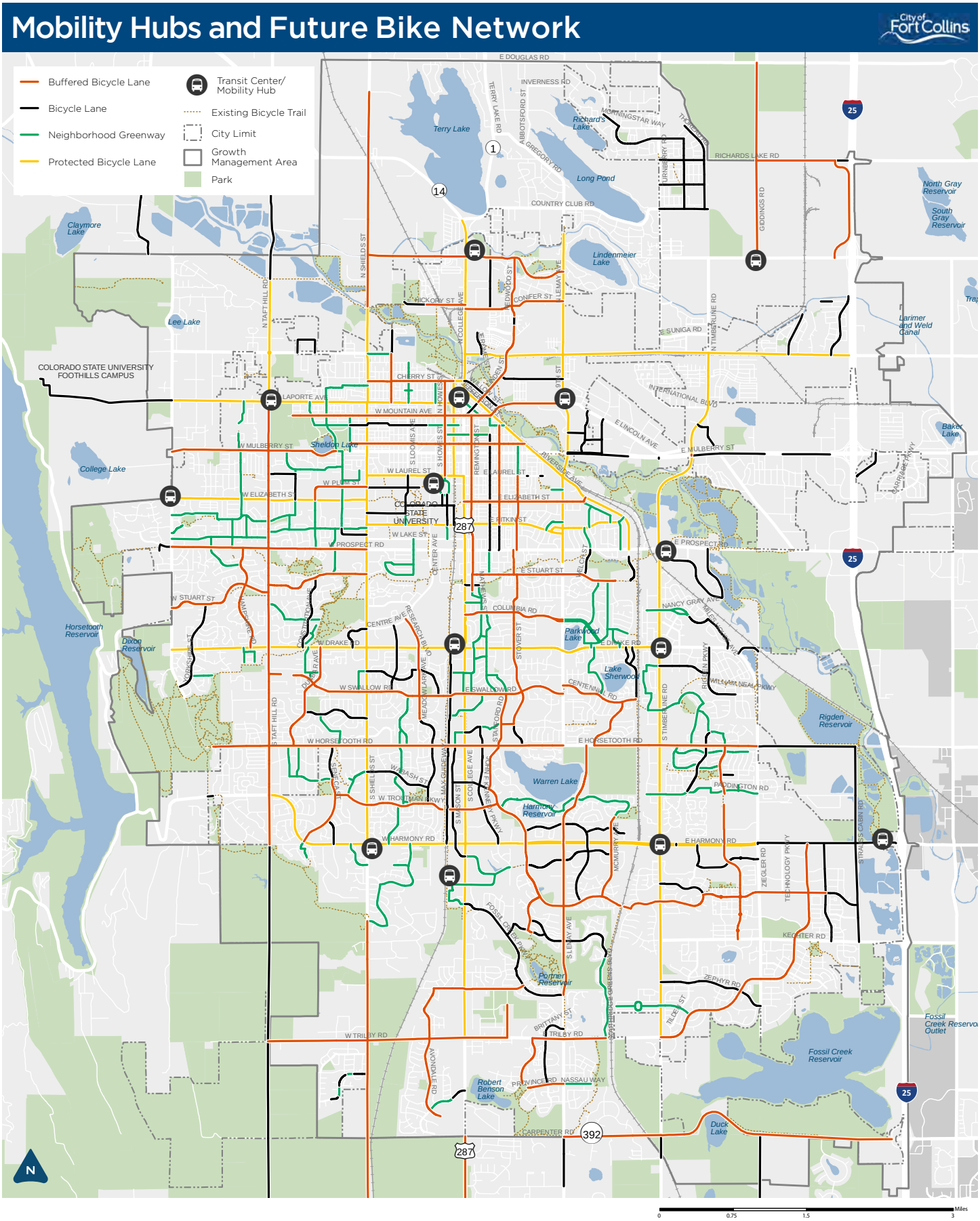


Figure 23 – Map of Mobility Hubs and Future Bike Network

Park-n-Ride

Park-n-rides extend the reach of transit for those who cannot or choose not to connect to the network via walking, biking, drop-off or connecting transit. Park-n-ride facilities are particularly attractive to commuters (to work or school) who would otherwise have to pay a relatively high monthly cost to park at their destination or who have a long commute and can benefit from having someone else drive them to their destination. Currently, there are several park-n-ride lots around the city, mostly oriented along the MAX line. (There is also parking at the Harmony Transfer Center, near Harmony Road and I-25). While the future of transit parking is a bit uncertain when considering how autonomous-vehicles could influence how people get to transit, there is still demand for park-n-rides in the near- to mid-term. Transfort recently completed a park-n-ride analysis for expanding parking along the MAX line, which recommends more than 300 new parking spaces via a variety of strategies such as leases, easements, land purchases, shared parking, redevelopment and marketplace pricing. Outside of MAX, this plan identifies four areas that should be considered for strategic park-n-rides. They are:

- **Terminus of the North College Avenue BRT** – This proposed mobility hub location would provide a strong anchor for the North College BRT line and would allow people from the north to access BRT and thus Downtown and the CSU campus.
- **I-25 and Prospect Road and I-25 and Mulberry Street** - Park-n-rides at these two locations would primarily serve regional Bustang service to Denver. They would also facilitate transfers between Bustang and local service such as a route serving East Mulberry Street.
- **Expand I-25 and Harmony Road Park-n-ride ("Harmony Transfer Center")** - A future mobility hub will be located at what will be an important transfer point between regional buses to Greeley and Denver, the future Harmony Road BRT, and other local bus service. Future demand will probably necessitate expanding the existing park-n-ride to accommodate transit riders both heading to Fort Collins and to Denver and Greeley.

Private Shuttles

Private shuttles currently operate in Fort Collins. One of the more common examples is a shuttle between an apartment complex that targets college students and CSU. Private shuttles can help to reduce auto use, auto ownership and parking demand both at CSU and across Fort Collins, all of which are in line with City goals. Therefore, Transfort is generally supportive of shuttles when they provide services to areas without strong transit connections. As the transit network builds out with additional BRT and high-frequency routes, the need for private shuttles to operate will decrease because these services are expensive to operate. One area where Transfort will work with private shuttle operators is related to curbspace so they do not block buses or conflict with other public uses in the right-of-way.

PARK-N-RIDE: WHAT TO CONSIDER IN AUTONOMOUS-VEHICLE (AV) ERA?

In the past, providing park-n-ride was fairly straightforward—identify a site and seek funding to build dedicated transit parking. Today, more thought should be given to park-n-ride because the demand for this type of transit access could radically decrease in an era where AVs are ubiquitous and are operated as shared fleets. Therefore, for any new potential park-n-ride facility, Transfort will consider one of these models:

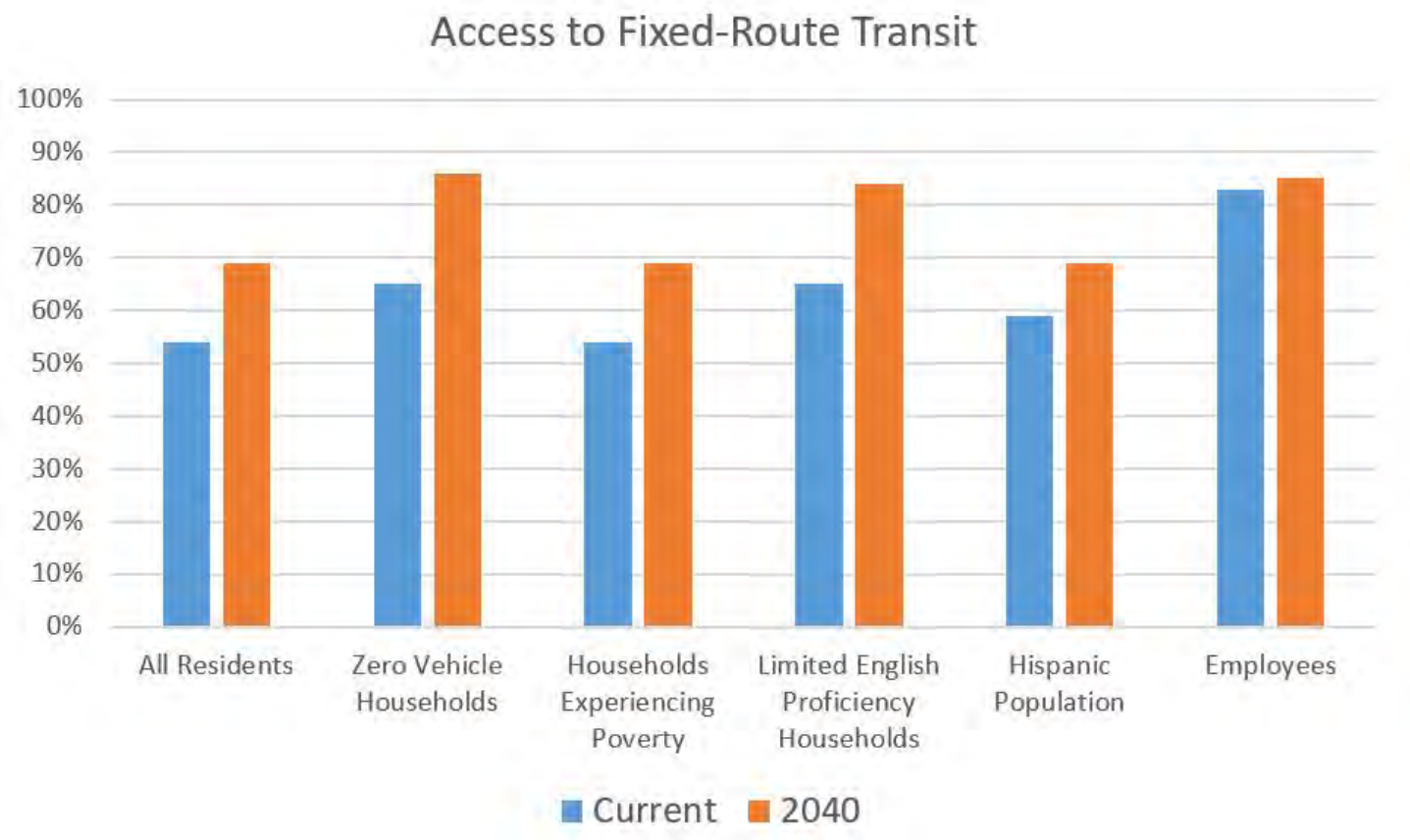
- **Partnership with adjacent land-use** – By leveraging existing underutilized parking or by developing new parking in conjunction with a landowner and leasing the supply, park-n-ride can be developed without permanently locking up land into parking that might later have little value.
- **Land banking** – If it makes sense for Transfort to own the parking facility, ensure that grants are written in such a way that the parking facility can be redeveloped in the future (some federal grants prohibit the conversion of transit parking to other uses, even if the parking is not utilized). In this way, a parking facility could generate ridership in the near term and be redeveloped as transit-oriented development or affordable housing in the future.

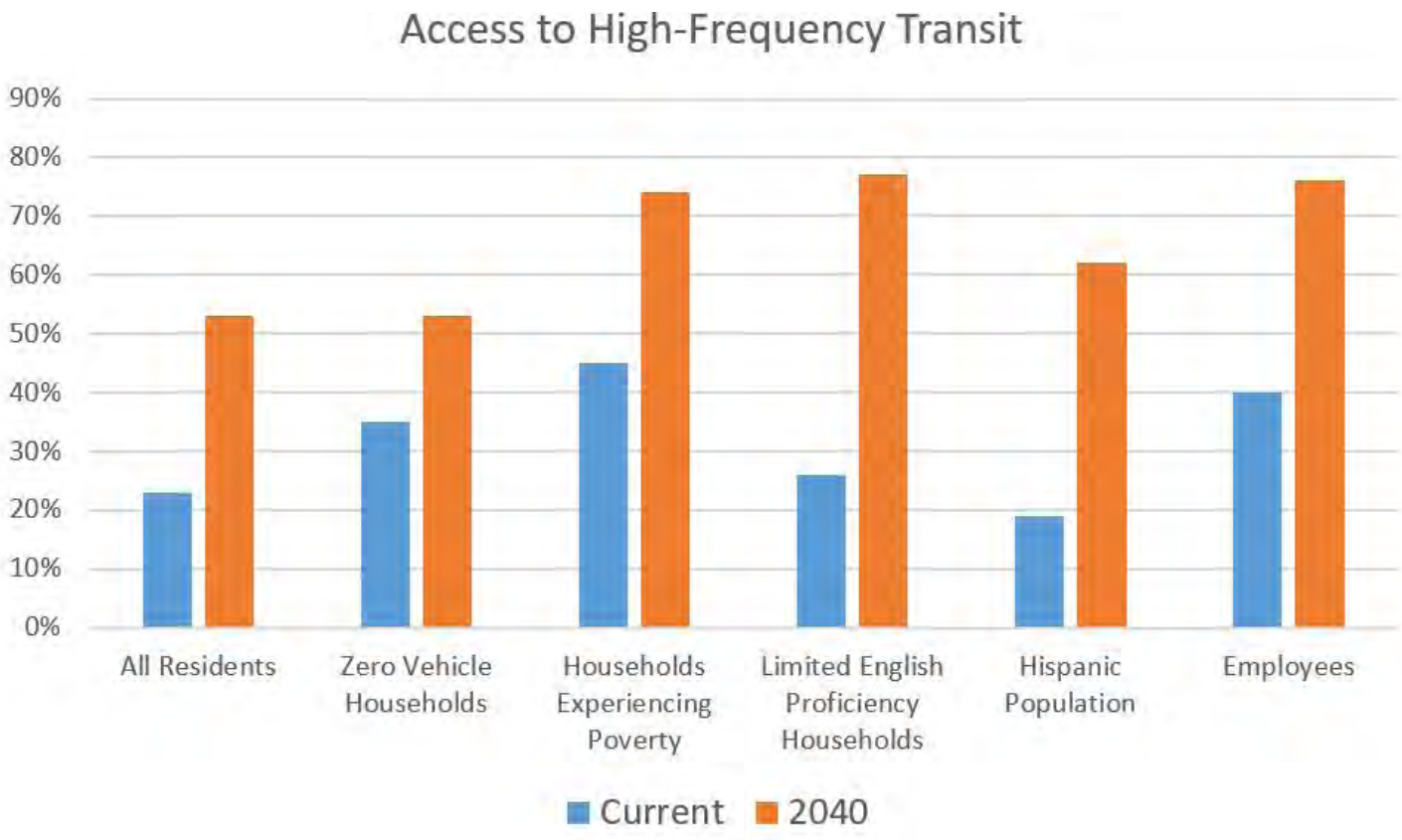
Equitable Transit-service

Equitable access to City services and investments is a core goal of Fort Collins. To that end, the Fort Collins Social Sustainability Department hosts a Transportation Equity Subcommittee that ensures that social equity is a key consideration in transportation-planning efforts. Recognizing the role of transportation in advancing social outcomes, equity must be a core consideration when deciding where to make investments in transit and what form those investments should take.

In 2014, Fort Collins conducted a Social Sustainability Gaps Analysis, which sought to understand where service gaps exist in the city and how to address issues relating to housing, poverty, education, transportation and other needs of vulnerable communities. The analysis identified the need for more transportation options as a common theme when evaluating the needs of vulnerable populations in Fort Collins. During stakeholder interviews, lack of weekday-evening and Sunday transit-service was cited as a common barrier to community access. Transfort began providing evening transit-service in the spring of 2014. In the fall of 2017, service began on Sundays and Holidays on core routes. In response to citizen feedback, the city began 365 Service. The 2040 Transit Master Plan seeks to further expand the span and frequency of transit to better meet the needs of all residents in the city. Additionally, Transfort is committed to ensuring that transit is easy and intuitive to use for all members of the community. Transfort will continue to add Spanish to signs, materials, outreach and rider education. Additionally, Transfort will improve its outreach process on route changes to provide more time for people to prepare and to ensure that information is distributed in a bilingual format.

The 2040 Transit Master Plan presents a strong opportunity to address inequity by incorporating vulnerable communities into the planning process, starting with the visioning and prioritization as a part of this Plan. Fort Collins has demonstrated a commitment to advancing social equity, and Transfort is strongly committed to promoting equal access to transit throughout the city. This planning process for the TMP included a thorough public outreach process as described in the Community and Stakeholder Input Chapter. The 2040 Transit Network identified in this Plan provides a significant increase in transit access to all demographic groups.




Access to High-Frequency Transit
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
All Residents
Zero Vehicle Households
Households Experiencing Poverty
Limited English Proficiency Households
Hispanic Population
Employees
Current
2040


TRANSFORT
IF YOU'RE
GONNA BE
DUMB

IMPLEMENTATION STRATEGY

This section outlines the phasing strategy, specific actions and funding options the City will use to gradually implement the 2040 transit vision over time.

“We need to plan ahead and improve public-transit now.”

- Community Member

IMPLEMENTATION STRATEGY

Implementation Costs

The Transit Master Plan outlines the vision and policies for expanding the transit system according to current and future demand, which is not currently funded. The costs over the next 20 years are significant:

Investment	Cost
Capital Projects (pg. 73)	$271 Million to $308 Million
Operations and Maintenance in 2040	$30.5 Million per year

The primary action item in this plan is to conduct a funding study to identify a dedicated and permanent funding source. The funding study will explore options for ongoing funding and capital improvement funds as well as fare structures and a possible fare-free system. Some funding options are outlined on page 92.

Phasing Strategy

The Transit Plan will be implemented in phases over time and provides for flexibility to deviate to some extent from what is shown in the 2040 Transit Network Map. The pace of implementation and potential to deviate from the Plan will depend in large part on major factors and how these three factors play out over the next 20 years. The three factors are:

» **Land-use** - Land-use will be the primary driver in determining when and where new services are planned to be added. High-frequency and BRT service will be added to corridors as infill and new development occurs on those corridors. The Plan also allows flexibility in the transit network so that if the types and mixes of land-use are different than anticipated, the level of transit-service can be adjusted to be consistent with land-use changes. For instance, if the Mulberry Corridor develops into a transit-supportive mixed-use corridor, transit-service can be increased to meet additional demand. Likewise, planned service levels can be decreased if development is less than anticipated.

» **Funding** - Implementation of the Transit Master Plan will require a doubling of revenue service hours as well as significant capital investments. When and how much additional funding will become available in the future will dictate the speed and extent to which improvements can be made. A comprehensive overview of existing and potential funding options and strategic opportunities to grow transit over time are presented later in this chapter. The plan also includes a short-term phasing strategy to address the potential for incremental increases in funding.

» **Technology** - New transportation technologies introduced in the past several years (including ride-hailing services, carshare, bikeshare and electric scooters) have had a significant impact on mobility and travel behavior particularly in urban areas across the country-and Fort Collins is no exception. Advances in future technology could have significant influences on transit demand, mobility options and the cost of providing different transit-services. How and when various elements of the Plan are implemented will depend in part on future technologies and how quickly they take hold. Implementation of the mobility innovation zones are likely to rely on emerging technology including on-demand-type service and potentially autonomous-vehicle technology.

Alternative Outcomes

Alternatives Triggered by Technological Changes

The Plan will adapt as needed to changes caused by advances in technology. For example, if a new type of mobility option starts to shift riders away from less-frequent service, it may reduce the need for those routes. Alternatively, a mobile-device platform that integrates trip planning and fare payment of multiple modes may increase ridership in lower density areas of the city triggering an increase in service provided to those areas. As a third example, advances in autonomous-vehicle technology may reduce the cost of providing transit, allowing for the Plan to be implemented more quickly and more services to be provided in lower-demand areas for the same cost. On the other hand, single- or zero-occupant autonomous-vehicles could lead to significant congestion on key transit corridors, leading to performance issues and the need for additional infrastructure investments to provide reliable service.

Land-use Alternatives

A potential alternative transit-service plan was explored if land-use developed differently than what is currently planned. In this future scenario example, higher-intensity development occurs along the East Mulberry Street corridor instead of the Harmony Road corridor. In response, new BRT service would shift from being implemented along Harmony Road to being implemented along East Mulberry Street, where demand for transit-service will be higher. This example illustrates the flexible approach the Transit Plan will use to phase and potentially alter transit-service if needed over time to match actual (instead of forecasted) land-use growth.

Short-Term Plan

The short-term plan adds some new routes and restructures others, increasing the transit level of service for the Transfort network in terms of frequency and coverage (both local and regional). The short-term plan represents the first phase of service expansion and requires a 33% increase in operating budget to $21 million per year and up to $80 million in capital investment, which will set the City on a path to achieve the 2040 Plan. The list of projects in the short-term plan was developed based on existing transit needs, current land-uses and community feedback. The primary constraint to implementing the short-term plan will be securing funding.

A map of the short-term plan is illustrated on page 87 and includes these major elements:

New BRT and High-frequency Service

- New BRT route on the West Elizabeth Street Corridor
- High-frequency service on Drake Road; restructure to a more direct route alignment
- High-frequency service on North College Avenue

Improvements to Local Service

- New frequent peak service route connecting CSU with East Lincoln Avenue (15-minute peak/30-minute off-peak frequencies)
- New frequent peak service on West Prospect Road
- Frequency on Harmony Road increased to 15-minute peak, 30-minute off-peak
- 30-minute all day frequencies on South College Avenue, South Lemay Avenue south of Harmony Road and Shields Street
- Service to CSU Foothills Campus realigned to connect with the West Elizabeth BRT; frequencies increased to 30-minute, all-day service

Mobility Innovation Zones

- Transfort will work with the private sector to pilot microtransit or on-demand service in the southeast area of the city as the first phase of implementing the mobility innovation zones

Mobility Hubs

- A new mobility hub will be added to the Harmony corridor to complement a mobility innovation zone.

Regional Transit

- Service increased on the FLEX
- New regional route to Windsor and Greeley (operated by GET)
- New regional route to Wellington

Accomplishing the short-term plan will require a financial commitment from the City and public. It will require a 33% increase in operating budget (from $15.8 million annually in 2018 to $21 million, excluding inflation) in order to achieve a 34% increase in bus service hours. It will also require capital investments to expand the fleet, expand the maintenance facility, improve bus stops, and make speed and reliability improvements to add new BRT service along West Elizabeth Street which will cost up to $80 million depending on the level of improvements. Potential strategies to increase funding to support the short-term plan are identified later in this chapter.

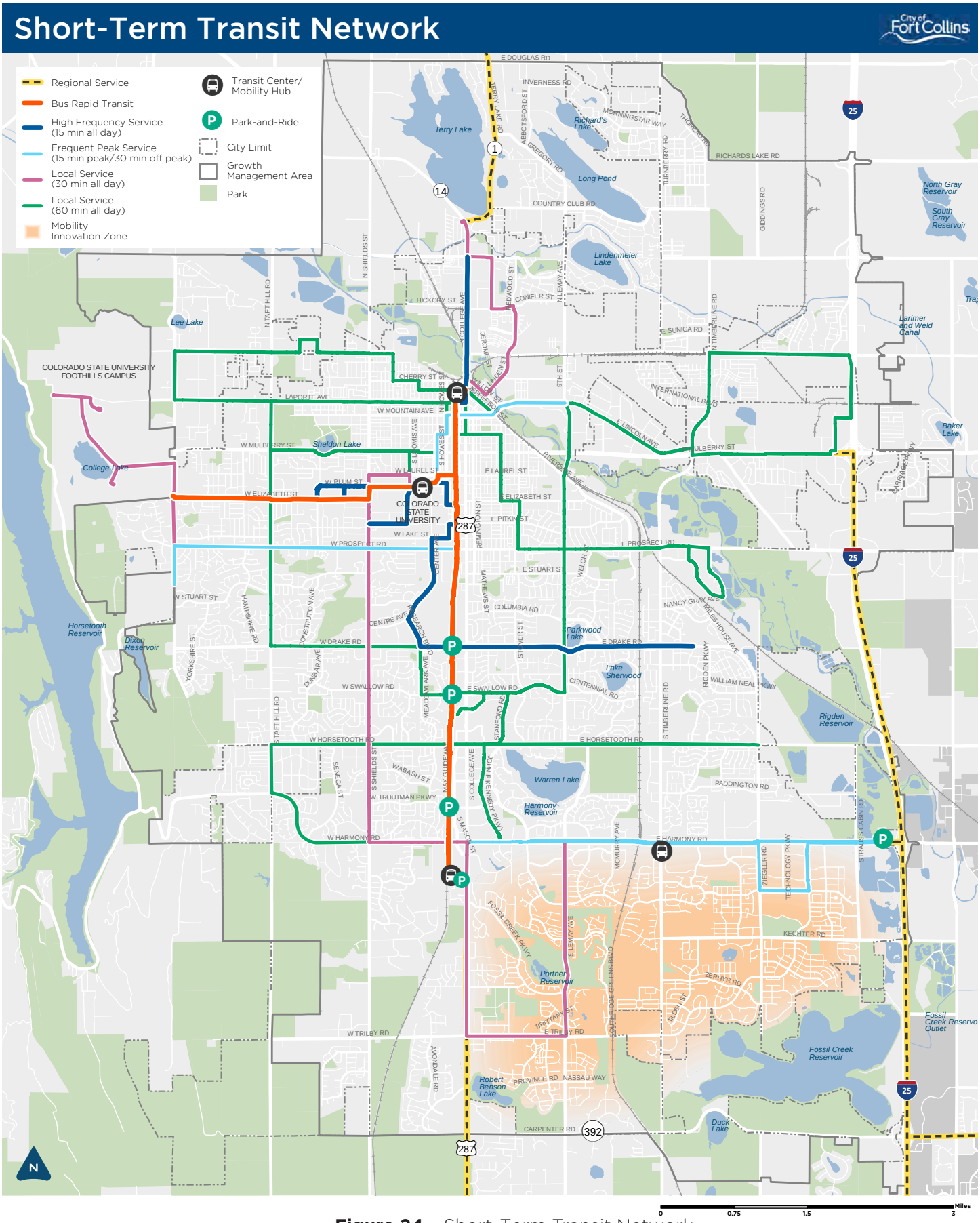


Figure 24 – Short-Term Transit Network

Actions

Evolving Fort Collins' transit network to meet the changing land-use patterns and travel needs of the city cannot be completed overnight. This section provides a series of actions to implement the Transit Master Plan over time. The specific actions are all tied to achieving an outcome and are categorized by major topic areas. In addition, order of magnitude costs, approximate timing and how success will be measured are all outlined. Since many of the action items are related to City Plan and Transportation Master Plan policies, any relevant/related strategies are also listed so that there is a clear link between Transit Master Plan implementation and advancement of these other important City plans. **The advancement of the actions listed below are contingent on funding, land-use changes and the development of partnerships with other organizations.** Also, many of the projects have natural synergies with others such as piloting in *Mobility Innovation Zone* in Southeast Fort Collins, implementing a *Mobility Hub*, and introducing high-frequency service to East Harmony Road-projects such as these should be implemented together. Transfort will continually review the actions in this list and revise priorities in response to opportunities that arise. This constant review and adaptation are consistent with the spirit of the Transit Master Plan as a living document.

CATEGORY	OUTCOME	ACTION ITEMS	COST ($: <1M $$: 1-3M $$$: >3M)	PRIORITY/ TIMING	MEASURE OF SUCCESS	RELATED CITY PLAN OR TRANSPORTATION MASTER PLAN STRATEGY/POLICY
Regional Transit Connections	Improve regional connections	Improve FLEX service through collaborative planning with Loveland, Berthoud, Longmont and Boulder	$	Ongoing	Increased FLEX ridership	T-4e
		Support CDOT in planning, development and implementation of other intercity transit-services including Bustang expansion and intercity rail	$	Ongoing; long-term for intercity rail	Increased Bustang ridership; future intercity transit between Fort Collins and other Front Range cities	T-4f
		Provide regional transit-service to Greeley, Windsor, Laporte, Wellington and other communities	$$	Ongoing/ short-term	New regional transit connections	T-4b, T-4c
	Explore more extensive regional transit integration	Work with neighboring transit agencies on regional fare integration and reciprocity	$	Short-term	New regional fare policies and cross-agency fare reciprocity	T-5e
		Study potential benefits of consolidating transit service or establishing an RTA	$	Short- to medium-term	Study complete; recommendations for next steps	T-4b, T-4c, T-4e, T-4f
BRT	West Elizabeth Corridor	Develop a funding plan to build improvements and implement BRT on West Elizabeth	$$$	Short-term	Funding secured, service operational	T-5f
	North College Corridor	Prepare a detailed BRT corridor study to identify specific capital needs and operational characteristics	S	Short-term	Study complete	T-5g
		Develop a funding plan to design, build improvements and implement BRT on North College as transit-supportive uses develop	$$$	Medium- to long-term	Funding secured, service operational	T-5g
	Harmony Corridor	Develop a funding plan to design, build improvements and implement BRT on Harmony as transit-supportive uses develop	$$$	Medium-term	Funding secured, service operational	T-5g

CATEGORY	OUTCOME	ACTION ITEMS	COST ($: <1M $$: 1-3M $$$: >3M)	PRIORITY/ TIMING	MEASURE OF SUCCESS	RELATED CITY PLAN OR TRANSPORTATION MASTER PLAN STRATEGY/POLICY
Transit-service Evolution	Leverage partnerships to grow transit ridership	Continue collaboration with CSU on transit and mobility enhancements that can be implemented through a partnership	$	Ongoing	Optimized CSU transit-service, increased CSU ridership	T-4g
	Revise bus routes and services	Gradually restructure the transit system to provide a better balance between coverage and productivity, while responding to changing land-use; include introducing new BRT and high-frequency bus service, enhanced connections, and innovative mobility services for lower density areas	$-$$$	Ongoing	As development occurs and new funding becomes available, routes are revised to reflect the future transit network	T-5a
	Implement Innovative Transit-services	Identify potential partnerships between transit and other mobility providers to pilot on-demand options (such as microtransit) in mobility innovation zones; this would be completed in conjunction with the implementation of new mobility hub(s)	$-$$	Short-term	Mobility Innovation Zone pilot launched (in conjunction with a mobility hub)	T-8a
		Explore new partnerships for Dial-A-Ride services; study a new real-time reservation system	$	Short-term	Study complete	Policy T-5.10
		Develop a plan and seek funding for increased deployment of intelligent transportation systems (ITS), connected vehicle infrastructure, and transit signal priority	$$	Short-term	Plan complete and deployment of ITS and other infrastructure	T-3n, T-8b
		Pilot a transit signal priority system to evaluate benefit to riders and transit operations	$$	Short- to medium-term	TSP pilot complete	T-8b
		Develop a fleet replacement and technology plan to identify when to replace vehicles and the technologies to be considered in new fleet procurements	$	Short-term	Plan complete	T-5d, T-3g, Env-4l
		Develop MaaS roadmap once the types of services, technologies, and use cases stabilize	$	Long-term	MaaS roadmap complete	T-3c, T-5e
	Revise transit-service performance metrics to track progress	Update transit-service standards, metrics and performance criteria to match the new services outlined in the Transit Master Plan; regularly evaluate progress and inform future actions	$	Short-term	Updated service standards and regular updates	T-5h

CATEGORY	OUTCOME	ACTION ITEMS	COST ($: <1M $$: 1-3M $$$: >3M)	PRIORITY/ TIMING	MEASURE OF SUCCESS	RELATED CITY PLAN OR TRANSPORTATION MASTER PLAN STRATEGY/POLICY
Transit-service Evolution	Update bus stop design standards and guidelines	Update bus stop design standards and guidelines	$	Short-term	Document updated and adopted	Policies T-5.5, T-9.11
	Develop Transit Infrastructure Design Standards and Guidelines	Develop a design-guidelines document on transit infrastructure, including high-frequency routes and mobility hubs	$	Short-term	Document completed	Policies T-3.11, T-5.1, T-5.2, T-5.4
	Expand Transit Facilities	Prepare a study to expand capacity at or near the Downtown Transit Center and seek funding to implement	$$-$$$	Short- to medium-term	Study complete, expanded Downtown Transit Center	Policy T-5.5
	Expand Transit Facilities	Identify and implement a pilot mobility hub that can support a pilot Mobility Innovation Zone	$-$$	Short-term	Pilot innovation zone and mobility hub implemented	Policy T-3.11
Maintenance and Operations	Expand Maintenance Base	Seek funding and develop a plan to expand and potentially relocate the maintenance facility to accommodate a larger transit fleet	$$$	Short-term	Expanded maintenance base	T-5c
	Expand Fleet	Seek funding to expand the fleet to support expanded transit-services	$$$	Ongoing	Expanded Fleet	T-5d
Funding	Identify funding for the Future Transit Network	Develop a study that identifies funding strategies, mechanisms, and recommendations to implement the Future Transit Network	$	Short-term	Study with recommendations completed	T-5b
	Increase operating funding to support expanded service	Develop a funding strategy as recommended by the funding study noted above	$	Short-term	New funding secured	T-5b
	Secure capital funding for major infrastructure needs	Identify grants and develop a funding strategy as recommended by the funding study noted above	$	Short-term	New funding secured; implement new major capital projects	T-2d, T-5b
Supportive Strategies	Boost transit ridership through transportation demand management	Seek funding to provide City support of local and regional employer commute trip-reduction programs	$	Short-term	Expanded commute trip reduction programs	T-5e, T-8n

Promotion, Education, and Marketing

Promoting transit is a key part of the City's travel demand management strategy and is consistent with the City's Climate Action Plan. In 2014, Transfort published its 2014-16 Marketing Plan, updated annually, which summarized how the Transfort brand can be grown and managed to achieve the agency's goal of modern and easy transit that is widely valued by the community. Within the Marketing Plan, target populations, specific strategies and ways to track success are highlighted. All represent best practices for any organization that needs to stay visible amid a field of other options. The Marketing Plan is supported by the Transfort Brand Management Guidelines, which has resulted in a strong identification, particularly with buses, stations and products related to the MAX Bus Rapid Transit System.

Moving forward, Transfort should continue to monitor the effectiveness of its marketing and promotions activities and regularly update the Marketing Plan. As mentioned elsewhere in this Transit Master Plan, the mobility environment is changing rapidly and the modes that compete with and complement transit are constantly shifting. Additionally, Transfort's primary rider base and the most-likely new riders are likely to shift over the years as there is more concentrated development along transit corridors and as more people begin to move away from cars as the default choice for all trips. Thus, the marketing program needs to be flexible and nimble to adjust to changes in mobility needs.

One area for potential improvement relates to the use of survey data. In 2017, Transfort completed a transit-passenger survey for bus and Dial-A-Ride riders. This survey included several important questions about rider perceptions of the service ranging from safety and cleanliness to frequency and span of service. While some of these issues were identified in the Marketing Plan, a closer link could help make sure that Transfort's messaging addresses negative perceptions while leveraging strengths of service. In addition to surveying transit passengers, Transfort should also consider surveying nonriders because people who do not use transit typically have a very different perception of transit-service. The City's Community Survey provides a broad citizen evaluation of public transportation, and customer satisfaction has been increasing steadily since 2006. A more in-depth nonrider survey could help to identify misconceptions of nonriders to help improve the agency's image, and where there are overlapping perceptions (both positive and negative) from passengers and nonriders, this can be a particular focus for improved marketing and outreach.

Another area of potential improvement involves educating the community at large about transit: service changes, how to ride, its environmental benefits, health benefits, and ability to work or relax while traveling. Education should start in schools, potentially integrated with the City's Safe Routes to Schools Program. Educational material should also be bilingual to reach the Latinx community.

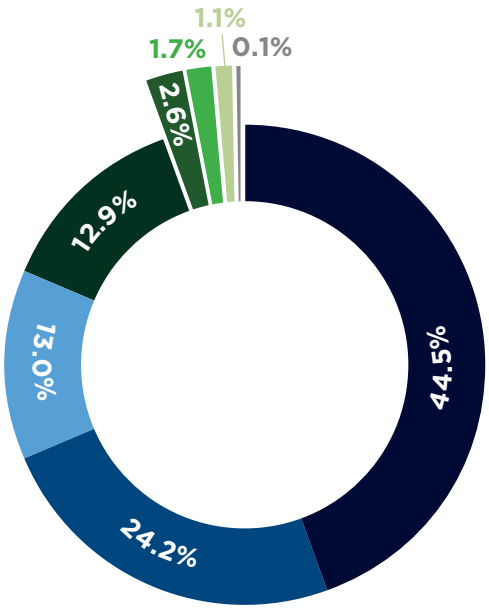
Lastly, special transit-service to events such as CSU games provides a great opportunity to showcase Transfort to people who might not otherwise ride transit. Looking for more opportunities to introduce transit to people is something that transit agencies are increasingly looking to do. For example, King County Metro in Seattle recently took one of its new battery electric buses to a technology conference in the suburban part of the city. As part of the conference, people had the opportunity to ride on the bus between the conference location and the rapid charging station at one of the region's major transit centers. Given the location of the conference, many attendees had not ridden on a bus in a long time and they were exposed to how transit is modernizing and how extensive transit is-even in a suburban setting. While marketing is a key component, investing in the infrastructure to support the 2040 Transit Network is the most important component in increasing transit-mode-share.

Funding

To meet the transit vision outlined in this Plan, Fort Collins will need to expand the revenues dedicated to transit-service in the City. This section summarizes Transfort's current funding and highlights strategies that can be used to raise additional transit revenue, which will be explored in depth with a funding study (see Action Items). Given the need for voter and/or City Council approval for any revenue increases for transit, additional studies will be required to determine how to best fund future transit in Fort Collins.

Existing Funding Sources

The chart below provides a summary of the Transfort's operating budget for 2018. Nearly three quarters of Transfort's budget is from local sources, including 45% originating from the General Fund (which is generated mostly from sales taxes, government fees and property tax), 13% from partner contributions mostly with CSU, and 12.9% from the Keep Fort Collins Great (KFCG) sales tax, which sunsets in 2020 unless renewed. About 24.2% of Transfort's budget is provided from state and federal sources (of which a substantial portion goes to capital costs, including purchasing buses). Fares and fees exclusive of CSU and business contracts account for less than 3% of the operating budget.



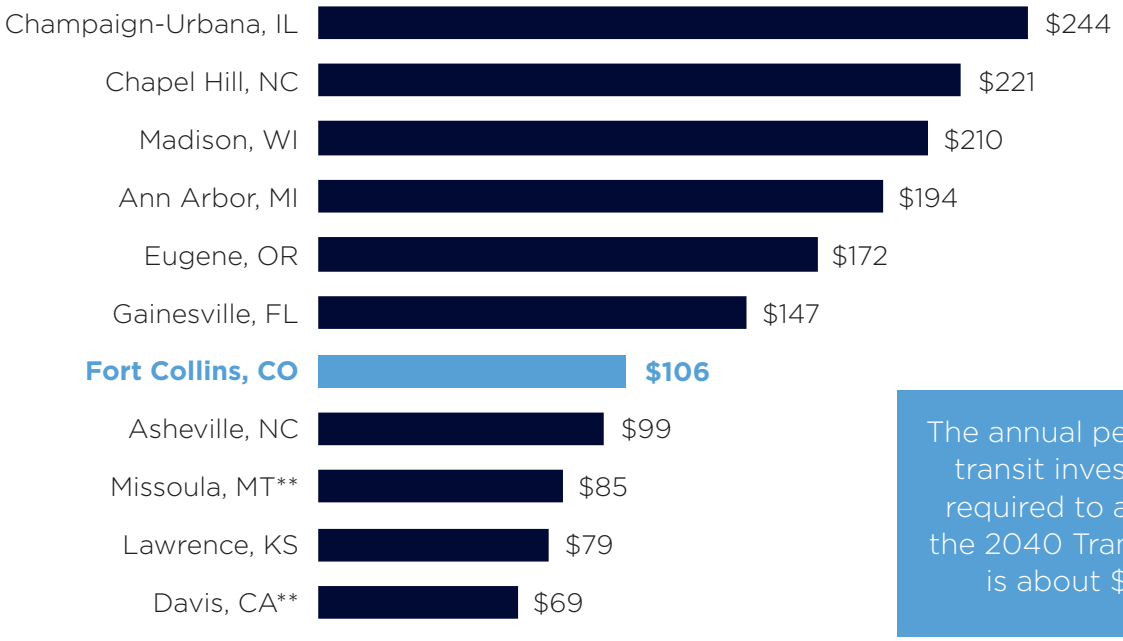
SUM OF PERCENT OF REVENUE

- General Fund (44.5%)
  - KFCG (12.9%)
- Federal Operating (24.2%)
- Agreements and Partner Contributions (13.0%)
- Fares and Fees (2.6%)
- Advertising (1.7%)
- State Operating (1.1%)
- Miscellaneous (0.1%)

Peer City Funding Comparison

The chart below provides data on the annual funding that peer cities expended per capita in 2016 to provide transit-service to the community. Fort Collins falls in the lower half of the spectrum, illustrating the opportunity to continue to increase investment in transit in the future. In general, the communities that have invested more in transit also see higher productivity.

PEER CITY ANNUAL TRANSIT INVESTMENT PER CAPITA (2016)*



The annual per-capita transit investment required to achieve the 2040 Transit Plan is about $133.

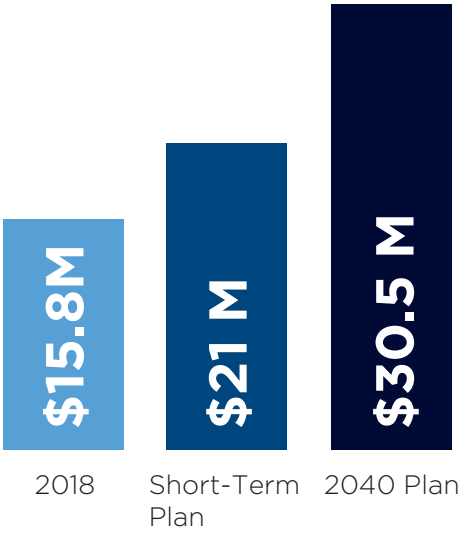
*Additional information on peer city performance can be found on page 18.

**Transit agency is operated partially or entirely by the local university.

Funding Strategies

Achieving the transit vision and growing ridership will require a doubling of revenue service hours by 2040 as well as several major capital investments. This section will serve as an introduction to the Transit Funding Study which is a primary action item of this plan. The City's portion of operating expenses to implement the 2040 Plan are expected to roughly double from $15.8 million per year in 2018 to $30.5 million per year in 2040 (both in 2018 dollars). This will require developing a strategy to increase funding for transit over time. In addition to the existing revenue sources, there are a number of additional sources Fort Collins could tap into in order to fund future services. It is unlikely that just one of these options would fully secure the necessary funds for this Transit Plan. Instead, it is more likely that several of the following strategies would be used, each providing incremental additional funding that, when added together, would result in a comprehensive funding package.

OPERATING EXPENSES (CITY PORTION)



» **Higher Sales Tax** – Given the population and number of regional retailers in Fort Collins, a small increase to the sales tax has the ability to generate a large amount of revenue. This would require voter approval. A well-crafted transit tax that identifies specific projects and services and how the community will benefit typically stands a better chance at passing a public vote. Using just a sales-tax increase and no additional funding sources beyond what is provided today, an additional sales tax of about 0.45-0.5% (1/2 cent or 45-50 cents per $100) would be needed to fund the estimated operating costs (excluding capital costs) of the 2040 Transit Plan.

» **New Partner Agreements** – Negotiating new agreements to provide bulk-rate discounted passes for apartment complexes, school districts, existing business districts (such as the Downtown Development Authority), business parks and other entities presents an opportunity for the City to increase both ridership and farebox recovery. Bulk-pass programs are typically more successful at generating revenues than seeking to have all the bulk-pass participants purchase a monthly/annual pass themselves. Transfort already has a bulk-pass program in place with CSU and employee-pass program called FortPass, which offers bulk passes at a 68% discount. Another successful example of this comes from RTD's EcoPass, which is a bulk-rate discounted pass offered to hundreds of businesses and neighborhoods throughout the Denver Region, and accounts for a substantial portion of system ridership and about 4% of revenue (22% of fares). Transfort also uses partner agreements to fund special services and to enhance service frequencies on certain routes.

» **Transportation Utility Fee** – A utility similar to those established fees for gas and electricity could be implemented to fund transit or transportation. Existing fees on the electric utility could also be increased. Utility fees can be established without a public vote and can generate significant revenues, but at a higher cost burden per household than sales tax, which also generates revenue from nonresidents. Because the fee is citywide, transit-service would become fare-free. A major benefit of utility fees is stability. Sales tax can vary considerably due to economic cycles and even seasonal weather patterns. Utility fees tend to be stable.

TRANSPORTATION UTILITY FEE CASE STUDY:

Transportation utility fees are commonly used in communities across the county. Corvallis, OR uses a transportation utility fee to fund its transit system and operates fare-free. The City charges on a per-month basis just over $2 for multifamily customers, just over $3 for single-family customers and varying amounts for commercial entities. The fee system is mostly on trip-generation estimates, and fees are updated annually to meet revenue needs.

» **Transportation Capital Expansion Fee (Street Oversizing Fund)** – This is a one-time fee that is assessed on new development to support the construction of transportation infrastructure in Fort Collins. This fee cannot be used to support ongoing transit operations, but it can be used for fixed capital costs such as BRT infrastructure, the maintenance facility expansion, mobility hubs, and speed and reliability improvements. The Transportation Capital Expansion Fee also has to be allocated to implement capital improvements for other modes (roads, sidewalks, bike facilities). Therefore, its ability to raise substantial transit capital revenue is somewhat limited. However, many communities use similar "impact fees" as effective ways to leverage state and federal grants, thus multiplying the benefit of this type of fee. Currently, this fee is not used for transit capital projects, but it could be expanded to do so. Note that impact fees are highly volatile and can be high during strong economic times and very low during recessions.

» **Public-Private Partnerships** – Fort Collins already established itself as an innovator in this respect through a recently established partnership with a private sector taxi company to supplement its on-demand and Dial-A-Ride service. This partnership allowed Transfort to offer a better service at a lower cost. Public-private partnerships with new mobility services, including microtransit providers, TNCs and autonomous-vehicle transit-services would be a great opportunity to pilot new service as part of future Mobility Innovation Zones. There may also be opportunities to partner with the private sector to integrate fare payment, trip planning and other mobile device technologies with other agencies and modes.

» **Payroll or Business Head Tax** – A substantial funding source for transit in the Portland, OR area (and in Oregon in general) is a payroll tax deduction. This is in part because Oregon does not have a sales tax, which is a primary source of transit funding in most of the country. In addition, this type of tax is seen as a way for businesses to help pay for a share of transit since there are not many other transit taxes that are suited just for employers. Locally, Denver implements a similar business head tax on most employees to generate revenue for city facilities and services. This could be an option for Transfort to collect a portion of revenue from the employee market.

BUSINESS HEAD TAX CASE STUDY:

Through what is called the Occupational Privilege Tax, Denver assesses about $9 per employee per month on all employees who earn at least $500 per month. The fee is partly paid by the employee and partly paid by the employer to fund city facilities and services. It was first enacted in 1969 and in 2015 this tax generated over $50 million in revenue for the city.

» **Additional Advertising** – Transfort already contracts with a media advertisement agency, which generates slightly less than 2% of operating costs. Transfort will explore opportunities to expand advertising revenue as it is generally easy to administer, but it should be acknowledged that advertising will never be a major generator of transit revenue.

» **Increased Farebox Recovery** – When combined with contracts with CSU and others, Transfort's farebox recovery rate in 2018 was about 16% (only 3% if those contracts are excluded), which is lower than most transit agencies of this size. Setting a goal of increasing Transfort's farebox recovery would generate additional revenue for expansion, but higher fares tend to reduce ridership. Three primary strategies would help Transfort increase its farebox recovery over time: increasing the productivity of routes; expanding the bulk-rate pass program to additional partners; and increasing fares. While increased fares can help to quickly generate new revenues (fare increases can be quickly recovered, whereas some taxes such as sales/utility can take many months to realize gains), the ridership impacts erode some of the benefit of the fare increase. Bulk rates (if negotiated well) can have stronger impact on revenues and less of an impact on ridership (assuming that many bulk-pass buyers do not leave the system). Given impacts to ridership and equity, this plan warrants caution about increasing transit fares in general, but potential changes to bulk-rate pass prices or increases to regional services (such as FLEX) could be explored.

» **Improvement Districts** – An improvement district can be considered for generating revenue for capital improvements within a defined area. Increases to property taxes would need to be confirmed to be within the state's maximum property-tax levy. Improvement districts can generate substantial revenues, but property taxes are often difficult to win voter approval.

Fares

Transfort's standard fare is $1.25 per ride, including transfers. Transfort also offers discounted passes to people who qualify, as well as a variety of passes, including a deep-discounted, bulk-purchase employees pass called PassFort. Combined, all of the revenue generated by fares and passes account for less that 3% of the annual operating budget. Through an agreement, ASCSU and CSU funds about 13% of the annual operating budget for Transfort, which allows CSU students, staff and faculty to ride for free. When the contract with CSU is included, Transfort's farebox recovery (the portion of operations directly funded by riders) is about 16%.

Compared with other similar-sized cities with a major university, Transfort's farebox recovery is on the low end of the spectrum. The primary reason for the higher farebox recovery in some of the other cities because the universities in those communities fund a higher percent of the service. For example, the University of Florida funds more than 50% of the Regional Transit System in Gainesville. To a lesser extent, higher farebox recovery is achieved because more service is provided with higher productivity.

Converting to a Fare-Free System

Excluding the contracts with CSU and others, fares only account for 3% of Transfort's operating budget. Given this, as one of the action items under the Funding Strategy, Fort Collins will explore converting the transit system to fare-free. Research has shown there is a strong elasticity between fares and ridership. Fares can be a big barrier to potential riders, both from the financial burden and inconvenience (finding exact change, etc.). Converting to fare-free would probably lead to increased ridership and productivity across the system, which would help with Fort Collin's mobility, climate action and environmental goals. Fare-free would also increase speed and reliability of service, save administrative costs and substantially increase equity of the system by providing greater access to the service for people with all income levels. Some of the barriers to fare-free transit include the need to make up for the lost fare revenue (which might require cuts in service), the added cost of fully funding Dial-A-Ride services, and political sensitivities about transit riders getting an outsized subsidy from the public.

Several examples of fare-free systems in the U.S., includes Chapel Hill NC, Missoula MT, and Corvallis OR. Chapel Hill is the largest in the country with annual ridership more than 6 million and annual operating expenses of about $18 million. Chapel Hill and Missoula still report a farebox recovery because the Universities still fund a portion of service. Fort Collins could convert to fare-free while still preserving much of its farebox recovery by utilizing a similar funding model. Following the model of other Cities it's likely that Transfort would need CSU to be a strong partner and potentially contribute an even-larger share to allow the system to operate fare-free. CSU would benefit from this partnership through increased investment in the transit system, particularly along corridors heavily used by CSU students and staff, such as the plan to add BRT to the West Elizabeth Street corridor.

Fare-Free Case Study: Chapel Hill, NC

Chapel Hill operates the largest fare-free transit system in the country, with more than 6 million riders in 2017. The City decided to convert their system to fare-free in 2002, based in part on their low farebox recovery (around 10%). Prior to Chapel Hill's conversion to fare-free a sizable chunk of its funding was provided by the University of North Carolina. In order to convert to fare-free, the City was able to negotiate with UNC to pay for a larger amount and received additional contributions from the public. Recent revenue show that close to 40% of operating costs are covered by UNC, with about 25% funded by taxpayers through property tax and vehicle-registration fees and another 25% to 30% coming from state and federal sources.

Fare-free transit has been immensely popular among the community. However, converting to fare-free did not come without obstacles. First and foremost, it required the support of the community and UNC. Second, conversion to fare-free occurred in conjunction with a 20% increase in transit-service and would probably have not worked without increasing service. Lastly, extra funding was also needed to support the City's paratransit-service. The benefits have been numerous, including a dramatic increase in ridership, increased access to jobs among the community, congestion mitigation and faster boarding.

Regional Transportation Authority / Regional Transportation Partnerships

Fort Collins and the surrounding cities of Loveland and Greeley each operate their own transit systems. In addition, cities to the south such as Longmont and Boulder are part of the Denver Regional Transportation District (RTD). The proximity between Fort Collins and the neighboring transit agencies, along with the trend in this plan for more regional service prompts the question of whether Transfort and neighboring transit providers should consolidate into a regional transportation service. Colorado law allows for the formation of a Regional Transportation Authority (RTA), of which there are five in the state. RTAs are allowed to collect fees, fares and taxes to fund transportation capital and operations projects, including transit.

In general, RTAs offer the benefit of consolidating separate transit operations into a single agency, with the potential for less overhead and a larger scale than can be beneficial for purchasing vehicles, attracting competitive bids, and securing grants. The downside is that the individual communities will have less control of local service than they did when they were independent.

In 2013, Transfort and neighboring communities led a North Front Range Transit Vision Feasibility Study. The purpose of the project was to explore and analyze the tools available for potential integrated regional transit-services and operations, governance and decision-making, with the aim of improving transit-service, increasing ridership and improving transit's overall cost-effectiveness for the citizens of the North Front Range. The study evaluated a number of different service options and governance options, including Intergovernmental Agreements (IGAs), Regional Service Authorities (RSAs), Regional Transportation Authorities (RTAs), Special Districts and Special Statutory Districts. The study recommended moving forward with initial integration of fixed-route and paratransit operations of Transfort and COLT, resulting in a new regional transit-service entity through the execution of an intergovernmental agreement between the Cities of Fort Collins and Loveland.

At this point, with Transfort's future vision largely focused on improving transit-services within the City and supporting future City growth, consolidating into a larger RTA or annexing to RTD may not be practical at this time. However, working with regional partners to increase efficiencies, expand regional transit-service and grow regional ridership will be important. Some of the current regional partnerships Transfort has successfully engaged in to expand regional transit-service and quality include:

» Partnership formed to fund the planned Poudre Express regional bus service between Greeley and Fort Collins, with stops in Windsor (to be operated by Greeley-Evans Transit).

» Integrated paratransit contract with Loveland through the IGA that was established with Loveland.

» City of Loveland contracts with Fort Collins to provide Transit Management Services in the form of a Transit Manager that remains an employee of the City of Fort Collins.

» Work is underway to begin limited-fare integration, with a long-term goal of full-fare integration after the Poudre Express becomes operational in 2020.

» Existing partnership with CDOT's regional Bustang service. Transfort provides a bus bay at the Downtown Transit Center for Bustang arrivals and departures.

» Transit agencies have mutual aid agreements, and Greeley-Evans Transit supported Transfort's CSU Game Day service in 2017 with vehicles and operators.

As the communities of the North Front Range continue to expand regional transit-service and coordinate or combine services, a thorough study of the feasibility of an integrated transit system should be conducted.

Alternative Transit Funding Strategies

While not all of these ideas could work without legislative changes in Colorado or major changes in how Fort Collins manages and funds mobility, below are some ideas of how other agencies have funded transit-service expansions. Keep in mind that most transit systems use a diverse blend of funding that mixes taxes, fares, fees and grants to fund operations and capital expansion.

- **Tolls, Congestion Fees, Road-User Charges** – While local roadway tolls, congestion fees or cordon charges may be a long time in coming to Fort Collins, areas that have such charges often dedicate a substantial amount of the revenues to transit in the funding of either new service or capital projects. Examples include express toll lanes in Northern Virginia and suburban Seattle and toll revenues in the San Francisco Bay Area and New York City.

- **Vehicle License Fees** – Sound Transit in the Seattle region recently funded a major transit expansion, in part through a significant increase in vehicle license fees. FASTER federal grant funds have been used for capital projects and operating transit-service of statewide significance.

- **Ride-Hailing Fee** – The Chicago Transit Authority is charging a 20-cent fee on every ride-hailing trip in the city to help fund maintenance projects on the transit system. Portland, OR is considering a similar fee to mitigate downtown traffic congestion and fund increased peak-period transit-service.

- **Property Tax** – AC Transit in the San Francisco Bay Area receives a substantial portion of its operational funding through a series of dedicated property-tax levies.

- **Parking Fees** – Parking fees, either through taxes on parking revenues or special property taxes on land devoted to parking, are used in Europe and Australia to fund transit. The idea is that land/income devoted to, or generated from, parking should be used to fund mobility options for those who otherwise are not benefited by parking.

- **Gas Tax** – Twelve U.S. states and most Canadian provinces levy a portion of the gas tax to fund transit operations.

Case Study – Sound Transit and its sister agency, King County Metro have seen dramatic ridership increases over the past several years. During the same time, most transit agencies in the United States have seen declining ridership as incomes have risen, gas prices have been stable and used-car prices have fallen. In 2016, the voters in the Puget Sound Region of Washington voted for a major $54 billion expansion of regional rail and bus service that includes major capital projects and perpetual operational funding. The financing for the transit expansion was a combination of a new sales tax (which required state legislative approval), property taxes and vehicle-license fees. The most controversial portion of the tax was on vehicle-license fees, which more than tripled in some cases. Overall, the tax proposal passed easily, 54% in favor to 46% opposed. Rapid growth, increasing traffic congestion, and topographical constraints that concentrate growth into dense areas helped to convince voters that transit expansion is required to accommodate future growth in the region.


max

PERFORMANCE MEASURES AND MONITORING

Transfort's current Service Standards and Policies articulate the measures that are used to set service levels and evaluate proposals for new service. The standards are also used to regularly analyze and evaluate the performance of existing services and to determine whether it is appropriate to add new services. The transit improvements proposed in this Plan will introduce new types of services, which in turn will require changes to the ways that Transfort measures and monitors performance and considers when to expand service.

“Increase service frequency (like the Max), especially from residential areas. ”

- Community Member

PERFORMANCE MEASURES AND MONITORING

Overview of Existing Service Standards

At present, Transfort classifies its services into five types:

- **Rapid Transit Route** - These routes operate in a dedicated guideway through dense employment areas, at high frequencies. These routes make limited stops offering direct service. Existing example: MAX.
- **Commercial Route** - These routes provide a basic level of transit access throughout the city and operate in all periods. These routes operate primarily in arterial corridors. Commercial routes operate at a frequency of at least 60 minutes. Existing example: Route 16 - Harmony Road.
- **University Route** - These routes service high-demand, densely populated areas near CSU, with direct service to campus. These routes are held to high standards to justify their limited market. University routes operate at a greater frequency when school is in session. Existing example: Route 31 - Plum Street.
- **Residential Route** - These routes largely serve residential areas in the community. Existing example: Route 9 - Laporte Avenue.
- **Regional Route** - These routes operate primarily outside the city, with limited stops to expedite commuting between communities. Existing example: FLEX

For each type of service, Transfort defines service design standards, sets minimum-service levels and monitors performance based on the number of passengers per vehicle revenue hour and vehicle revenue mile. It also sets standards for on-time performance and defines the types of amenities that should be provided.

Service Availability: Transfort currently determines where to provide service based on a number of factors. These include:

- Population density (current and projected)
- Employment density (current and projected)
- Service-area characteristics (age, income, vehicles per household)
- Opportunity for timed transfers
- Destinations:
  - Employers or groups of employers with 300 or more employees.
  - Hospitals/Nursing Homes, which typically do not attract a large number of trips but often serve those who depend on transit.
  - Colleges/Schools: Students comprise a major segment of Transfort's ridership, and institutions with an enrollment of at least 1,000 students warrant consideration of service.
  - Shopping Centers with more than 100,000 square feet of leased retail space. Mixed-use retail and office complexes can also be included in this category.
  - Social Service/Governmental Centers that serve at least 100 clients per day.

Directness of Service: Transit riders want service to be relatively direct. Transfort has two standards designed to ensure that this will be the case:

» Deviations from a direct path from end-to-end of the route shall account for no more than one-quarter of the end-to-end travel time of the route.

» For a specific deviation, the total additional travel time for all passengers should not exceed three minutes for each rider boarding or alighting along the deviation.

Productivity: Transfort measures productivity in two ways: passengers per revenue vehicle hour and passengers per revenue vehicle mile. "Satisfactory levels" range from 20 to more than 40 passengers per hour and one to six passengers per mile:

» Rapid routes: At least 41 passengers per vehicle hour and six passengers per mile.

» Commercial, Residential and Regional routes: At least 20 passengers per vehicle hour and three passengers per mile.

» University routes: At least 30 passengers per vehicle hour and six passengers per mile.

Transfort does not currently measure its FLEX regional service differently than local routes. However, given the long distances and limited stops, a better measure would be passenger miles per revenue hour.

Vehicle Loads: Transfort sets loading standards to ensure that buses do not get overcrowded. For most service types, loads should not exceed 125% of seated capacity during peak periods (150% for Rapid Routes) and seating capacity during off-peak periods. When trips exceed these levels, additional service should be provided. For example, during peak times with bad weather, buses operating along West Elizabeth Street often warrant a trailer bus (an additional bus to provide capacity).

Service Frequency: Transfort sets minimum service frequencies for each service type that is intended to balance convenience with productivity levels:

» Rapid routes should operate at least every 15 minutes during peak periods and 30 minutes during off-peak periods.

» University and Residential routes should operate at least every 30 minutes during peak periods and 60 minutes during off-peak periods.

» Commercial routes should operate at least every 60 minutes during both peak and off-peak periods.

» Regional routes with at least two trips in both the AM and PM peak periods.

On-Time Performance: Transfort defines on-time as ranging from one minute early to five minutes late, which is a common definition. Based on this definition, at least 90% of trips should operate on-time during peak periods and 95% during off-peak periods. While this metric was intended for transit center departures and arrivals, Transfort has been measuring this standard at bus-stop timepoints. As a result, the standard is very difficult to meet and should be revisited and revised to a figure more in line with industry standards, which is typically 75% to 80% schedule adherence.

In addition, trips are sometimes not run or completed for various reasons, including mechanical problems, traffic problems and other types of incidents. Transfort has a standard that 99% of buses should at least start service (i.e., "pull out of the garage") and that 98% of total trips should be completed.

Distribution of Transit Amenities: Transfort desires to provide shelters at as many bus stops as possible. In the short and medium term, priority for upgrades is given to bus stops with a high-volume of usage by boarding passengers; and proximity to schools, seniors, person with disabilities, low-income individuals and CSU students and staff.

Changes to Reflect Proposed Services

The proposed service improvements will result in changes to the types of services that Transfort operates. Future service types will include:

» **BRT,** which will be similar to the current MAX route but would also include BRT-such as service but without exclusive bus lanes (proposed routes on North College Avenue, West Elizabeth Street, Harmony Road).

» **High-Frequency,** which would provide frequent service in other major corridors, including routes that are now classified as University routes.

» **Frequent Peak,** which would provide frequent peak-period service but less-frequent off-peak service.

» **Local,** which would be similar to today's Commercial and Residential routes.

» **Regional,** which would be the same as today's regional routes

» **Mobility Innovation Zones,** which would be a new type of lower-volume service designed to serve lower-density areas.

SERVICE CLASSIFICATION	PEAK*	MIDDAY	EVENINGS/WEEKENDS
BRT	10	10	15
High-Frequency	15	15	30
Frequent Peak	15	30	30
Local	30	30	60
Regional	3 Morning and 3 Evening Trips	N/A	N/A
Microtransit / Mobility Innovation Zones**	15-30	15-60	TBD

*Peak periods cover the AM and PM commuting periods, midday is between the two commuting periods, evenings are after the PM commuting period and can also cover early-morning service. Specific times of each period vary by route and will be determined through more specific route planning efforts.

**Depending on the type of transit-service provided in mobility innovation zones, the service-frequency standards could vary. For on-demand services, frequency is replaced by wait time as the measure of transit availability. Typically, transit agencies seek to have on-demand wait times of 15-20 minutes or microtransit shuttle frequencies of 20-60 minutes.

New service standards will need to be developed for the new service classifications. In most cases, these will be very similar to the existing standards, since Transfort's existing service standards are state of the practice. Minimum-service frequencies have been developed as part of this project and are shown in the table above. In general, the new service standards should include annual tracking of at least three core metrics to monitor system performance over time. These are: ridership, productivity and coverage (both systemwide and of the high-frequency network).

In most cases, the new service standards will be very similar to existing standards. Two major exceptions will be the elimination of 60-minute local service and the introduction of Mobility Innovation Zones. As described earlier in this report, this will be an entirely new type of service designed to serve lower-volume areas with smaller vehicles that could be fixed-route or demand response, or a combination, and could use app-based reservations systems. The ways in which these services are provided are changing rapidly and are likely to continue evolving. However, it is clear that the service standards for Mobility Innovation Zones will need to be significantly different:

Service Availability: Mobility Innovation Zones will serve areas that have significantly lower population and employment densities than fixed-route services, and Transfort will need to determine acceptable minimum-density levels for where the coverage extends. These may be based on a mix of population/employment density and proximity to the mobility hub where the innovation zone will be focused on delivering people to transit.

Directness of Service: Mobility Innovation Zone services can provide on-demand service or more circuitous neighborhood shuttles with flexible routing (microtransit), in which case directness standards may not be applicable.

Productivity: Productivity levels for Mobility Innovation Zones will be significantly lower than for Transfort's fixed-route services, most likely in the range of four to five passengers per vehicle hour.

Vehicle Loads: For Mobility Innovation Zone services, typically all passengers are provided with a seat, although some of the newer autonomous shuttles can accommodate standing passengers. The load factor will need to be set in accordance with the type of service that is operated in each of the zones.

Service Frequency: If neighborhood microtransit shuttles operate in Mobility Innovation Zones, frequency standards will be applicable, and for the purposes of this plan, minimum frequencies of every 30 minutes at peak times and every 60 minutes off-peak have been assumed. However, the Mobility Innovation Zone service could also be provided as an on-demand service (either all day or during off-peak hours). In this case, wait-time standards are more appropriate than frequency. For on-demand service, maximum wait times of 20 minutes should be identified, with 10 or 15 minutes being a higher-performance standard that some agencies are beginning to adopt.

On-Time Performance: Depending upon how service is provided, on-time performance standards could be either the same as for other services or based on the timeliness of passenger pick-ups.

Distribution of Transit Amenities: The types of facilities that will be needed will depend on how service is provided. However, typical microtransit and on-demand services only have amenities on the mobility hub side of the trip (since the other end of the trip has flexible beginning and end points).

Performance Goals

The following performance goals are based on projections of service for the Future Transit Network (2040). As build-out of the network occurs, some characteristics, such as route alignment and frequency, may vary due to land-use development, availability of funding, and partnerships. Performance goals will be adjusted as the network evolves.

PERFORMANCE METRIC	TODAY	2040 GOAL
Ridership Increase	N/A	120%
Weekday Ridership	18,000	40,000
Revenue Serivce Hours Increase	N/A	100%
Weekday Revenue Service Hours	430	870
Productivity Increase (Passengers per service hour)	N/A	10%
Productivity	42	46
Mode Share	1.8%	6.0%
Transit Coverage (People within 1/2 mile of BRT or High-frequency Transit		
- Residents	23%	53%
- Employees	40%	76%
Transit System-Wide Coverage		
- Residents	58%	85%
- Employees	87%	96%