Envision LITTLETON

Our Community. Our Future.

TRANSPORTATION MASTER PLAN

October 2019

Littleton Colorado

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GLOSSARY OF TERMS DEFINITIONS

The following terms are defined for their particular use and application with this Transportation Master Plan. In some cases these terms may be defined and used differently in City Code or other City documents.

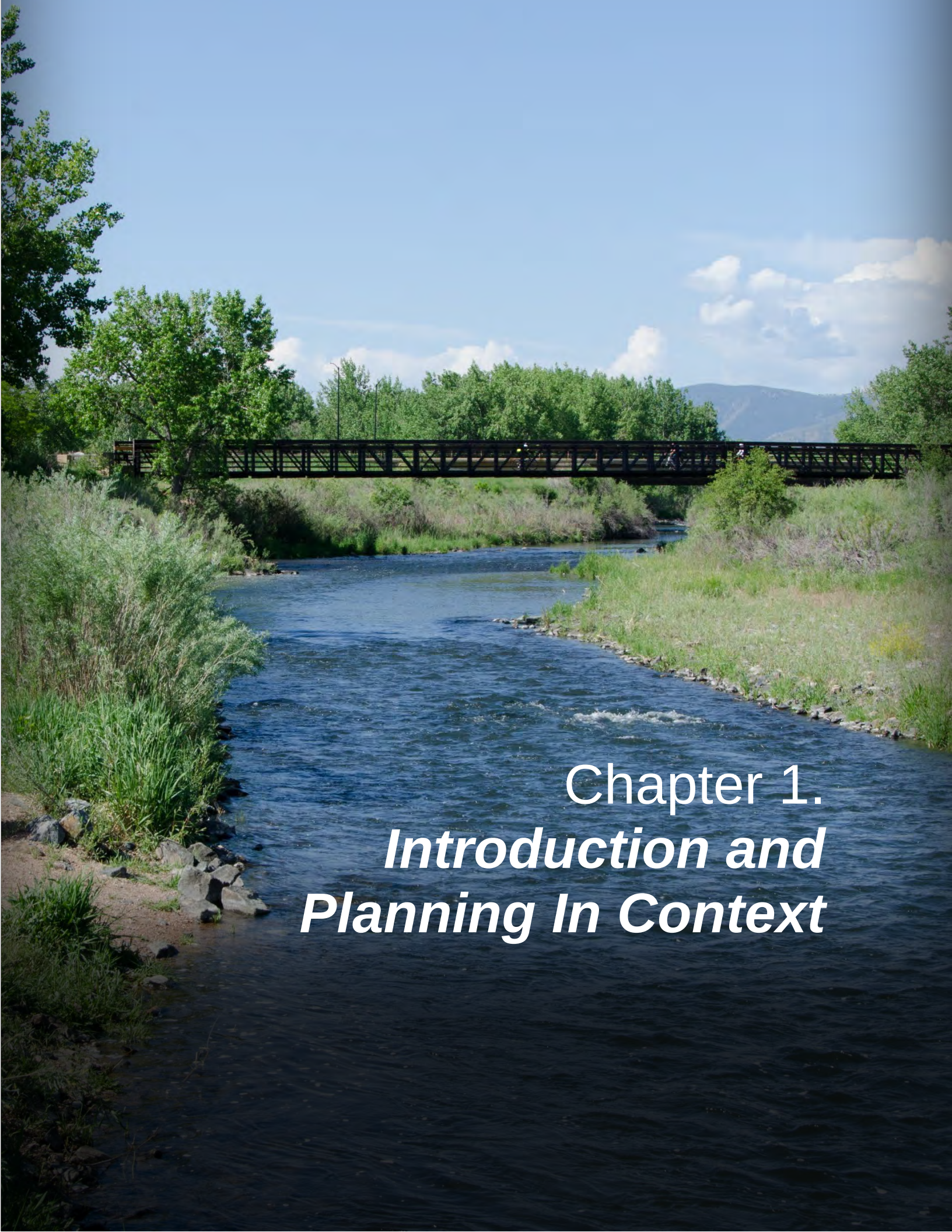
Access Management	The systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway as well as roadway design applications that affect access, such as median treatments and auxiliary lanes, and the appropriate separation of traffic signals.
Access Preservation Area	The Planning & Environmental Linkages study (PEL) led by CDOT begins in 2019 and will consider future alternatives for the US-85 Santa Fe Drive thoroughfare. There are numerous uses in the corridor including residential, commercial and retail needing a variety of access routes to Santa Fe Drive; the Access Preservation Area will raise awareness with CDOT and stakeholders that the needs of all corridor residents, property owners, and businesses must be considered when reviewing potential future alternatives.
American Association of State Highway & Transportation Officials (AASHTO)	A nonprofit, nonpartisan association representing highway and transportation departments in the 50 states, the District of Columbia and Puerto Rico. It represents all five transportation modes: air, highways, public transportation, rail and water. Its primary goal is to foster the development, operation and maintenance of an integrated national transportation system.
Americans With Disabilities Act (ADA)	The legislation defining the responsibilities of and requirements for transportation providers to make transportation accessible to individuals with disabilities.
Arterial	A class of roads serving major traffic movements (high-speed, high volume) for travel between major points.
Automated Vehicles (AV)	Vehicles that incorporate technology that assist with operation of the vehicle. They perform some of the tasks to drive the vehicle, and driverless vehicles require no human operator.
Average Annual Daily Traffic (AADT)	The total volume of traffic on a highway segment for one year, divided by the number of days in the year.
Bikeway	1) Any road, path, or way which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes. 2) A facility designed to accommodate bicycle travel for recreational or commuting purposes. Bikeways are not necessarily separated facilities; they may be designed and operated to be shared with other travel modes.
Bus Rapid Transit (BRT)	A bus-based public transit system combining the quality of rail transit and the flexibility and economics of a traditional bus system. BRT systems are usually constructed on designated multimodal corridors.
CapaCity	A transportation facility's ability to accommodate a moving stream of people or vehicles in a given time period.
Carsharing	Rental cars that are available for use by the hour or mile. These can be located in one spot or able to be parked anywhere within a service area.
Collector	A class of roads that provide direct access to neighborhoods and arterials.
Comprehensive Plan	A guiding document; a framework for City policies and priorities; a long-range vision of what we want our City to become; a tool for making decisions about how

	that vision should be achieved; strategic steps to make the vision a reality; targeted and strategic planning of the City.
Congestion Management	A systematic and regionally accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state and local needs.
Complete Networks Plan	Complete Networks allow every user to go everywhere. Different types of facilities are preferred by the elderly, children, commuters, and people with a variety of disabilities. In a complete network, different routes can address access to key destinations for each kind of user.
Connected Vehicles (CV)	Vehicles that incorporate technology that allows the on-board computers to communicate with other vehicles and with sensors and other infrastructure on the ground.
Corridor	A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways and transit route alignments. (APTA1)
Crash (Vehicular)	An event that produces injury and/or property damage, involves a motor vehicle in transport, and occurs on a trafficway or while the vehicle is still in motion after running off the trafficway.
Electric Vehicles	Vehicles that are powered by electric motors using energy from batteries that are charged at home or at charging stations.
Expressway	A controlled access, divided arterial highway for through traffic, the intersections of which are usually separated from other roadways by differing grades.
Facility	Any tangible means of moving people and things from place to place or the structures necessary to support the process of moving people and things from place to place (such as roads, trails, bike lanes, sidewalks, etc.).
Fatality	For purposes of statistical reporting on transportation safety, a fatality is considered a death due to injuries in a transportation crash, accident, or incident that occurs within 30 days of that occurrence.
Federal Highway Administration (FHWA)	A branch of the US Department of Transportation that administers the federal-aid Highway Program, providing financial assistance to states to construct and improve highways, urban and rural roads, and bridges. The FHWA also administers the Federal Lands Highway Program. It administers the highway transportation programs of the Department of Transportation under pertinent legislation.
Federal Transit Administration (FTA)	A branch of the US Department of Transportation that is the principal source of federal financial assistance to America's communities for planning, development, and improvement of public or mass transportation systems. FTA provides leadership, technical assistance, and financial resources for safe, technologically advanced public transportation to enhance mobility and accessibility, to improve the Nation's communities and natural environment, and to strengthen the national economy.

Freeway	A divided arterial highway designed for the unimpeded flow of large traffic volumes. Access to a freeway is rigorously controlled and intersection grade separations are required.
Freight	The movement of goods by truck, train, or other vehicle.
Goals	Generalized statements which broadly relate the physical environment to values.
Grade Separated Interchange	A method of aligning a junction of two or more surface transport axes at different heights (grades), thereby removing crossing conflicts.
Grants	A federal financial assistance award making payment in cash or in kind for a specified purpose. The federal government is not expected to have substantial involvement with the state or local government or other recipient while the contemplated activity is being performed. The term "grants-in-aid" is commonly restricted to grants to states and local governments.
High Occupancy Vehicle (HOV)	Vehicles carrying two or more people. The number that constitutes an HOV for the purposes of HOV highway lanes may be designated differently by different transportation agencies.
Highway	Is any road, street, parkway, or freeway/expressway that includes rights-of-way, bridges, railroad-highway crossings, tunnels, drainage structures, signs, guardrail, and protective structures in connection with highways.
Infrastructure	All the relevant elements of the environment in which a transportation system operates.
Intelligent Transportation Systems (ITS)	The application of advanced technologies to improve the efficiency and safety of transportation systems.
Intersection	Used to describe the point where two or more roadways cross or meet.
Level of Service (LOS)	A qualitative assessment of a road or intersection's operating conditions. An indicator of the extent or degree of service provided by a facility based on and related to the operational characteristics of the facility. A standard measurement used by transportation officials which reflects the relative ease of traffic flow on a scale of A to F, with free-flow being rated LOS-A and congested conditions rated as LOS-F.
Light Rail	A streetcar-type vehicle operated on City streets, semi-exclusive rights-of-way, or exclusive rights-of-way. Service may be provided by step-entry vehicles or by level boarding.
Local Street	A street intended solely for access to adjacent properties.
Long Term	In transportation planning, refers to a time span of, generally, 20 years. The transportation plan for metropolitan areas and for States should include projections for land use, population, and employment for the 20-year period.
Manual on Uniform Traffic Control Devices (MUTCD)	A document issued by the Federal Highway Administration (FHWA) of the United States Department of Transportation (USDOT) to specify the standards by which traffic signs, road surface markings, and signals are designed, installed, and used.

Measures of Effectiveness	Measures or tests which reflect the degree of attainment of particular objectives.
Micromobility	Personal shared transportation devices like bikes, mopeds, and electric scooters.
Microtransit	Privately owned and operated shared transportation system that can offer fixed routes and schedules, as well as flexible routes and on-demand scheduling.
Mobility	The ability to move or be moved from place to place.
Mode	A specific form of transportation, such as automobile, bicycle, subway, bus, rail, or air.
Multimodal	The availability of transportation options using different modes within a system or corridor.
National Association of City Transportation Officials (NACTO)	A coalition of the Departments of Transportation in North American cities.
Objectives	Specific, measurable statements related to the attainment of goals.
Parkway	A highway that has full or partial access control, is usually located within a park or a ribbon of park-like developments, and prohibits commercial vehicles.
Public Transit	Traditional public transportation via bus and rail that usually operates on a fixed route and schedule.
Ridehailing	Uber or Lyft or other services that provide on-demand point-to-point rides in privately owned autos.
Shared Mobility	A wide range of transportation options involving fleet ownership or operation of various modes of transportation.
Sharrow	A marking placed in a shared auto travel lane to indicate where people should preferably cycle.
Silver Bike Friendly Designation	Designation granted by the League of American Bicyclists to recognize communities that encourage biking for transportation and recreation.
Stakeholders	Individuals and organizations involved in or affected by the transportation planning process, including federal/state/local officials, MPOs, transit operators, freight companies, shippers, and the general public.
Transportation Demand Management (TDM) Plan	A Transportation Demand Management (TDM) plan employs a wide range of strategies to maximize existing roadway capaCity through tactics such as carpooling, alternate modes, and encouraging changes in travel behavior.
Telecommuting	Communicating electronically (by telephone, computer, fax, etc.) with an office, either from home or from another site, instead of traveling to it physically.
Traffic Analysis Zone (TAZ)	A traffic analysis zone or transportation analysis zone (TAZ) is the unit of geography most commonly used in conventional transportation planning models
Traffic Management Center (TMC)	The hub of a transportation management and control system. The TMC brings together human and technological components from various agencies to perform a variety of functions. TMCs may deal with freeway traffic management, surface

	street traffic management, transit management or some combination of these functions.
Transportation Systems Optimization	The systems that are emerging to better manage and optimize the transportation networks, using real-time data. Emerging technologies include adaptive signal control, transit signal priority, and the sensors and communications infrastructure to allow remote management of the systems.
Vehicle Hours of Travel (VHT)	The number of hours traveled along a roadway or roadway network during a given time period.
Vehicle Miles of Travel (VMT)	The number of miles traveled along a roadway or roadway network during a given time period.
Vulnerable User Groups	Vulnerable user groups are those most at risk in traffic. Such users include those with greater difficulty navigating around fast-moving vehicles (such as the elderly or certain disabled populations) and those unprotected by an outside shield, namely pedestrians and two-wheelers, as they sustain a greater risk of injury in any collision against a vehicle.



Chapter 1.
Introduction and Planning In Context

INTRODUCTION

The Transportation Master Plan (TMP) will help address the challenges of facilitating mobility and access in a strategic manner, within the reasonable fiscal constraints of the City's budget and limited state and federal funding opportunities, and in a way that is responsive to anticipated demographic and technological changes.

The TMP resulted from an 18-month planning and community engagement process. The process began with the Envision Littleton Vision Report, adopted unanimously by City Council on December 18, 2018. The Vision Report established a unifying vision and identified Littleton's core values, guiding principles, and shared priorities and concerns. With influence from the City of Littleton's Comprehensive Plan and other guiding documents, the TMP will establish the City's ultimate transportation system vision, the policies to support that system, and capital projects that are prioritized with consideration of funding constraints. The final TMP will provide a long-term transportation vision for the City of Littleton, and serve as a guiding document for improvements to roadways and multimodal transportation networks.

LITTLETON'S MOBILITY FRAMEWORK

The mobility framework for the City of Littleton has served the City for more than 100 years, connected to Denver and beyond by the Denver & Rio Grande Railroad as well as the section line road corridors that still make up the major transportation framework today. This well-conceived and planned framework hosts a City of nearly 48,000 and has contributed to the City being recognized as one of the best places to live in Colorado. Littleton has several important and highly-functional transportation assets that contribute to its economic vitality. These include the major arterial network that provides connectivity to the Denver region, light rail service through the heart of the City, and the very popular trail network that connects citizens to the natural beauty within the City and region.

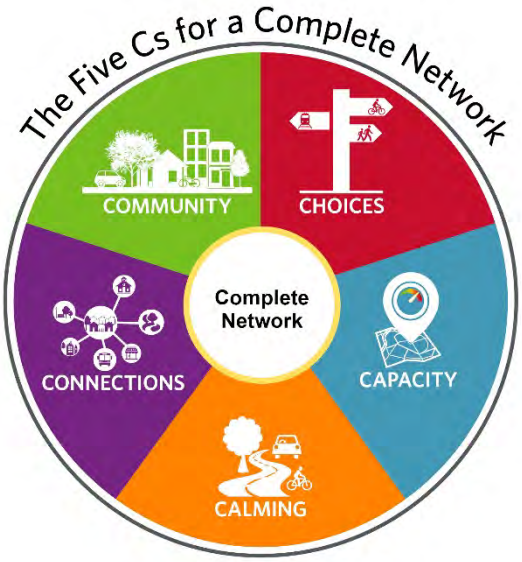
Population growth within Littleton is not new, but when the City experienced similar growth starting in the late 1970's, the transportation investments were both long-lasting and proactive. Now population growth from surrounding areas has placed new burdens on the City's transportation system and will require a new approach to being both proactive and provide long-term solutions. A history of the City's major transportation initiatives is below.

1970s and 1980s	Traffic signals were added throughout the City
Mid 1980s	Mineral Avenue extended from Southpark Lane to Platte Canyon Road
Mid 1980s	C-470 constructed
Mid 1980's	Bowles Avenue was widened from two lanes to four lanes from Santa Fe Drive to Sheridan Boulevard
Mid 1980s	Railroad tracks were depressed from Ridge Road on the south to the northern border of the City
Early 1990s	Single-point urban interchange at Santa Fe Drive and Belleview Ave completed ($25 million)
Late 1990s	Santa Fe Drive beautification project upgrading signal poles and street lights for a more uniform corridor
2000	Light Rail opens with two stations in Littleton; the first rail connection in the region outside Denver. The City upgraded the downtown station; adding public art and relocating the historic train station to the current site.
2010	Santa Fe Drive and C-470 East overpass built ($25 million)

The City's arterials and expressways, and often its collector streets, swell with traffic beyond their physical capaCity during the daily rise and fall of regional commuting traffic. The City is also significantly impacted by the regional transit solutions that have been deployed to date. For example, the Regional Transportation District (RTD) park-n-ride lots at the Mineral Avenue and Downtown Littleton Stations fill to capaCity by 7am with commuters from Highlands Ranch, Southglenn, Columbine, and Ken Caryl. The ability of RTD rail and bus services to meet the local needs of the City is compromised by the undersupply of service.

There are many plans being implemented by CDOT, RTD and adjacent municipalities that will affect traffic and mobility in Littleton over the next several years. There are also tremendous increases in regional growth south and west of Littleton that will increase pressure on the major thoroughfares and transit networks that surround and traverse the City. The implications of these changes will need to be understood and incorporated into our City's plans moving forward.

PLAN PURPOSE



The intent of planning is to set the desired course for our City. When we plan, we make a commitment to make the City a better place to live, work, and play. The purpose of Envision Littleton is to set down on paper what we want to accomplish in the near future and in the long term. That is why this plan ends with a list of recommendations for projects to accomplish in the next five years, but also includes a Mission and Goals that set the long term outlook for the City. The Mission and Goals allow us to consider different types of transportation improvements on a level playing field, and allow us to prioritize improvements. Finally, viewed through the lens of what we can afford (using existing as well as new funding sources), the projects can be sorted into an implementation plan.

The TMP will serve as the reference for elected leaders and policy makers to advocate for the regional transportation needs of the City and to articulate the City's position on regional transportation projects. The TMP will also inform the Capital Improvement Plan for streets and transportation infrastructure, setting out priorities along a logical and fiscally sound progression that fulfills the TMP over a period of years.

The TMP applies an approach to planning that focuses on providing a transportation system that works for all users. In the context of the City of Littleton and the concurrent update to the Comprehensive Plan, this means the plan maps out a complete network of streets that finds the balance where streets are vibrant, safe and promote a sense of place while providing multimodal choices for users of all ages and ability. This systematic approach emphasizes the following major themes:

- **Community**: No plan or project can truly be successful without engaging the community. This is about returning streets to the community and improving a community's quality of life.
- **Choices**: The healthiest and most vibrant communities understand that bicycling, walking and transit are critical components of the transportation system. A complete system not only addresses safety and mobility concerns, but also provides encouragement of active living, ultimately improving community health.
- **CapaCity**: Although a multimodal approach can increase the overall person capaCity of a roadway corridor, the impact on auto capaCity is often a concern that must be addressed. A toolbox of analysis techniques and operations strategies to manage roadway capaCity has been identified to help balance mobility needs across modes.
- **Calming**: Plans and designs should create context-appropriate streets that consider the needs of all potential users, encourage appropriate driving behaviors and speed, and provide welcoming environments for non-motorized users.
- **Connections**: We know that providing connections between sites, neighborhoods, modes and jurisdictions is crucial to maintaining healthy transportation systems and communities. A systematic approach to providing a complete network can facilitate key connections within the community.

PLANNING IN CONTEXT

This Transportation Master Plan represents an alignment of previous and ongoing plans, guidelines, and reports conducted by the City of Littleton and regional partners. In a review of 37 such documents, several common themes emerged (meaning they appeared in at least 3 previous planning efforts). Note that these themes, which are listed below, do not necessarily represent the top priorities for the City of Littleton's transportation policy; instead, they suggest likely starting points for the discussion.

Common Themes from Existing Plans

- Make Littleton pedestrian friendly by expanding the pedestrian network, adding pedestrian bridges, extending sidewalks and improving existing sidewalks.
- Improving connections between downtown/river corridor/parks/trails.
- Complete network of streets in the City that provides connections, choice, calming, and capaCity where appropriate.
- Improving traffic flow on arterials.
- Improving bike facilities.
- Decrease cut-through traffic in residential areas.
- Improving multimodal connections between commercial locations/residential developments.
- Improving trail network for transportation around and out of City.
- Improving intersection crossings.
- Improving connections to light rail.
- Improving road connections to key destinations but not through natural areas/build fewer cul-de-sacs/promote grid street network.
- Improving parking downtown, implement parking structures, consider parking restrictions.
- Implement traffic calming strategies in neighborhoods.
- This plan has a foundation in prior planning efforts, including but not limited to:

Littleton Plans & Studies

- Citywide Plan (2014)
- Belleview Avenue Corridor Vision (2018)
- Bicycle and Pedestrian Master Plan (2011)
- Broadway Corridor Study (2009)
- Downtown Neighborhood Plan (2011)
- Littleton Downtown Design Standards (2006)
- Mineral Station Area Framework (2018)
- Neighborhood Plans and Corridor Plans (2016)
- Three Mile Plan (2015)
- Amended Columbine Square Urban Renewal Plan, City of Littleton (2015)
- Arapaho Hills Historic Preservation Guidelines, City of Littleton (2016)
- Resident & Business Surveys (2018)
- City of Littleton Parks, Recreation, and Trails Master Plan (2016)
- Downtown Littleton Historic Preservation Guidelines (2011)
- Landscape Design Criteria Manual (1992)
- Louthan Heights Historic District Design Guidelines (2017)
- South Platte River Corridor Development Design Guidelines (2000)
- Mineral Station ULI Advisory Services Report (2006)
- Mineral Avenue TAP Final (2014)
- Littleton Housing Report (2017)
- Neighborhood Traffic Management Program (not dated)
- Storm Drainage Design and Technical Criteria Manual (2018)

Relevant Regional Plans and Studies

- South Platte River Corridor Vision, Arapahoe County, (2013)
- South Suburban Parks and Recreation Master Plan (2017)
- Arapahoe County Bicycle/Pedestrian Master Plan (2017)
- High Line Canal Conservancy Vision Plan (2017)
- RTD (Regional Transportation District) 2015-2020 Strategic Plan (2015)
- RTD Regional BRT Feasibility Study (2018)
- RTD Quality of Life Study (2017)
- RTD TOD Strategic Plan (2010) and Status Report (2013)
- DRCOG (Denver Regional Council of Governments) Metro Vision 2040 (Amended 2019)
- DRCOG Active Transportation Plan (Draft) (2018)
- DRCOG Regional Transportation Plan 2040 (2017)
- Arapahoe County 2035 Transportation Plan (2010)
- Jefferson County Bicycle and Pedestrian Plans (2012)
- Jefferson County Countywide Transportation Plan (1998)
- Douglas County 2030 Transportation Plan (2009)
- South Platte Working Group South Platte Connections Study (2019)

PLAN CONTENT OVERVIEW

The TMP combines quantitative analysis of the City's existing transportation system with feedback from the Envision Littleton process. Following the Existing City report, which provides background and insights about the state of driving, walking, riding a bike, and transit service in Littleton today, the TMP introduces a strategic framework to guide decision-making about the future.

The middle sections of the plan focus on articulating a future for the transportation system and identifying a pathway toward that future. Sections on auto & freight, active transportation, transit, and mobility trends contain several common components:

Legacy of Past Planning. Plans and studies previously developed for Littleton and vicinity offer insights from the time they were prepared, and provide an essential foundation for this Plan.

Key Issues and Considerations. These reflect input and discussions from varied Envision Littleton community engagement activities, workshops with City Council and Planning Commission, and interaction with other City boards/commissions, City departments, and partner agencies and organizations.

Framework for Action. The framework is organized in three tiers: (1) Goals, (2) Policies, and (3) Actions.

The actions in each section convey tangible steps that will lead to achievement of the goals in line with the stated policies. A final section with considerations and procedures for implementation and periodic updates rounds out the plan.

IMPLEMENTATION

With the Transportation Master Plan (TMP), the City of Littleton and other partner agencies and organizations have an essential new document that should be frequently referred to for guidance in community decision-making. As with the Envision Littleton Comprehensive Plan, the TMP should be a "living document" that responds to change. Its key planning considerations, goals, policies, and action strategies must be revisited periodically to ensure that the Plan is providing clear and reliable direction on a range of matters, including land development issues and public investments in infrastructure and services.

Implementation is not just a list of action items. It is a challenging process that requires the commitment of the City's elected and appointed officials, staff, residents, business owners, major institutions, other levels of government, and other organizations and individuals who will serve as champions of the TMP and its particular direction and strategies. Scheduled plan evaluations and updates will help maintain its relevance and credibility as the policy and action guide for the City.

Chapter 2.
Existing City

INTRODUCTION

Littleton is defined by its neighborhoods, its expansive trail and open space network, and its historic downtown. The transportation system is characterized here by mode: auto, active transportation, and transit. Existing data was collected and public input reviewed to gather information on the ability of these networks to meet the needs of the community. What follows is a data book, summarizing the major takeaways from that inventory of existing conditions.

MODE: AUTO

People who drive their private automobiles (autos) make up the majority of travelers in Littleton. As ride-hailing services have proliferated in the region, an increasing portion of auto travelers are using these services as well. In general, traffic volumes have increased and congestion in Littleton has worsened throughout its recent history as more people have moved to the City and to surrounding communities.

That said, Littleton is characterized by good access to major regional auto corridors, including Santa Fe Drive (US 85), Broadway, Belleview Avenue, County Line Road, Bowles Avenue/Littleton Boulevard, Mineral Avenue, and C-470. These routes have served the residents of Littleton well, providing convenient access to regional job and activity centers.

Internal City circulation is characterized by a network of collector streets that provide access to neighborhoods (Figure 1).

Major issues related to auto travel within the City include:

- **Congestion:** Growth within and surrounding Littleton has resulted in increased congestion on many streets (Figure 2).
- **Barriers:** the City is crossed by multiple barriers limiting connectivity. While some areas of the City have a strong internal grid, barriers like the South Platte River, Santa Fe Drive, Highline Canal, the rail corridor, and even some suburban neighborhoods exist that break up the grid and force traffic to use one of only a few major connections, resulting in traffic congestion.
- **Safety:** A total of 5,089 crashes occurred in Littleton during the 5-year period from 2014 to 2018—about three per day. The social and economic impacts of these crashes are vast (Figure 3).
- **Parking:** Downtown parking has been identified as a major issue, and has been cited as a reason for avoiding coming to the downtown retail and commercial district.

CONGESTION

According to INRIX (a Big Data aggregator), delays on arterials and highways within Littleton have an annual economic impact of:

$25 to $33 million per year.

Congestion at Santa Fe Drive and Mineral Avenue

Parking is fully utilized on Main Street.

81.8% **Percent of Littleton residents who commute to work in a private auto (including those who drive alone as well as those who carpool; 8.4% telecommute)**

Figure 1. Existing Roads

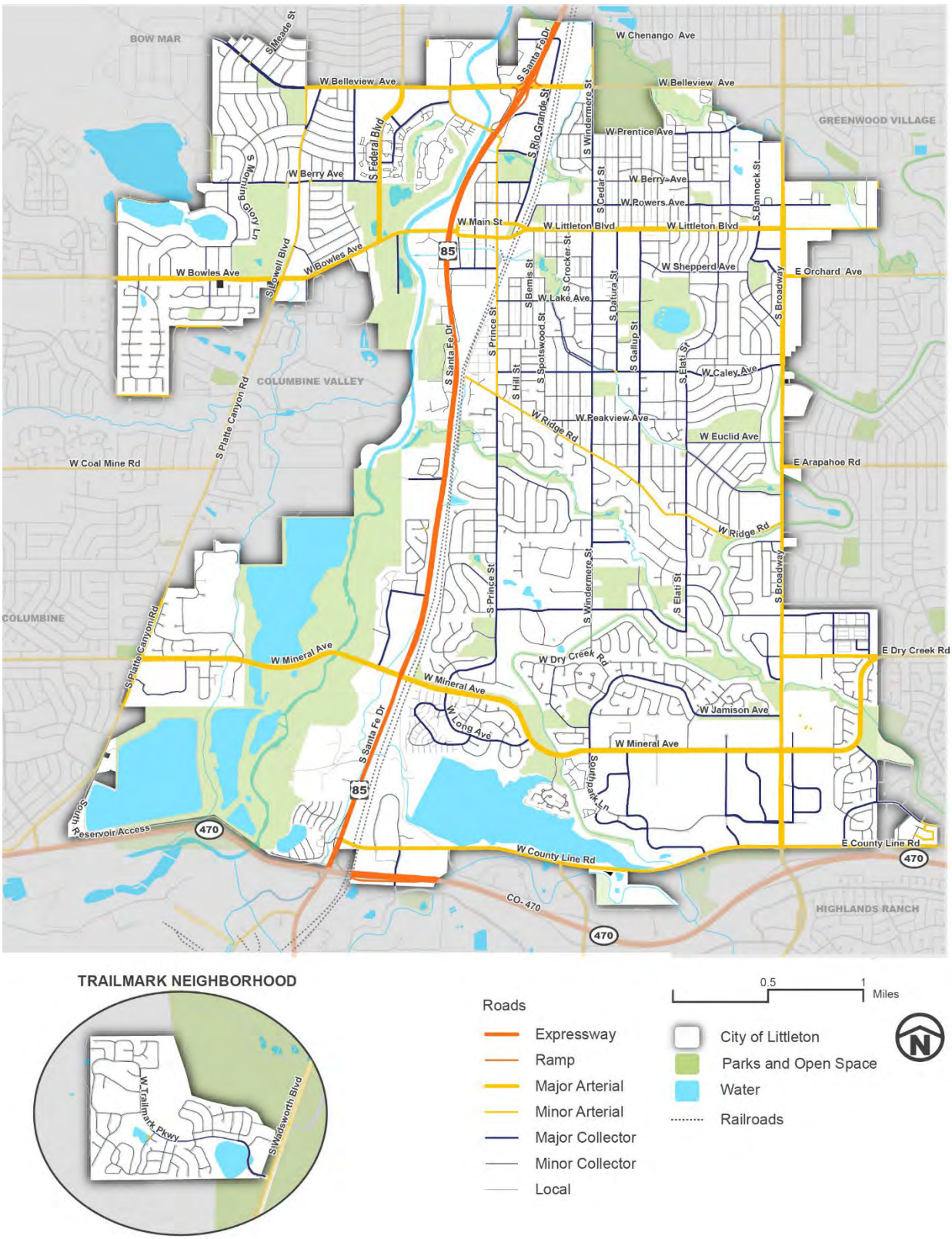


Figure 2. Roadway Congestion

Traffic Congestion

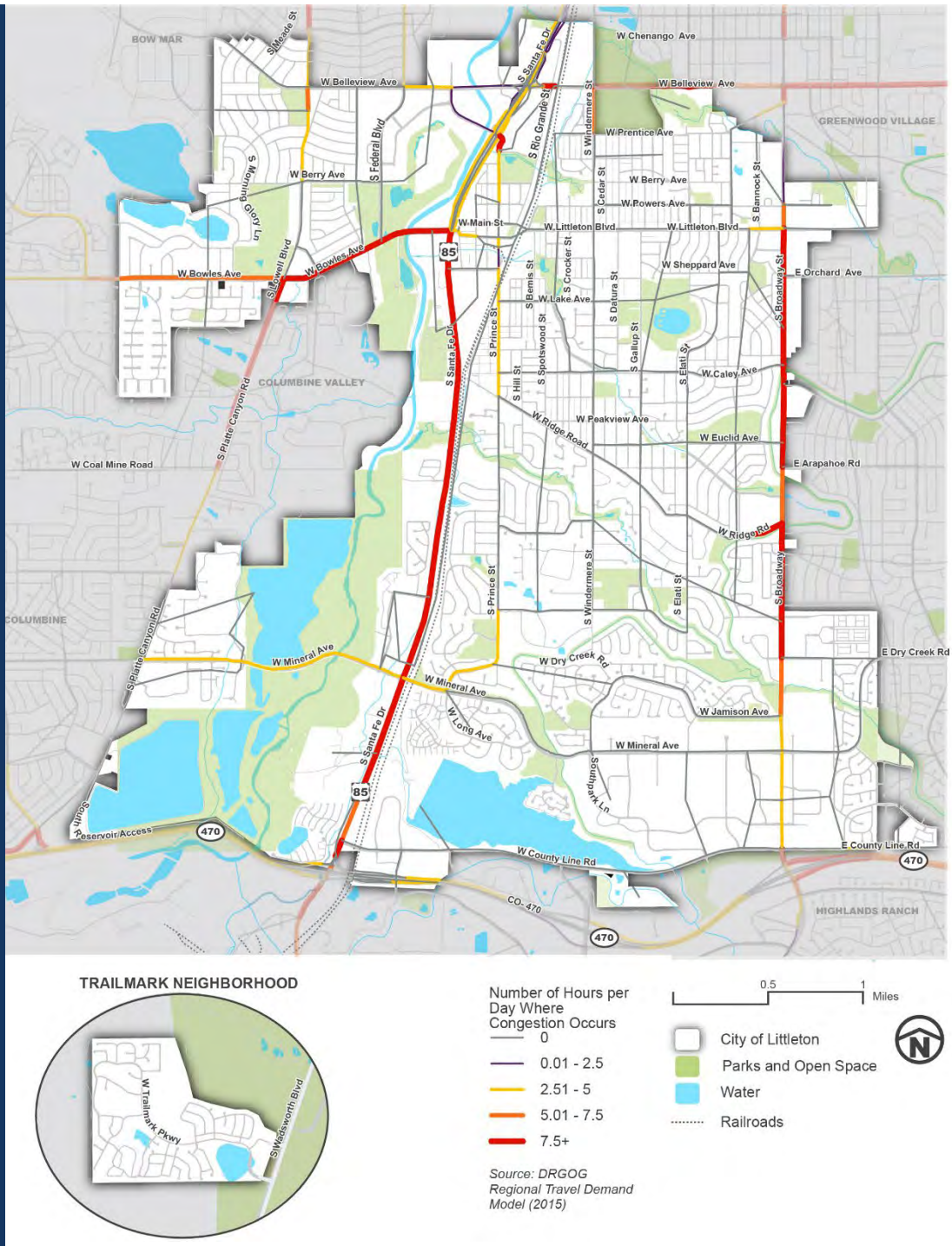
Vehicular delay is common in Littleton, with several major corridors experiencing many hours of delay each day.

The map at right depicts the average number of hours of delay per day. Of note, Santa Fe Drive, Broadway, and Bowles Avenue are congested throughout most of the day.

Other roadways are congested during peak periods, particularly Prince Street and Mineral Avenue, which can experience very severe congestion, albeit during shorter periods.

Bottlenecks occur at several intersections throughout the City as well, notably including intersections along Santa Fe Drive at Mineral Avenue, Bowles Avenue, and Prince Street.

Santa Fe Drive carries as many as 60,000 vehicles per day near Mineral Avenue, well over it's intended capaCity.



TRAFFIC: #1 public concern | $25m to $33m annual economic impact

Figure 3. Vehicle Crashes

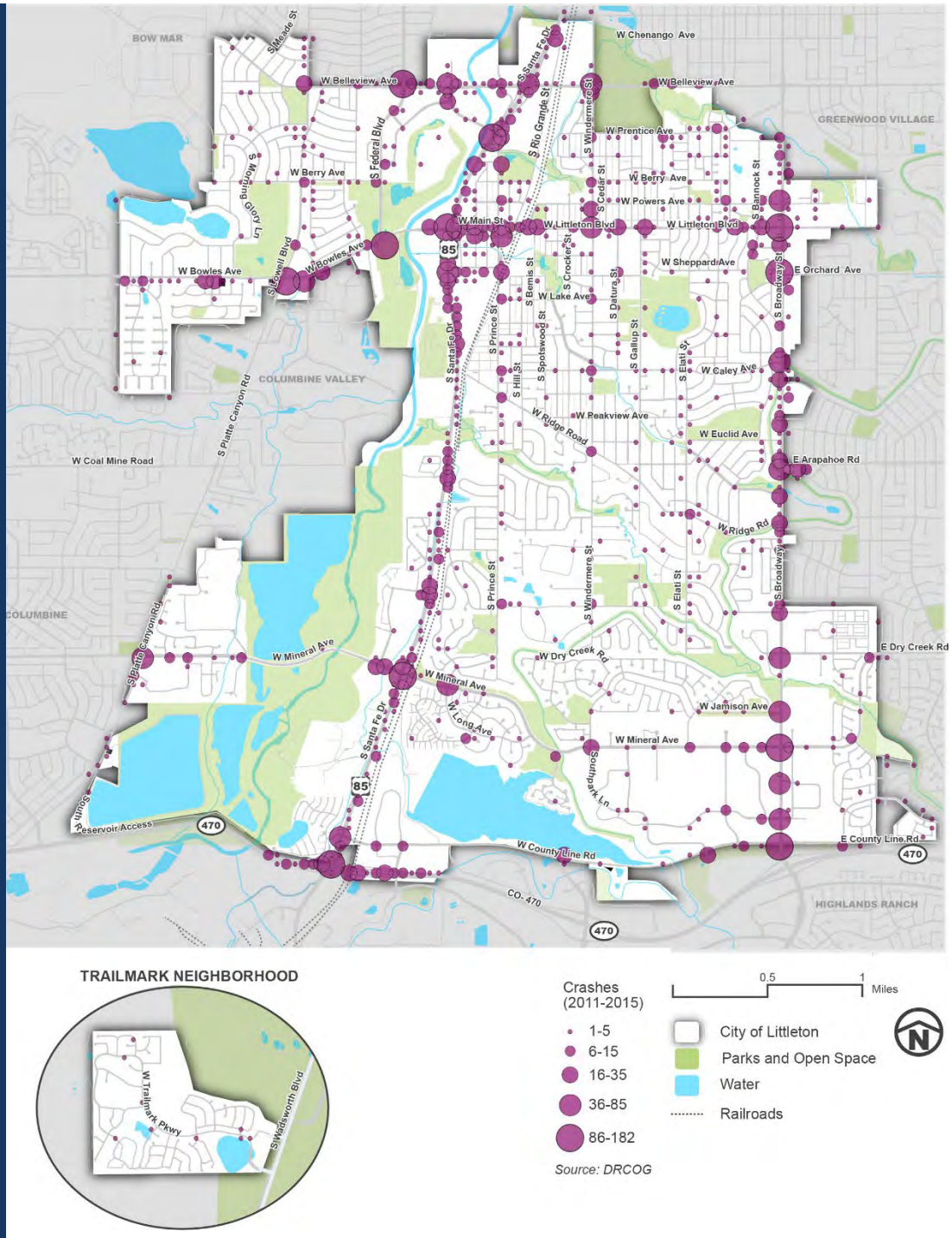
Auto Safety

Over a 5-year period from 2014 through 2018, 5,089 crashes occurred in Littleton. During that same time period, 418 people were injured in automobile crashes.

Crash concentrations exist at the following locations:

- The length of the Broadway corridor
- Santa Fe & Mineral
- Santa Fe & Church
- Santa Fe & Bowles
- Santa Fe & Prince
- Federal and Bowles
- Bowles and Platte Canyon

In general, where congestion occurs, crashes follow. Congestion-related crashes (such as rear-ends) make up by far the highest proportion of crashes in the City. Between 2014 and 2018, rear-ends accounted for 42% of all crashes.



SAFETY: #4 public concern | 1,000+ CRASHES PER YEAR

MODE: TRANSIT

Littleton is within the Regional Transportation District (RTD) service area. RTD operates fixed route and demand-response service in Littleton. Major transit routes include:

- C-line and D-line Light Rail: These two routes interline through Littleton but serve different destinations in Downtown Denver, with the C-line terminating at Denver Union Station and the D-line terminating in Central Downtown at the 18th & California Station.
- Bus routes serving the following corridors:
    - Broadway
    - Federal Boulevard
    - Lowell Boulevard
    - Bowles Avenue/Littleton Boulevard
    - Ridge Road
    - Mineral Avenue
    - South Santa Fe Drive
    - County Line Road

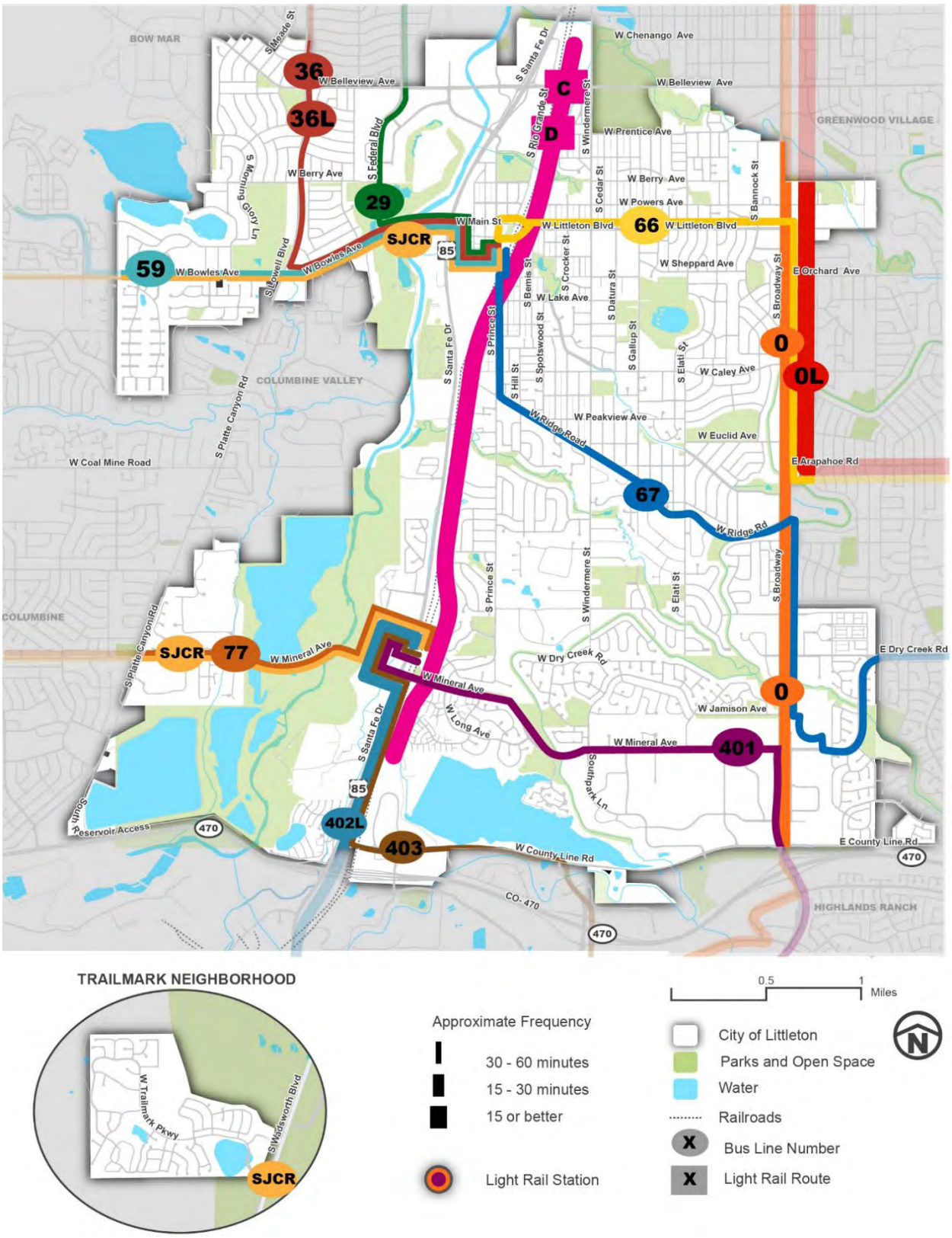
- Littleton's Shopping Cart service: Shopping Cart is a scheduled fixed-route service shuttling passengers to/from area grocery stores and the Streets of Southglenn Monday-Saturday. The service is provided for disabled residents or residents age 55 or older and serves approximately 8,000 rides per year.
- Demand-response services in Littleton include:
    - RTD's South Jeffco FlexRide (SJCR)
    - Littleton's OmniBus: OmniBus service is scheduled by appointment only, Monday-Friday, with ride priority given to medical trips (top priority), grocery shopping, and hair/barber trips. The service is provided for disabled residents or residents age 55 or older and serves approximately 6,000 rides per year.

Existing transit facilities within Littleton are depicted in Figure 4 and transit statistics are shown in Figure 5. While 72% of respondents to the City's recent traveler survey perceive transit service positively, several challenges have been identified:

- Parking: The Littleton Downtown and Mineral Park-n-Rides fill to capaCity early in the morning and demand for parking at these stations exceeds their capaCity.
- Connectivity: Auto, pedestrian, and bicycle connectivity is poor at the Mineral station and could be improved at the downtown station.
- 30-minute peak period service for most bus routes does not meet a typical Level of Service standard that makes taking transit attractive to "choice riders"—those who can choose another mode of travel.

6.4% **Percent of Littleton residents who commute to work via transit**

Figure 4. Existing Transit Facilities



Approximate Frequency

- 30 - 60 minutes
- 15 - 30 minutes
- 15 or better
- Light Rail Station

0.5 1 Miles

- City of Littleton
- Parks and Open Space
- Water
- Railroads
- Bus Line Number
- Light Rail Route

Figure 5. Transit Statistics

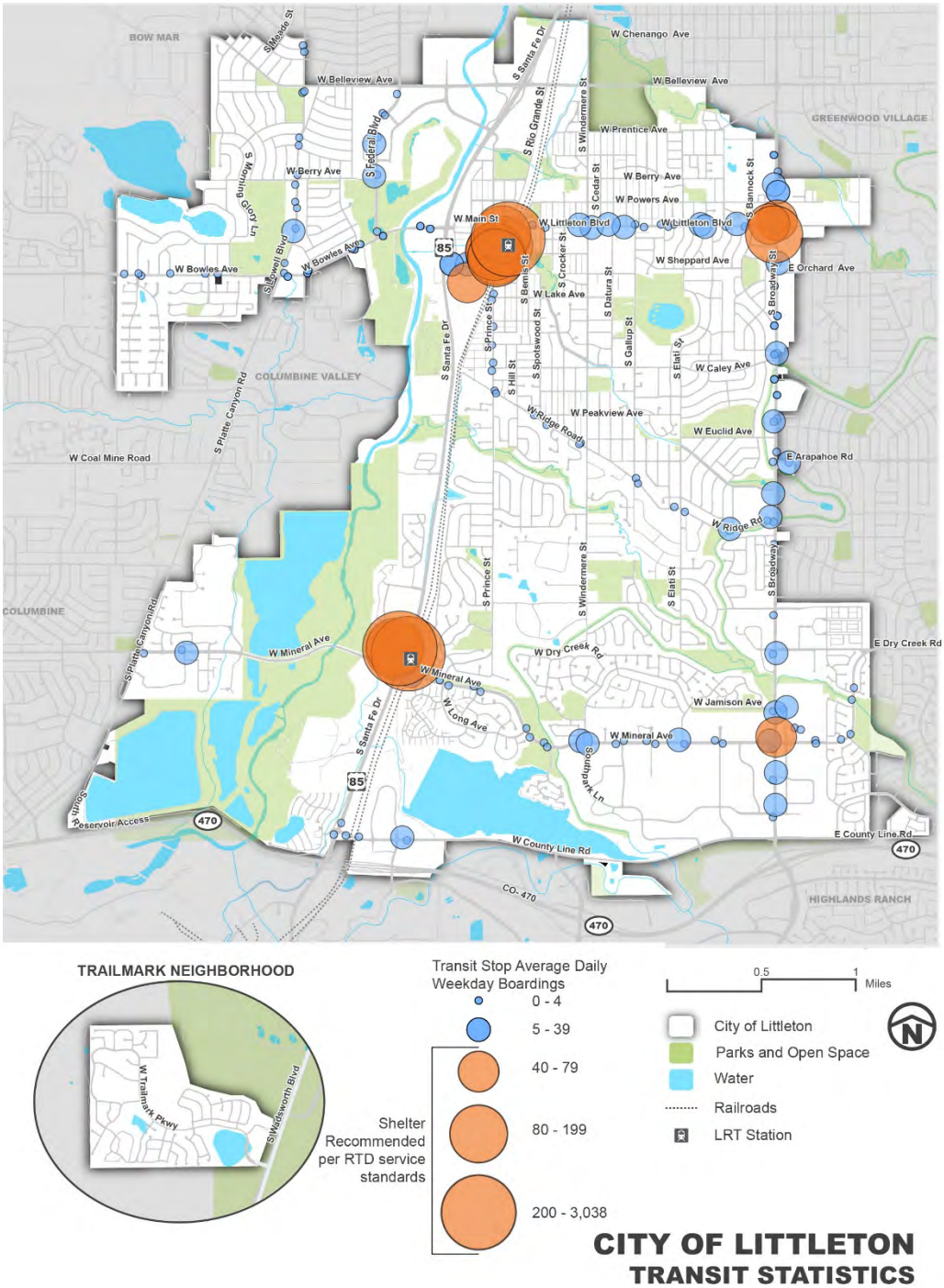
Transit Usage

Transit ridership in Littleton is highest on bus service along Broadway and Littleton Blvd (especially downtown) as well as light rail. The map at right depicts the average number of boardings at each transit stop each day. Average weekday ridership for each route:

Route	Ridership
0	340
0L	170
29	170
36	420
36L	360
59	160
66	570
67	150
77	90
401	150
402L	120
403	110
C (light rail)	2000
D (light rail)	2300

The D-Line service to Downtown Denver is one of only a few transit services in metro Denver that provides a travel time that is competitive with auto travel.

Route 67 along Ridge Road has been identified by RTD as struggling to meet ridership standards. This route remains in service because of the lack of transit alternatives in the area.



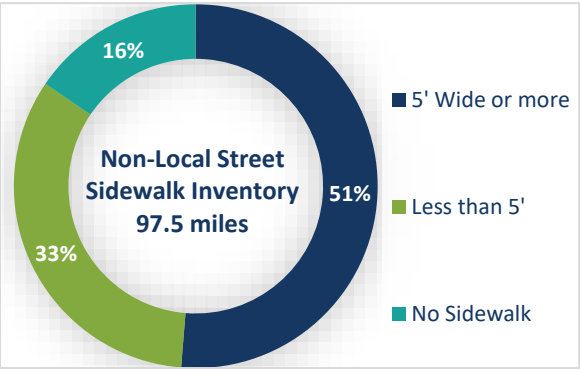
TRANSIT: 2 Light Rail Lines | 1,800+ DAILY BUS RIDERS

MODE: WALK

Littleton is a diverse City when it comes to pedestrian activity and infrastructure. On one hand, Littleton has active pedestrian-friendly areas like downtown Littleton, and the City is home to an extensive trail system. On the other hand, Littleton is crisscrossed by auto-oriented arterials that prioritize motorized travel modes. This dichotomy means that the City faces challenges and has real opportunities to address pedestrian comfort, convenience, and safety (Figure 6). Major challenges identified through the inventory of the pedestrian system include:

Adopted in November 2011, Littleton's Bicycle & Pedestrian Master Plan was developed through a grant from tri-county health and focuses on short term, implementable improvements to the on-street system for walking and biking in Littleton.

- Safety: Over the 5-year period from 2011 to 2015, 121 crashes that involved pedestrians occurred, a rate of about 2 per month. People walking are vulnerable to serious injury when involved in a crash with an auto. Of particular concern is the Broadway corridor, where 17 such auto-pedestrian collisions occurred during the study period.
- Connectivity: The freight and RTD rail corridor represents a major pedestrian barrier. The rail corridor and the Santa Fe Drive corridor stand between the majority of Littleton residents and the South Platte River and adjacent trails—a wonderful pedestrian amenity. Another challenge identified is pedestrian connectivity to neighborhood parks.
- Transit Access: While walking to the Littleton Downtown station is possible, access to the Mineral Station is difficult for pedestrians. In addition, many of Littleton's bus stops are not well served by pedestrian facilities.
- Accessibility: People with disabilities encounter challenges throughout Littleton. The City has nearly 4,000 locations that have been identified in Littleton's ADA Transition Plan as needing accessibility improvements. These upgrades will take place as community improvements are constructed over forthcoming years.



Littleton can build upon the following amenities:

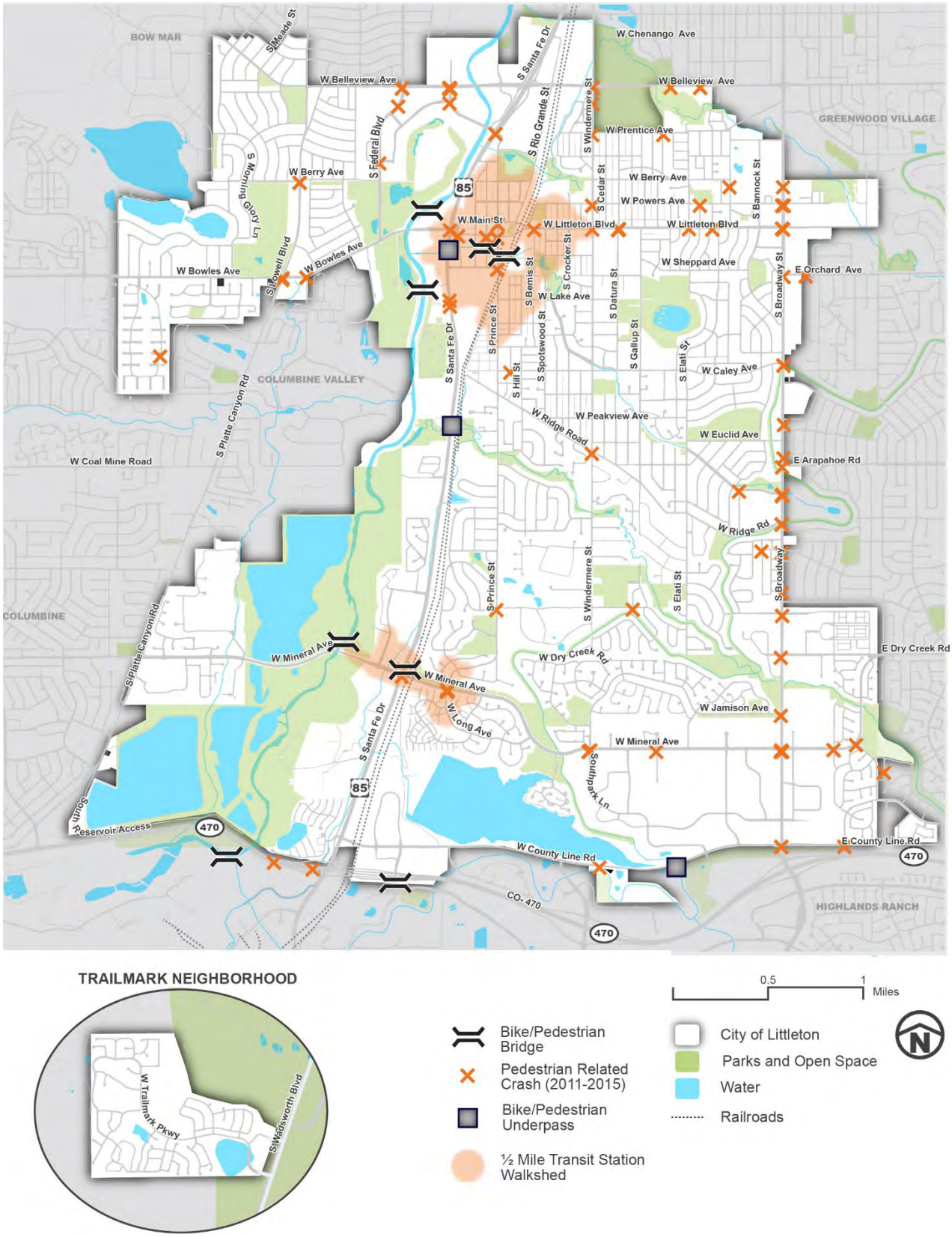
- Trail Network: 51 miles of regional and local trails provide excellent pedestrian facilities throughout Littleton.
- Downtown Littleton: Downtown Littleton is a strong pedestrian destination, although walkability could be improved in the City's core in order to improve safety and enhance economic vitality.

Littleton contains 51 miles of trails.

Typical auto-oriented neighborhood street with narrow sidewalk.

49% **Percent of Littleton sidewalks that are missing or don't meet ADA standards.**

Figure 6. Pedestrian Opportunities and Challenges



MODE: BIKE

As with walking in Littleton, biking is well-served by the regional facilities, but can be impeded by barriers and the design of infrastructure (Figure 7). Major challenges include:

- Safety: Over the 5-year period from 2011 to 2015, 77 crashes that involved bicyclists occurred. People biking are vulnerable to injury when involved in a crash with an auto. Again, the Broadway corridor has been a hazardous place to bike, with 17 bicycle related crashes in that period.
- Connectivity: The freight and RTD rail corridor represents a major barrier. The rail corridor and the Santa Fe Drive corridor stand between the majority of Littleton residents and the South Platte River and adjacent trails—a wonderful amenity for bicycling.
- Transit Access: Access to the Mineral Station is difficult for bicyclists, and the station itself represents a barrier for access to the Mary Carter Greenway.

Littleton can build upon the following amenities:

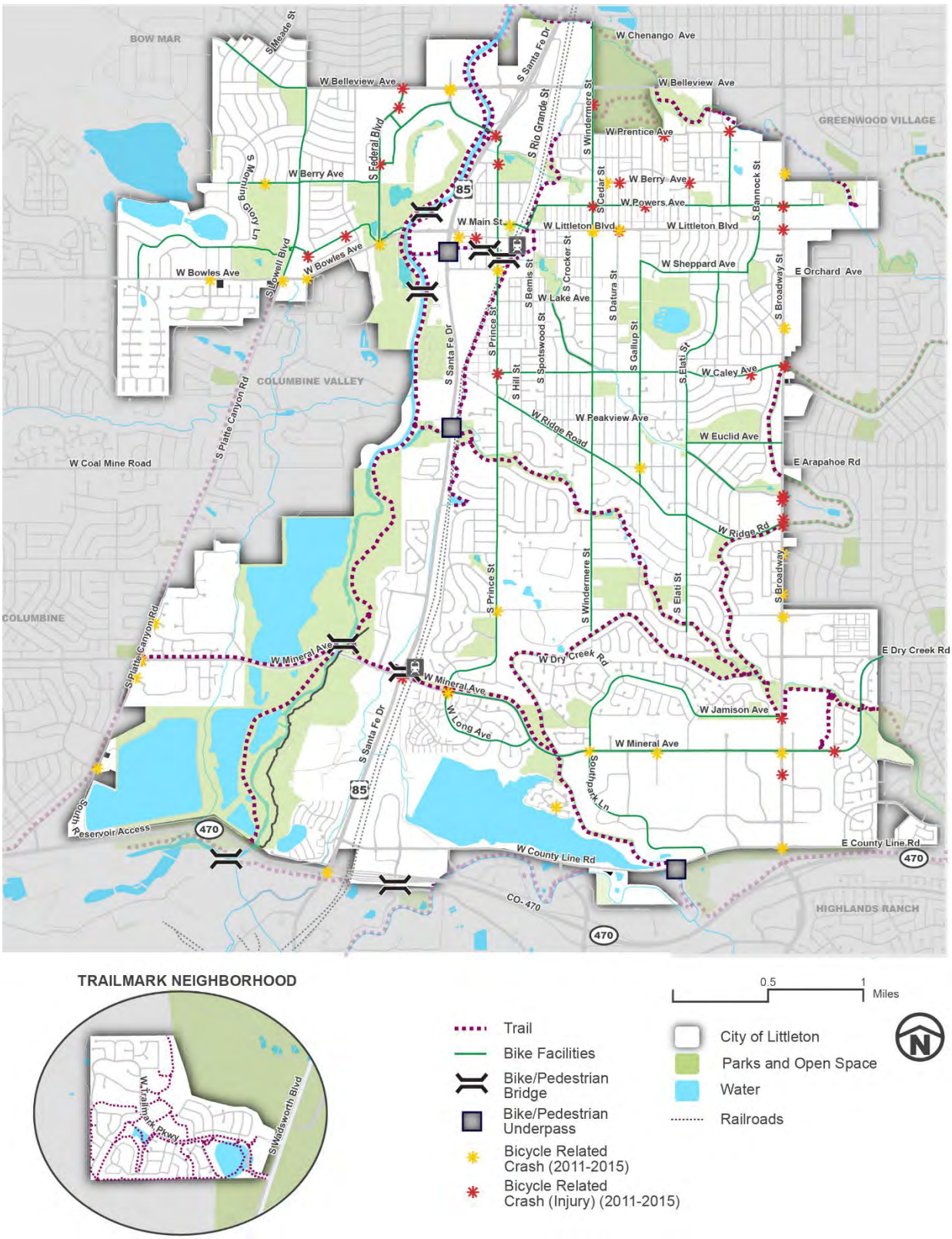
- Trail Network: 51 miles of regional and local trails provide excellent bicycle facilities throughout Littleton.
- On-street Bike Facilities: Littleton has 24 miles of on-street bike facilities, covering 15% of the City's roads. These facilities include sharrows, signed bike routes, shared parking/bike lanes, and separate marked bike lanes. On most minor arterial and collector streets, these bike facilities provide convenient access for most of the City. Improvements to the design of these lanes and expansion of the network could enhance the use of these facilities.

Many of Littleton's trails are bike-friendly.

Typical bike lane, striped and signed, but no markings.

0.4% **Percent of Littleton residents who bike to work (does not include children bicycling to school or recreational bicycling)**

Figure 7. Bike Challenges and Opportunities



FUNDING

Littleton spends the vast majority of its annual transportation budget on maintenance and operations of the existing system. Significant improvements to the system will require securing additional funding.

Littleton funds its transportation projects through a mix of revenue generated at the local, state, regional, and federal levels. The primary source of this revenue is Colorado's Highway Users Tax Fund (HUTF), which currently disperses approximately $1.4 million to Littleton each year. Statutorily, HUTF funds must be spent only on transportation improvements, and Littleton has dedicated the entirety of these funds to maintenance.

The growth of the City and aging infrastructure has placed an increased burden on street maintenance in recent years. The available funds are currently inadequate to support ongoing maintenance needs, and no funding exists for capaCity improvements.

As of today, no funding for capital improvements is available through the budget process. Typically, the only way the City has been able to fund capaCity improvements, bicycle facilities, pedestrian enhancements, or other projects has been through saving funds allocated for other means and re-allocating them to transportation needs. This is not a sustainable funding plan.

A complete funding analysis can be found in Chapter 9. Implementation.

Chapter 3.
Mission and Goals

MISSION AND GOALS

HOW DID WE GET HERE?

Littleton's Transportation Master Plan (TMP) is a tactical approach to achieving the community's vision for a transportation network that moves people and goods while enhancing Littleton's unique character and identity. The goals, objectives and strategies introduced here are a response to 18 months of listening to citizens and stakeholders through a series of surveys, workshops, events, newsletters, and conversations.

The Envision Littleton process created a foundation to describe what gives Littleton its identity and what is important to those who live and work here, and who enjoy all the City has to offer. Building on the adopted unifying vision, guiding principles, core values, and other guidance in that plan, the TMP's strategic framework was developed through a lengthy refinement process involving listening sessions and workshops with City staff, Joint Leadership (City Council and Planning Commission), broad community input including a Community Coordinating Committee (CCC), and other stakeholders. Additional information about community input can be found in the Community Engagement Appendix.

City Departments engaged through workshops and listening sessions:

- Finance
- Police
- Community Development
- Economic Development
- Communications
- Information Technology (IT)
- Public Works

Community members reached:

- **In-person: 8,315**
- **Social media: 45,354**
- **E-mail: 70,805**
- **Postcards: 50,506**

"I would like people to be nice when they're going someplace."

"We know we're going to have big expenses coming up, and we don't have the funding sources for those."

"The traffic, as is, is unsustainable, in 20 years it will be worse. It has to be addressed."

"We can't just solve today's problems - we have to solve tomorrow's problems."

"Happier drivers."

"I could think of no other City where I would wish to live."

"The goal is a transportation system that supports a community where people want to live, work, and play. That's an enabler for quality of life and it's an enabler of job creation in the City."

"Change is going on around us. Do we want it to happen to us, or do we want to participate? It's about time -- we need to be proactive and not reactive"

"I'm pretty patient, but sometimes I get a little crazy when I'm sitting in traffic."

STRATEGIC FRAMEWORK

The Envision Littleton guiding principles, values, shared priorities, and shared concerns form the basis for the TMP. The strategic framework shown here explains how the TMP is structured. The rest of this section explains each of the five goals in detail, shows how the objectives support the goals, and introduces key policy points.

Envision Littleton Vision Report
A unifying vision and summary of Littleton's core values, guiding principles, and shared priorities and concerns

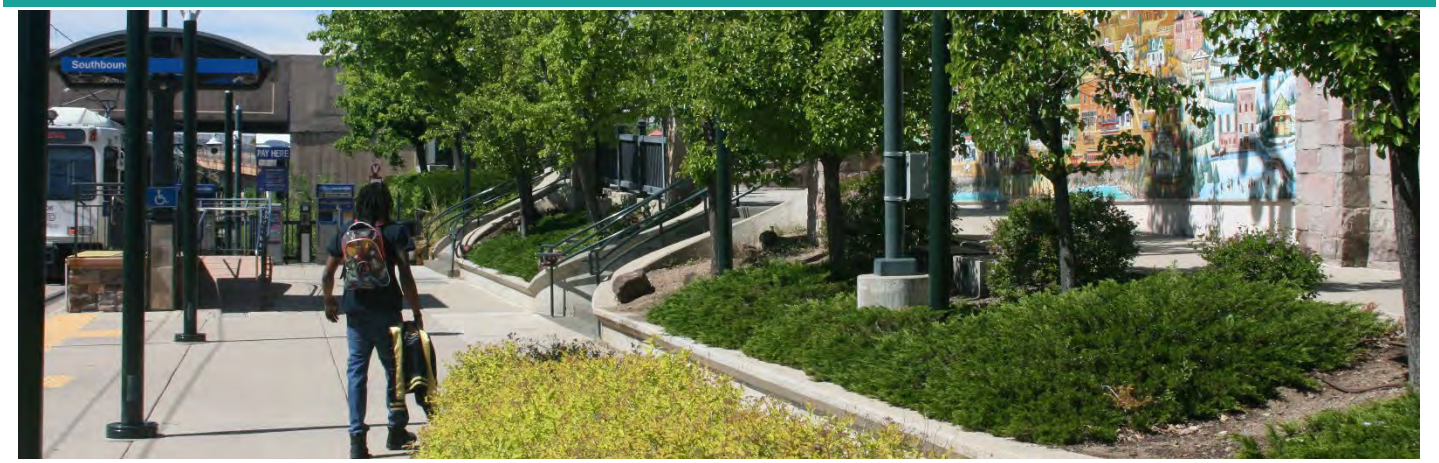
Transportation Master Plan Mission
What we are doing, for whom and why? The purpose of the Transportation Master Plan

Goals
Broad, qualitative statements regarding what we are trying to achieve

Objectives
Specific, measurable, time limited, quantifiable desired achievements in support of the goals

Policies, Strategies, and Investments
Actions we will be taking

Measures
How we will measure our progress toward our plan and a way for us to assess the need to adjust the plan



Littleton Downtown LRT Station.

WHAT ARE THE CITY'S MISSION AND GOALS?

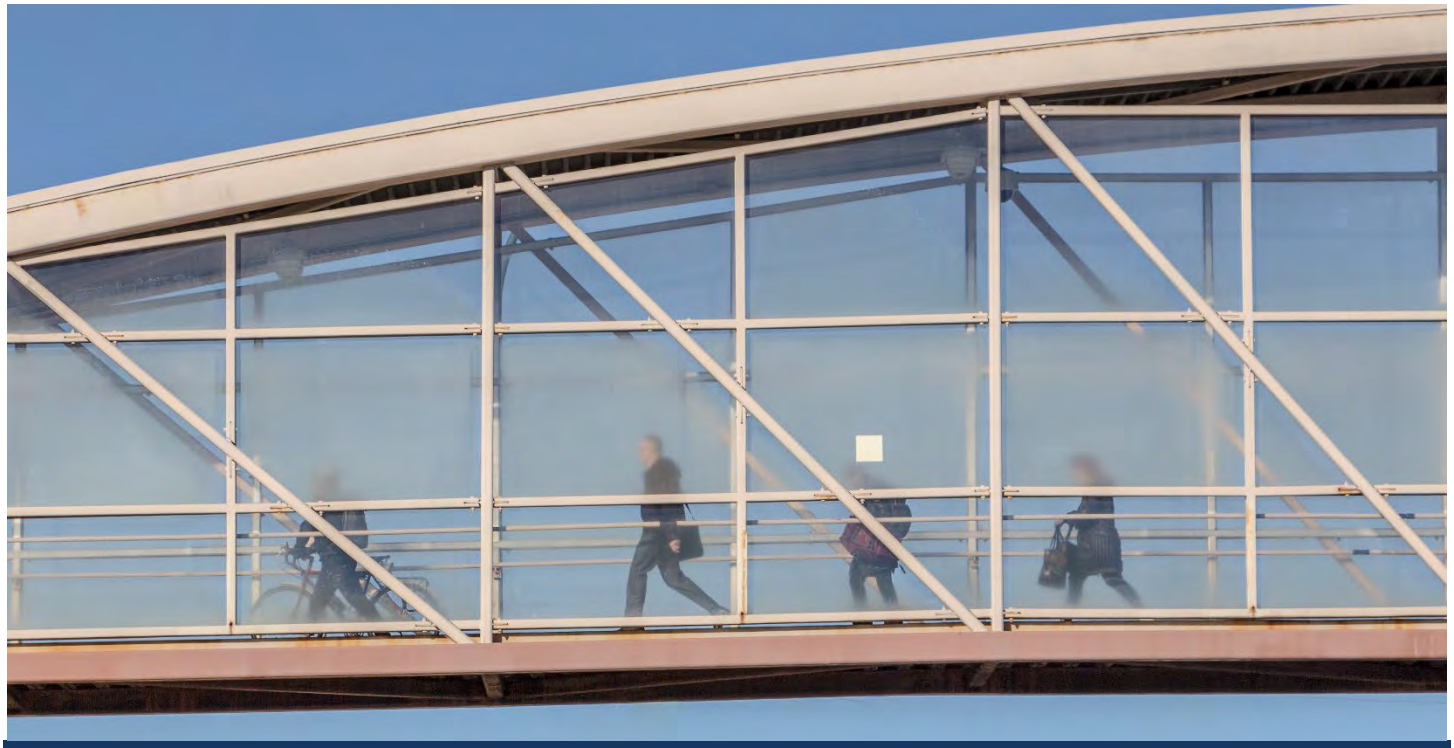
TRANSPORTATION MASTER PLAN **MISSION STATEMENT:**

Littleton will enable connection and accessibility for all through regional leadership and responsible stewardship of the City's transportation systems, policies, programs and services.

GOALS

- **Connected** — Connect people conveniently to the community, resources, and opportunities.
- **Healthy** — Promote safety and support efforts to maintain a healthy and active lifestyle.
- **Inclusive** — Allocate services and facilities so that all people have transportation options that are best suited for their needs and lifestyle.
- **Prosperous** — Contribute to our economic prosperity while maintaining and enhancing our community's character.
- **Sustainable** — Build and operate a financially and environmentally sustainable transportation system.

Littleton neighborhoods



GOAL: **CONNECTED**

Connect people conveniently to the community, resources, and opportunities.

What are we trying to achieve with the "connected" goal?

A connected Littleton is one where people have convenient ways to get from home to school, work, and popular destinations such as downtown and the Mary Carter Greenway. Achieving this goal will require creative approaches to crossing existing barriers and closing existing gaps in the transportation network, with a focus on comfortable and convenient networks as well as improved connections for all travelers.

ALIGNMENT WITH ENVISION LITTLETON:

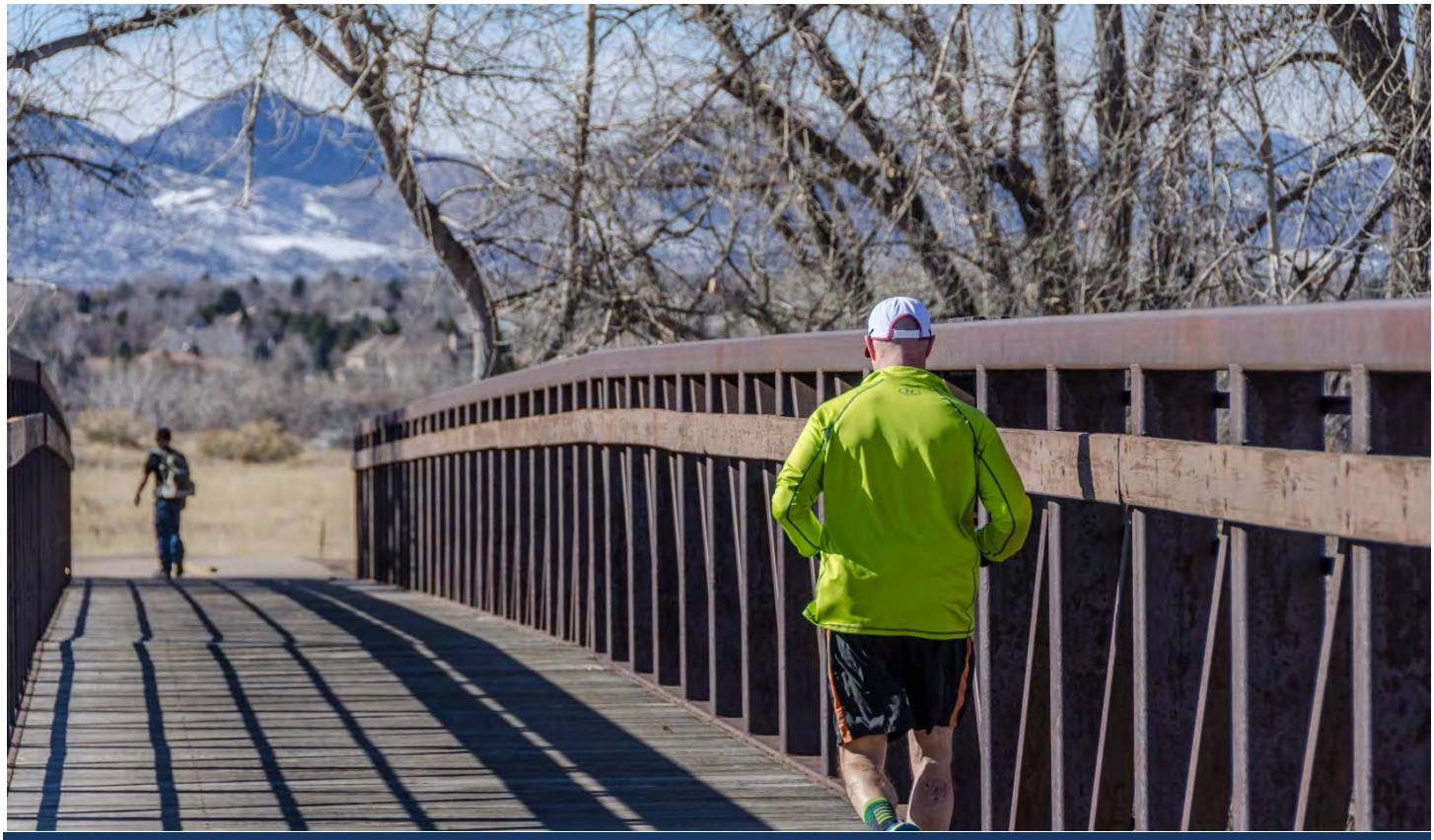
- Connected *(Guiding Principle)*
- Anchored *(Guiding Principle)*
- Being a Model Community *(Values)*
- Accessibility *(Shared Priorities)*
- Small town feel and community *(Shared Priorities)*
- Traffic *(Shared Concerns)*

"East to west connection is an issue for bikes and pedestrians as well as cars. There are significant barriers."

" We have a desire and need to improve connections with regional systems."

"The trail network is a huge benefit for the City."

"Our transportation system needs to balance moving people through and encouraging them to stay."



GOAL: **HEALTHY**

Promote safety and support efforts to maintain a healthy and active lifestyle.

What are we trying to achieve with the "healthy" goal?

In a healthy Littleton, the transportation network minimizes the safety risks of travel by any mode, and citizens have plenty of opportunities to maintain an active lifestyle. Achieving this goal requires a holistic, ongoing effort to identify and mitigate transportation network deficiencies. Success will also mean ensuring easy access to the City's abundant open spaces for all citizens.

"The trails are great for bicyclists and people who want to run or walk to get some exercise."

"Safety, safety, safety, safety ."

"Certain intersections don't feel safe for pedestrians."

ALIGNMENT WITH ENVISION LITTLETON:

- Active *(Guiding Principle)*
- The Outdoors *(Values)*
- Integrity *(Values)*
- Safety *(Values, Shared Priorities)*
- Park, trails, and open space *(Shared Priorities)*

GOAL: **INCLUSIVE**

Allocate services and facilities so that all people have transportation options that are best suited for their needs and lifestyle.

What are we trying to achieve with the "inclusive" goal?

An inclusive Littleton allows people an intuitive way to travel, regardless of ability, age, or socioeconomic status. Success will require a human-scale approach to adapting the transportation network—one that finds practical solutions to the mobility challenges of all people in Littleton.

"The cost of transportation shouldn't prevent people from getting to work."

"Community partners can continue to teach us how to create an accessible system that's practical for people, not just compliant. "

"The light rail is a huge strength of the transportation system, but connections to the stations could be better."

ALIGNMENT WITH ENVISION LITTLETON:

- Anchored *(Guiding Principle)*
- Being Inclusive *(Values)*
- Civic Involvement *(Values)*
- Accessibility *(Shared Priorities)*
- Affordability *(Shared Concerns)*

GOAL: **PROSPEROUS**

Contribute to our economic prosperity while maintaining and enhancing our community's character.

What are we trying to achieve with the "prosperous" goal?

A prosperous Littleton is one where services and facilities provide a cohesive civic identity and are the backbone for prosperity. Achieving this goal requires a coordinated approach to land use, transportation, and other infrastructure development. Success will mean thriving neighborhoods throughout the City.

"Improved mobility for pedestrians, bicyclists, motorists, and transit riders would encourage more people to live here and do business here."

"The truth is people think there's a parking problem, so we have a parking problem."

"Downtown is a huge strength. It's a place where people want to be, want to walk around."

ALIGNMENT WITH ENVISION LITTLETON:

- Authentic *(Guiding Principle)*
- Local History *(Values)*
- Quality *(Values)*
- Downtown Littleton *(Shared Priorities)*
- Compatibility of redevelopment *(Shared Concerns)*
- Growth impacts *(Shared Concerns)*
- Small town feel and community *(Shared Priorities)*

GOAL: **SUSTAINABLE**

Build and operate a financially and environmentally sustainable transportation system.

What are we trying to achieve with the "sustainable" goal?

For Littleton, sustainability means taking a long-term view of the City's financial and environmental resources. This includes establishing a prioritized set of transportation improvements that allows for adaptability as technology and demographics change. These improvements should include a focus on improving air and water quality. The City will work toward both aspects of its sustainability goal by maintaining a strong presence in regional planning efforts.

"The way the budget is currently, structured, it would be hard to keep up with transportation needs if the economy changes."

"We can't just solve today's problems - we have to solve tomorrow's problems."

"Colorado is a place where people want to be out in nature -- being tied up in your car for an hour runs antithetical to that goal."

ALIGNMENT WITH ENVISION LITTLETON:

- Active *(Guiding Principle)*
- Anchored *(Guiding Principle)*
- Being a Model Community *(Values)*
- The Outdoors *(Values)*
- Quality *(Values)*
- Parks, trails, and open space *(Shared Priorities)*
- Contentious local politics *(Shared Concerns)*

OBJECTIVES

Building from the goals, a series of workshops involving the Community Coordinating Committee, Joint Leadership Team, and TMP technical staff worked to develop a tactical approach to planning for the future of Littleton's transportation system. Those efforts produced the list of 31 objectives presented in Table **1**, spread across seven topic areas: Quality of Life, Community, Mobility, Active, Auto, Transit, and Freight.

How the objectives are used: The objectives are statements about the direction the City wants to take its transportation system. Each objective is associated with one or more performance measures, which include a baseline and a target for 2040. These measures informed the project prioritization effort found in the TMP. In addition, they provide a system of accountability for tracking progress over time.

The TMP is designed to be a living document that can be revisited at regular intervals. The objectives offer a benchmark to evaluate how effectively the City is achieving its goals as well as a record of the community's priorities as of 2019.

Table **1**. Transportation Objectives

No.	Topic	Objective	Related Goals				
			Connected	Healthy	Inclusive	Prosperous	Sustainable
1	Quality of Life	Achieve high resident satisfaction rates with transportation services	●		●	●	●
2	Quality of Life	Provide spaces that people can enjoy within the public right-of-way		●		●	
3	Quality of Life	Provide people with a sense of personal safety on all transportation modes		●	●		
4	Quality of Life	Provide transportation infrastructure that meets local business needs				●	●
5	Community	Provide transportation facilities that are well integrated with land use and character				●	
6	Community	Minimize transportation-related air quality degradation		●			●
7	Community	Minimize transportation-related water quality degradation		●			●
8	Community	Minimize transportation-related noise impacts		●		●	●
9	Community	Establish a transportation planning and implementation process that is flexible and adaptable					●
10	Community	Provide for a community-driven decision-making process for transportation investments			●		●
11	Community	Provide a transportation system the City can afford to maintain					●
12	Mobility	Provide a reliable and high-quality transportation system	●		●	●	
13	Mobility	Achieve a balanced mode share	●	●	●	●	●
14	Mobility	Provide high-quality transportation systems people can afford to use	●		●	●	

Table **1**. Transportation Objectives

No.	Topic	Objective	Related Goals				
			Connected	Healthy	Inclusive	Prosperous	Sustainable
15	Mobility	Provide travelers with relevant, timely information -- including innovative methods	●	●	●		
16	Active	Provide a well-connected, direct bicycling network	●	●			●
17	Active	Provide a safe and low-stress biking environment	●	●	●		●
18	Active	Provide a well-connected pedestrian network	●	●			
19	Active	Provide a safe and low-stress walking environment	●	●	●		
20	Active	Provide healthy transportation choices		●			●
21	Auto	Provide a well-connected automotive network	●			●	
22	Auto	Provide for safe automobile travel		●		●	
23	Auto	Provide a resilient and responsive traffic operations system	●				●
24	Auto	Provide an efficient automotive network	●			●	●
25	Auto	Provide a roadway network that allows for excellent emergency response	●	●			
26	Transit	Connect people effectively to the transit system	●			●	
27	Transit	Provide an efficient transit system with regional partners	●		●		
28	Transit	Provide safe and comfortable transit stops and stations			●	●	
29	Freight	Provide a reliable freight network	●			●	
30	Freight	Provide a well-connected freight network	●			●	
31	Freight	Provide a safe freight network		●		●	

WHAT IT MEANS TO PROVIDE A COMPLETE NETWORK

A complete multimodal transportation network in the City that provides connections, choice, calming, and capaCity while meeting the needs of the community will be the result of implementing the projects defined in subsequent sections. These projects and strategies, combined, will allow the City to realize its Transportation Goals, and ultimately deliver upon the Mission defined by the community. Not every street has the room or capaCity to serve every mode, nor do they all have the demand for each mode, so priorities have been determined based on the adjacent land uses, network needs, ability of the right-of-way to accommodate various modes and major destinations. Many of these priorities have evolved over time already, and are in place today, in the form of transit service on some streets, wider sidewalks, and bicycle facilities. The complete networks presented here will build upon this foundation and are intended to present a path to

completion of networks so that all people can choose the mode that best suits their travel needs and lifestyles.

LEVEL OF SERVICE

The City is using the term “Level of Service” (LOS) to define appropriate facility types and widths of facilities for the various transportation modes. These criteria are described in depth in the mode-specific chapters that follow. In Littleton, Level of Service allows us to judge how well our transportation networks are performing. Maintaining LOS standards allows the City to better manage the impacts of development and forms the foundation for how we can manage our transportation networks in a way that is responsive to growth pressures from within and from surrounding communities. The LOS standards or thresholds are defined within each mode-specific chapter.

- **Auto LOS:** for auto and freight networks, LOS refers to the relation between the number of vehicles that are using a specific roadway or intersection and the traffic capaCity of those roadways or intersections. It is generally provided as a letter-grade that easily communicates the level of congestion that exists in a location on a scale from A to F. See The Auto and Freight Chapter for details.
- **Active Transportation LOS:** for pedestrians and bicyclists, LOS refers to the level of stress that pedestrians and bicyclists feel from adjacent auto and freight traffic. In order to provide a complete network, comfortable and safe (low-stress) facilities must be provided. In order to provide such facilities, bicycle and pedestrian facilities require different levels of protection from autos and trucks to feel safe. See the Active Transportation Chapter for details.
- **Transit LOS:** for transit, LOS refers to the availability, frequency, comfort, and convenience of transit for people who make trips via transit on either bus or rail. The percentage of citizens with convenient access to high-quality transit is used to measure how well transit services are meeting Littleton’s needs. It must be acknowledged that the Regional Transportation District (RTD) owns and operates the vast majority of transit services within the City. Littleton is a member of RTD, and can influence LOS mostly through regional partnerships. See the Transit Chapter for details.

Provision of a complete transportation network that meets the needs of the citizens of Littleton requires that these criteria, combined with the other objectives outlined in this plan are met. In order to meet our goals, we will need to re-think the way we have designed our streets. In order to lay that groundwork, the types of streets that we provide as a service have been reconsidered below.

STREET TYPES

Littleton has a diverse set of street types, from local residential streets to wide commercial streets. The City has long used a standard functional classification approach to define the street network in the past. The City’s classification system consisted of local, collector, and arterial street classes. However, this functional classification system does not adequately account for the way the surrounding land use intensity and character affect the street’s operation and design.

The Envision Littleton plan has established a method to better account for these distinct issues when designing and operating our streets. The street types listed herein allow the City to address typical challenges encountered and develop future street type maps that will set the table for updated design standards. In addition to street types, this plan also incorporates modal priorities for active transportation, transit, and auto/freight, as well as overlays for character classes, consistent with those identified in the Comprehensive Plan. The Complete Network and Overlay maps can be found in the Recommendations Chapter following the mode chapters.

Local Street

Typical Right-of-Way	60-80 feet
Target Design Speed	20-25 mph
ADT Range (vpd)	<3,000
Lanes	2 (no lane markings)
Primary Purpose	Local access
Pedestrian/Bicycle Facilities	Attached and Detached Sidewalks
Landscaping	Property owner
On-Street Parking	Allowed

A local street can exist in any context and is used primarily for access to adjacent properties. The cross-section should encourage slow speeds and inherently multimodal operations, serving pedestrians, bicyclists, autos, and even infrequent freight traffic (i.e., deliveries, trash services, etc.). These streets provide the least through movement connectivity.

Example: Dry Creek Road (above)

Neighborhood Connector

Typical Right-of-Way	60-100 feet
Target Design Speed	25-35 mph
ADT Range (vpd)	3,000-18,000
Lanes	2, plus turn lanes where warranted
Primary Purpose	Local mobility
Pedestrian/Bicycle Facilities	Attached and Detached Sidewalks, on-street bike facilities
Landscaping	Property owner
On-Street Parking	Allowed, with some exceptions

Neighborhood connector streets are typically found in areas with almost exclusively adjacent residential land use. These streets are intended to serve short to medium length trips, and are slow speed. They include some local access to properties and are characterized by modest setbacks. These streets are good candidates for active transportation connections, as they will typically have less auto and truck traffic. Traffic calming may be desired to keep speeds slow and promote safety for all users.

Examples: Powers Avenue (above), Prince Street, Windemere Street

Suburban Connector

Typical Right-of-Way	80-120 feet
Target Design Speed	30-40 mph
ADT Range (vpd)	18,000-40,000
Lanes	4, plus turn lanes where warranted
Primary Purpose	Local and regional mobility
Pedestrian/Bicycle Facilities	Detached Sidewalks, protected on-street bike facilities or shared use paths
Landscaping	City, Street Trees and Median Landscaping
On-Street Parking	Not typical

Suburban connector streets are typically found in areas with adjacent residential land use and some suburban retail and commercial. These streets are intended to serve medium length trips, and are medium speed. They include minimal local access to properties and are characterized by modest setbacks. These streets are good candidates for active transportation connections including bicycle facilities, but should provide adequate separation.

Examples: Mineral Avenue (above), Bowles Avenue

Mixed Use/Downtown Connector

Typical Right-of-Way	60-100 feet
Target Design Speed	20-30 mph
ADT Range (vpd)	6,000-24,000
Lanes	2 or 4, plus turn lanes where warranted
Primary Purpose	Local access, business access
Pedestrian/Bicycle Facilities	Detached Sidewalks, on-street bike facilities
Landscaping	City, Street Trees
On-Street Parking	Allowed

Mixed Use/Downtown Connectors are found in areas that have a combination of retail, commercial, office, restaurant and residential uses. These streets are typically slower speed, and may have driveways. They are intended to be multimodal, with wide sidewalks and sometimes with facilities for biking.

Example: Sycamore Street (above)

Mixed Use/Downtown Main Street

Typical Right-of-Way	60-110 feet
Target Design Speed	20-25 mph
ADT Range (vpd)	6,000-40,000
Lanes	2 or 4, plus turn lanes where warranted
Primary Purpose	Business access, placemaking
Pedestrian/Bicycle Facilities	Detached Sidewalks, on-street bike facilities
Landscaping	Street Trees and other landscaping is important
On-Street Parking	Allowed, with some exceptions

The buildings along these streets should have little to no setback, pedestrian-oriented frontages, and activated main floor uses. Auto speeds should be slow and driveways should be limited. On-street parking may be incorporated, but due consideration to other uses of valuable public right-of-way should be given. Pedestrians are the priority on these streets, but people on bicycles or other soft vehicles should be provided a safe environment.

Example: Main Street (above)

Commercial Corridor

Typical Right-of-Way	80-150 feet
Target Design Speed	30-55 mph
ADT Range (vpd)	>20,000
Lanes	4 or 6, plus turn lanes where warranted
Primary Purpose	Regional mobility
Pedestrian/Bicycle Facilities	Attached and Detached Sidewalks, shared use paths
Landscaping	Street trees, turf, and other landscaping
On-Street Parking	Allowed (with some exceptions)

Commercial corridors serve mostly commercial uses, including shopping, industrial, offices, etc. Commercial corridors typically serve both through trips and provide property access; direct access should be discouraged. Commercial corridors have typically been focused on auto travel. Better pedestrian, bicycle, and transit facilities can be provided where appropriate. Speed limits should only exceed 40 mph on highly controlled facilities.

Examples: Broadway (above), Santa Fe Drive, Belleview Avenue

OVERLAYS

The following overlays identify areas or corridors within the City that should provide streets that cater to certain modes. These overlays will allow the City to provide complete networks for each mode, and will affect the design of the street and guide the City to make decisions about types of facilities to provide within the right-of-way.

Modal Priorities

Pedestrian

The City is focused on the safe and efficient movement of pedestrians (people walking or using mobility devices such as wheelchairs). All City streets should provide safe spaces to move along and across the street. Pedestrians are our most vulnerable travelers, and prioritizing their safety is of utmost importance. This plan focuses the City's future pedestrian enhancements on these areas of greatest need:

- First and last mile connections to transit including Mineral Station, Littleton Downtown Station, and the Broadway Transit Corridor.
- Safe Routes to Schools
- Park connections
- Regional trail connections

Tradeoff: As pedestrian enhancements are considered, it must be acknowledged that in some cases, this priority will require sacrificing space for some other mode. Sometimes this will include the removal of on-street parking in order to widen the sidewalk, or in some cases with constrained right-of-way between buildings this could entail removing a vehicle travel lane and reorganizing the road in order to provide more sidewalk space.

Bicycle

Bicycle priority streets aim to provide low-stress bicycle options to reach destinations. The treatments used on these streets may include striped bike lanes, protected bike lanes, cycle tracks, or separate off-street facilities, such as parallel trails. As with the pedestrian network, the City will focus on upgrades to the bicycle network where the need is greatest:

- First and final mile connections to transit including Mineral Station, Littleton Downtown Station, and the Broadway Transit Corridor.
- Safe Routes to Schools
- Park connections
- Regional trail connections, and connections to surrounding region

Tradeoff: As bicycle enhancements are considered, it must be acknowledged that in many instances, this priority will require sacrificing space for some other mode. Most often in Littleton, this will result in sacrificing space or mobility for the private automobile. Sometimes this will take the form of slower speeds due to narrower lanes, restricting turning movements or adding signals to increase safety or longer delays due to fewer lanes for auto capaCity, while other times this will mean the reduction of space for on-street parking.

Tradeoff: As transit enhancements are considered, it must be acknowledged that in many instances, this priority will require sacrificing space for some other mode. Most often in Littleton, this will result in sacrificing space or mobility for the private automobile. Sometimes this will mean that buses make stops within the travel lane to increase their speeds, while other times this will mean the reduction of space for on-street parking, or even the reduction of auto capaCity.

Transit

Transit corridors should be enhanced to meet the City's objectives to provide competitive and attractive transit service as an alternative to the private auto. The future Transit priority streets in the City, in addition to maintaining light rail operations along Santa Fe Drive, are:

- Broadway
- Littleton Boulevard
- Mineral Avenue
- Church Avenue
- Bowles Avenue
- Ridge Road

Treatments to enhance transit on these streets include, but are not limited to:

- Speed and reliability: queue jumps, transit signal priority, exclusive lanes
- Amenities: enhanced stops to include benches, lighting, shelters, fare payment systems, real-time information, or other means developed and recommended by the Regional Transportation District (RTD).
- Connectivity: future transit streets should ensure that stops are accessible to users, through sidewalk connections, ramps, and crossing treatments that enhance safety.

Truck

The City maintains designated truck routes intended to funnel freight movement onto corridors that are designed to handle heavy vehicles. As goods delivery evolves, it will be important for the City to remain flexible, and adapt to changes in the types and numbers of freight vehicles on our streets. Given these shifting trends, the truck route map and related policies should be reviewed annually.

Tradeoff: As freight movement enhancements are considered, it must be acknowledged that in many instances, this priority will require sacrificing space for some other mode. In many instances, truck design standards require that pedestrian and bicycle facilities are not as direct or comfortable. Proper consideration for these modes must be taken into account as designs proceed.

Character

The character of the adjacent land use should affect the design of the street. The major character contexts listed below have been identified in Littleton.

Estate

On streets in the estate or natural character areas, the separation between active and auto transportation users is generally less defined. Many streets in these areas are shared streets where different user groups mingle in the same space. Detached sidewalks are rare and the natural or landscaped setting generally comes right up to the edge of the street. On-street parking is generally discouraged and off-street parking facilities are common.

Suburban

On streets in the suburban character areas, the City envisions detached or wider attached sidewalks, with street trees. The mix of users includes all modes on many streets in these character areas. Green space should be prioritized as part of the streetscape. Building setbacks in these areas are larger, meaning that the building frontage is less important for activation, and landscaping plays a more prominent role. On-street parking is typically permitted where appropriate on lower mobility street types.

Urban

On streets in the urban character areas, the urban building forms interact with the streetscape to create a street wall. Sidewalks can be wide and attached with planters or trees, or can be detached with a tree lawn separating pedestrians from autos. Generally, urban areas will have more pedestrian activity and streets should dedicate more space to active transportation. Curb space management may become a priority, as ride-hailing and valet services become more popular. On-street parking is typically permitted, although due consideration should be given to using that space for other modes.

POLICIES, STRATEGIES & PROJECTS

The goals and objectives describe the community's desired future for its transportation system. In order to move toward that future while protecting existing values, the City must develop a detailed work plan consisting of capital improvement projects, and organizational strategies.

The following chapters detail the specific needs related to auto (including freight), active transportation (such as bike, pedestrian, and micromobility), and transit (bus and rail). This analysis results in a set of strategies and projects that would help Littleton work toward its transportation objectives, in the short term as well as over the next several decades.

Chapter 4.
Auto and Freight

INTRODUCTION

Because Littleton was developed in a time of rapid auto adoption and in times in which most people have access to a private auto, the City has a strong auto and freight network with few gaps. The City's network includes the full hierarchy of auto streets, from freeway (C-470) down to local streets.

The geography of the City has determined much of this network, particularly the location of the South Platte River and the freight and light rail tracks. These major linear assets also act as barriers to east-west connectivity. The Highline Canal, which meanders through the City, also limits connectivity.

The City is characterized by these and other features, and the way people move in and through the City is shaped by the way the City has been built. The primary auto-oriented corridors exist mainly along the City's edges:

- North-South Corridors:
    - Platte Canyon Road
    - Santa Fe Drive (US 85)
    - Broadway
- East-West Corridors:
    - Belleview Avenue
    - Bowles Avenue/Main Street/Alamo Avenue/Littleton Boulevard
    - Mineral Avenue
    - County Line Road

Meanwhile, the interior of the City is defined by its neighborhood character and slower moving traffic on narrower streets.

Auto traffic on the main auto-oriented corridors has been increasing in the recent past, spurred primarily by regional growth outside the City. Major developments have been built south and west of the City and have resulted in traffic congestion on Littleton streets.

LEGACY OF PAST PLANNING

The following plans previously developed for Littleton and vicinity offer insights from the time they were prepared and provided an essential foundation for preparing this Auto and Freight element of the Transportation Master Plan.

- Citywide Plan (2014)
- Belleview Avenue Corridor Vision (2018)
- Broadway Corridor Study (2009)
- Downtown Neighborhood Plan (2011)
- South Platte River Corridor Development Design Guidelines (2000)
- South Platte River Corridor Vision, Arapahoe County, (2013)
- DRCOG (Denver Regional Council of Governments) Metro Vision 2040 (2017)
- Arapahoe County 2035 Transportation Plan (2010)

Key takeaways from past planning efforts include:

- Improve connections between downtown/river corridor/parks/trails.
- Complete network of streets in the City that provides connections, choice, calming, and capaCity where appropriate.
- Improve traffic flow on Connector Streets and Commercial Corridors.
- Decrease cut-through traffic in residential areas.
- Improve multimodal connections between commercial locations/residential developments.
- Improve connections to light rail.
- Improve road connections to key destinations but not through natural areas/build fewer cul-de-sacs/promote grid street network.

KEY ISSUES AND CONSIDERATIONS

Input and discussions for this Transportation Master Plan, through varied *Envision Littleton* community engagement, workshops with City Council and Planning Commission, and interaction with other City boards/commissions, City departments, and partner agencies and organizations, yielded the following list of key items that relate to the auto and freight transportation network:

- **Congestion**: Growth within and surrounding Littleton has resulted in increased congestion on many streets.
- **Barriers**: the City is crossed by multiple barriers limiting connectivity. While some areas of the City have a strong internal grid, barriers like the South Platte River, Santa Fe Drive, the rail corridor, and even some suburban neighborhoods exist that break up the grid and force traffic to use one of only a few major connections, resulting in traffic congestion.
- **Safety**: A total of 5,089 crashes occurred in Littleton during the 5-year period from 2014 to 2018—about three per day. The social and economic impacts of these crashes are vast.
- **Parking**: Downtown parking has been identified as a major issue, and has been cited as a reason for avoiding coming to the downtown retail and commercial district.

More information on each of these key issues is provided below.

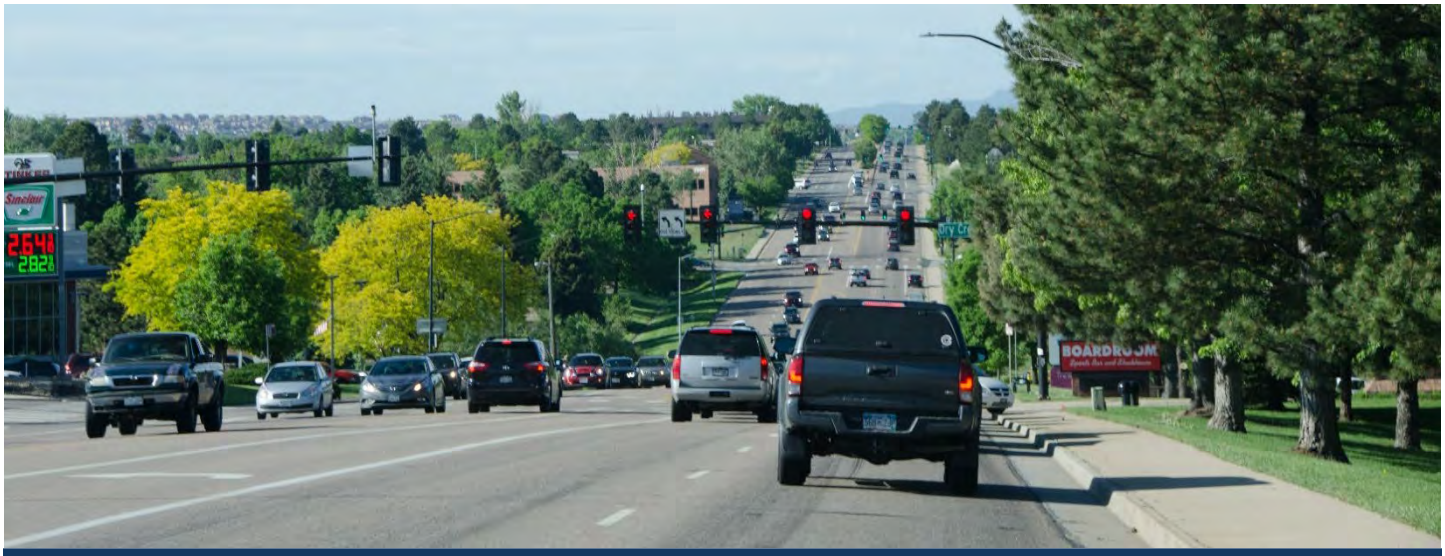
CONGESTION

Congestions is a term used to describe traffic conditions where motorists experience delay and the volume of traffic on a street is at or near its capaCity. Congestion, also referred to as poor Level of Service, in Littleton is primarily concentrated on its major regional corridors. In urban areas, most congestion occurs at intersections. This is the case in Littleton, with congestion occurring at major bottleneck locations throughout the City where Connector Streets and Commercial Corridors intersect.

Level of Service

A key method of evaluating the need for improvement is to examine roadway capacities. Through goal-setting, the City has set a desired Level of Service threshold for its roadways. Level of Service (LOS) refers to a letter grade system of gauging a road's ability to serve travel demand. The grades range from A to F, where A represents free-flow traffic conditions with almost no delay, and LOS F represents gridlock or severe congestion with high levels of delay.

The City's desired Level of Service is LOS E or better for Commercial Corridors and Suburban Connectors and LOS D or better for all other streets. LOS is a tool that allows the City to identify the appropriate improvement types for streets within its borders, and to require roadway improvements as mitigation from development that may increase the demand on the existing system.



The capaCity indicates the maximum number of vehicles per day (vpd) that can be served by a typical roadway before exceeding the LOS threshold. While the theoretical maximum number of vehicles served is higher, as traffic increases beyond these capacities, congestion occurs and travelers experience delay. Many factors can raise or lower these capacities, including but not limited to the number of intersections or access points, provision of turn lanes or other operational improvements, level of peak hour traffic, and even driver behavior. These capacities are widely-accepted typical capacities and traffic behavior and roadway characteristics in Littleton are generally consistent with the typical roadways on which these capacities are based.

In addition to corridor Level of Service, the City should also monitor intersection LOS, which is based on the typical average delay experienced by all of the motorists traveling through an intersection. Due to the number of intersections in the City, a thorough analysis of intersection LOS with traffic engineering software was not feasible for this plan. However, other tools allow the use of cell phone and GPS data to identify where poor LOS is occurring at intersections throughout the City.

An analysis of bottlenecks through use of INRIX data identifies those locations that cause the most traveler delay and frustration. INRIX is a Big Data aggregation company that compiles GPS and cell phone data all over the world. This data can be used to determine typical free-flow traffic conditions on major roads and subsequently when and where delay is occurring compared to free-flow conditions.

Analyzing the data in Littleton, it is apparent that the most severe bottlenecks in the City occur at intersections along the Santa Fe Drive, Broadway, Belleview Avenue, Bowles Avenue, and Mineral Avenue corridors. The table at right shows the 25 worst bottlenecks in the City ranked by the total delay (in minutes per day) experienced by motorists during the course of driving in 2018. These locations currently experience poor LOS at some point during a typical day.

Table 2 shows the planning level bi-directional (total of both directions) daily traffic capacities for typical roadways in Littleton based on these LOS thresholds.

Table 2. Planning Level Bi-Directional Daily Traffic Capacities For Typical Roadways

Facility Type and Lanes	CapaCity*
2-lane Local Street (LOS D)	3,000
2-lane Mixed Use/Downtown or Neighborhood Connector or Main Street (LOS D)	10,000
3-lane Mixed Use/Downtown or Neighborhood Connector or Main Street (LOS D)	18,000
4-lane Suburban Connector or Commercial Corridor (LOS E)**	40,000
6-lane Suburban Connector or Commercial Corridor (LOS E)**	60,000

* 2-way total vehicles per day

** Assumes turn lanes are provided as needed at intersections

Table 3. INRIX Bottleneck Rankings

Rank	Location	Delay (minutes per day)
1	NB Santa Fe at Mineral	77,973
2	NB Santa Fe at C-470	70,417
3	NB Santa Fe at Bowles	48,762
4	SB Santa Fe at Mineral	48,328
5	WB Mineral at Santa Fe	39,703
6	WB Bowles at Santa Fe	34,776
7	SB Santa Fe at Bowles	27,757
8	SB Broadway at Littleton	21,591
9	EB Bowles at Platte Canyon	20,120
10	SB Santa Fe at C-470	19,639
11	EB Mineral at Santa Fe	17,380
12	NB Broadway at Mineral	16,019
13	NB Broadway at Dry Creek	14,538
14	EB Belleview at Santa Fe	14,498
15	NB Broadway at Littleton	14,049
16	WB Main at Santa Fe	12,877
17	SB Broadway at Mineral	11,323
18	SB Santa Fe at Belleview	10,582
19	NB Broadway at Arapahoe	10,562
20	WB Bowles at Platte Canyon	9,735
21	NB Platte Canyon at Mineral	9,496
22	SB Santa Fe at Dry Creek	7,659
23	WB Dry Creek at Broadway	7,310
24	WB Arapahoe at Broadway	6,953
25	EB Bowles at Platte Canyon	5,984

Future Travel Demand

The Denver Regional Council of Governments (DRCOG) maintains a regional Travel Demand Model that is federally-mandated and used for transportation planning purposes. The current DRCOG model is referred to as the FOCUS model and is a tour-based model capable of projecting travel demand based on socio-economic data (land use), traveler behavior (where and when people make trips), mode choice (how people choose to make those trips), and network analysis (the most convenient ways to move around).

The current DRCOG tour-based transportation model was used to forecast future traffic volumes in Littleton to assess future needs and how they may differ from the needs of today. The model results were compared to real-world observations of traffic to make sure the model is accurately representing traffic in Littleton and adjusted where necessary.

In general, traffic in Littleton is expected to increase, as a result of increases in population in the region, including some in Littleton. Socio-economic data for Traffic Analysis Zones (TAZ's, which are geographic areas within the region) that are within or directly adjacent to Littleton are presented below. Note that these forecasts differ slightly from those presented in the Comprehensive Plan Update, due to the differences in geographic area and the source. The differences are minor between the two forecasts and are not expected to have an impact on the forecasted travel demand. The growth percentages are the total percent change in population expected by DRCOG in and around Littleton. These equate to about 1% to 1.5% growth per year.

As a result of this increase in nearby population, the model projects that overall vehicle miles traveled (distance traveled in a car, VMT) and vehicle hours traveled (time spent traveling in a car, VHT) are projected to increase in Littleton if no other measures are implemented to reduce them. Correspondingly, because the City has few programmed increases to roadway capaCity, the amount of congestion is expected to increase as well. Table 4 illustrates this increase, which means that Littleton residents are likely to spend a much greater percentage of their travel time in congested conditions.

Table 4. Anticipated Increase in Congestion

	2020 Model	2040 Model	+/- Growth	% Growth
Population	61,249	73,208	11,959	20%
Households	27,017	32,610	5,593	21%
Employment	37,199	47,628	10,429	28%

Figure 8 shows traffic counts—existing year traffic (vehicles per day)—and forecasted volumes—future year 2040 traffic (vehicles per day)—for the street network in Littleton. A process consistent with industry practice to produce these forecasts was followed to adjust the travel demand model's output. This allows the project team to forecast which streets are likely to be operating at a LOS that does not meet the standard set by the City. These locations are indicated in Figure 8. In general, the segments that are projected to be over capaCity are consistent with existing conditions where bottlenecks occur today (Table 5).

Table 5. Citywide Traffic Statistics

	2020 Model	2040 Model	+/- Growth	% Growth
VMT	1,109,785	1,222,104	112,319	10%
VHT	34,781	39,986	5,205	15%
Congested VMT	215,583	322,786	107,203	50%
Congested VHT	9,036	13,550	4,514	50%

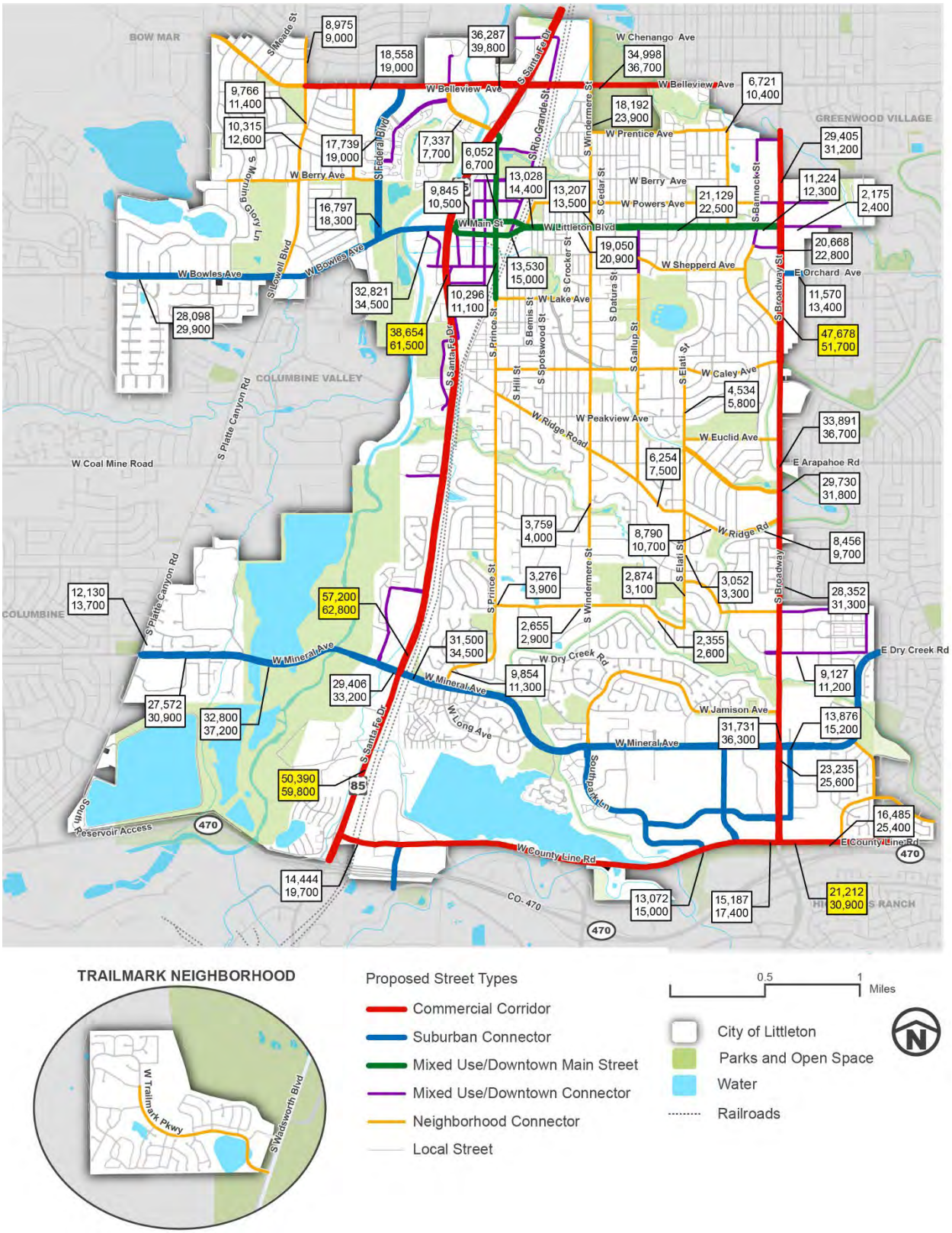
Origin-Destination Analysis

Because Littleton is experiencing so many regional pressures, an origin-destination analysis was undertaken to better understand how traffic from the greater region is impacting Littleton's streets. A tool developed by Streetlight Data, Inc. was used to determine where traffic entering or exiting the City or moving within the City is going. In general, the analysis indicates that the public and stakeholder perception of through traffic contributing to the majority of the congestion along major corridors is supported by the data. Indeed, 43% of all trips that use a Littleton street at some point in their journey are what are referred to External-to-External or Pass-Through trips, having neither an origin nor a destination within the City.

The key takeaways from this analysis are:

- Nearly half of all traffic entering the City on Broadway from the south heads east into Centennial. However, more than 11% continues through the City to the north while another 10% traverses the City to the west.
- People coming to Littleton from outside the City are generally destined for northern areas of the City.
- People leaving Littleton for other areas of the region are generally heading either north or east, with a slightly larger portion of travelers heading east.
- Eleven percent of people entering downtown at Bowles Avenue are destined for someplace within downtown. Other major origins/destinations include areas west and east of the City, accounting for 34% of traffic on Bowles Avenue/Alamo Avenue/Main Street east of Santa Fe Drive.
- People on Littleton Boulevard just east of downtown are generally headed in northern areas of the City or outside of the City, with even splits north, west, and east.

Figure 8. Proposed Street Types with Current and Future Volumes



Proposed Street Types

- Commercial Corridor
- Suburban Connector
- Mixed Use/Downtown Main Street
- Mixed Use/Downtown Connector
- Neighborhood Connector
- Local Street

0.5 1 Miles

- City of Littleton
- Parks and Open Space
- Water
- Railroads

- The perception that Santa Fe Drive serves as a pass-through corridor seems to be confirmed by the data. Only 23% of people coming into the City along Santa Fe Drive from the south have a destination within the City.
- Though not as pronounced as the northbound direction, southbound Santa Fe Drive still serves as a pass-through corridor. Only 42% of people coming into the City along Santa Fe Drive from the north have a destination within the City.

Freight

The City maintains a truck route map that identifies corridors that are appropriate for heavy vehicle use. This map is posted on the City website and is available for reference for freight haulers.

A review of the map was conducted for this plan. No changes are proposed to the Truck Route Map at this time. The map can be found in Chapter 8: Complete Network Recommendations as the Truck Overlay.

BARRIERS

The major physical barriers to auto and freight travel in Littleton are the South Platte River, Santa Fe Drive/Rail corridor High Line Canal, and some suburban neighborhoods that lack connectivity.

South Platte River: In Littleton, the only four roadways offering bridged crossings of the South Platte River include Mineral Avenue, Bowles Avenue, Prince Street, and Belleview Avenue. Particularly, the over two-mile separation between the Bowles Avenue and Mineral Avenue crossings results in a funneling of a great deal of traffic on to those two east-west corridors.

Santa Fe Drive/Rail Corridor: Again, between Mineral Avenue and Bowles Avenue/Main Street, crossings of the rail corridor and intersections with Santa Fe Drive are limited. This means that Prince Street serves as the only other viable route between the southern parts of the City and Downtown. When Santa Fe Drive is congested or an incident occurs, Prince Street is the alternate route and experiences traffic flows that are inconsistent with the classification and design.

Suburban Neighborhoods: Some neighborhoods in the southern part of the City have circuitous streets that lack connectivity to the roadway grid network and to each other. In some cases the High Line Canal creates a neighborhood barrier for driving, though it improves connections for pedestrians and bicyclists. This results in additional traffic being forced onto neighborhood connector streets that are intended to serve a minimal local area.

SAFETY

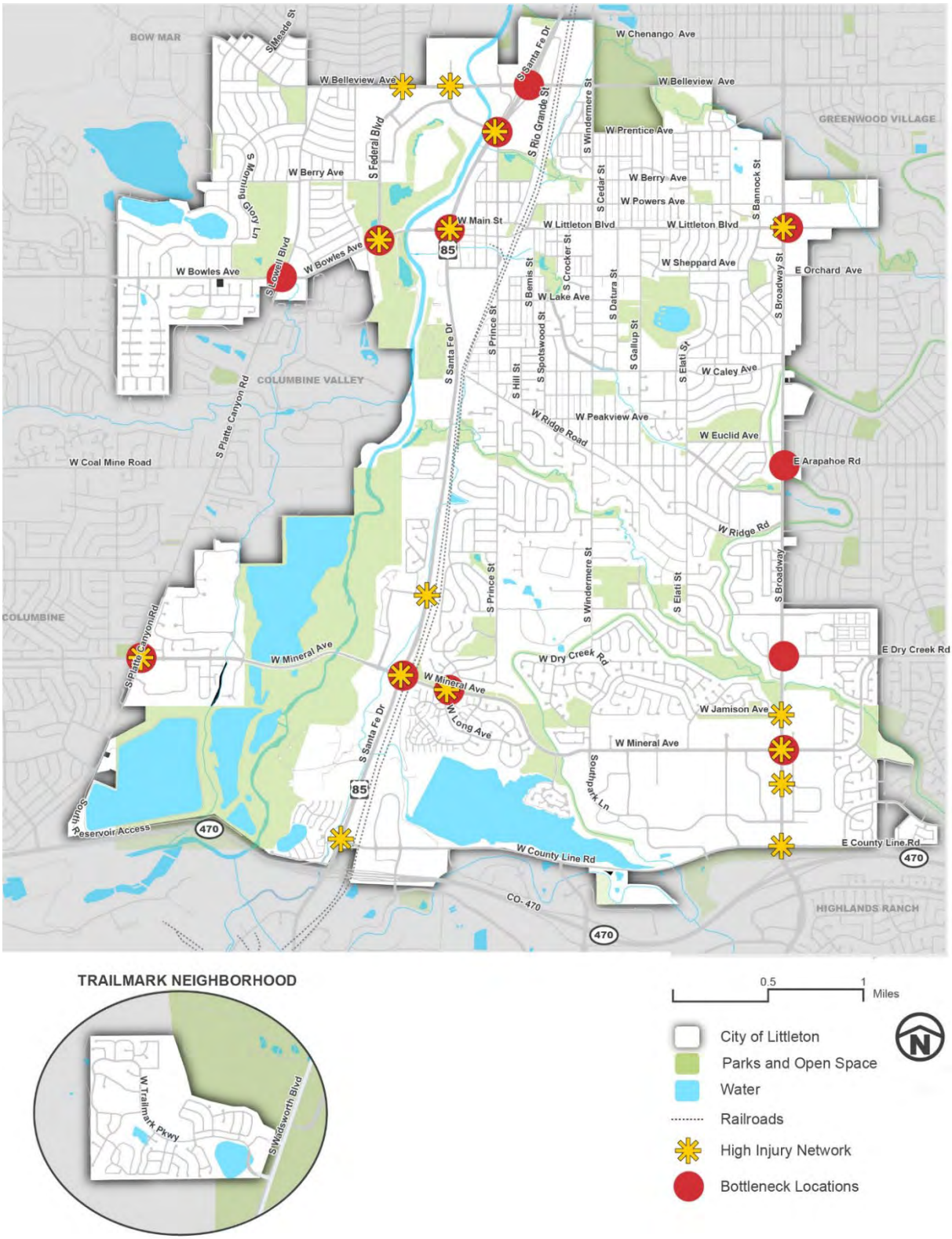
As the City's roadway network carries more traffic due to regional and local growth, the safety of those traveling within the City will continue to be a top priority. The major current crash locations are shown in the Existing City chapter, and are generally in locations that are congested. Between 2014 and 2018, a total of 5,089 crashes occurred in the City, with 418 resulting in injuries. Locations where a high number of crashes result in injuries have been identified as the High Injury Network (HIN; Figure 9). Any intersection where 5 or more injury crashes occurred in the 5-year analysis period qualifies. The HIN list of intersections is shown in Table 6.

A map summarizing the HIN and bottleneck intersections is shown on the next page. These locations are the prime candidates for safety improvements.

Table 6. High Injury Network (2014 to 2018)

Intersection	# of Crashes	Injury Crashes	% of Crashes at Intersection Resulting in Injury	# of Bike Crashes	# of Ped Crashes
Santa Fe Dr & Prince St	114	13	11%	0	0
Bowles Ave & Federal Blvd	106	12	11%	2	1
Belleview Ave & Prince St	56	11	20%	1	5
Broadway & County Line Rd	90	9	10%	0	0
Broadway & Mineral Ave	92	8	9%	0	1
Mineral Ave & Platte Canyon Rd	42	8	19%	2	0
Mineral Ave & Jackass Hill Rd	39	7	18%	7	3
Broadway & Littleton Blvd	86	6	7%	1	0
Broadway & Grant Way	43	6	14%	0	0
Belleview Ave & Federal Blvd	26	6	23%	0	0
Broadway & Jamison Ave	14	5	36%	1	0
Santa Fe Dr & Mineral Ave	161	5	3%	1	1
Santa Fe Dr & County Line Rd	59	5	8%	0	0
Santa Fe Dr & Bowles Ave	135	5	4%	1	0

Figure 9. High Injury Network and Bottleneck Intersections



PARKING

Throughout the Envision Littleton process, parking downtown is identified as an issue by stakeholders and residents. Downtown is currently served by a combination of on-street parking, off-street private parking lots, some off-street public parking lots, and a few privately owned valet parking services. This plan is not focused on parking but recognizes the importance of parking to the community from an economic standpoint and expectation for convenience and viability. It is recommended that parking be addressed in an upcoming Downtown Mobility Plan.

FRAMEWORK FOR ACTION

The framework for action below is organized in four tiers: (1) Goals, (2) Policies, (3) Objectives, and (4) Actions. All are intended to mesh with and support the other aspects of this Transportation Master Plan.

GOALS

Consistent with the Connected and Inclusive Guiding Principles, automobile (auto) and freight mobility are also important to the City's transportation goals. These modes of travel serve needs that are difficult to serve with other modes. Auto trips can be longer and more convenient than trips by active transportation modes or transit. Freight movements allow us to conduct commerce efficiently. Complete Auto and Freight networks support the City's goals:

- **Connected:** Auto and Freight networks provide connectivity that is otherwise difficult to provide through other modes, providing point-to-point access to jobs and destinations throughout the region.
- **Healthy:** It is increasingly important that people are connected to health care services in a reliable and convenient manner, particularly as our population ages.
- **Inclusive:** People who are unable to walk, bike, or otherwise use an active or transit mode should have access to transportation options that give them freedom of mobility for their daily needs.
- **Prosperous:** Our auto and freight networks provide the point-to-point long-haul and local service needed to conduct commerce and are the backbone for economic development.
- **Sustainable:** the auto and freight networks in the City are already mostly built and generally require only maintenance and operations to continue to serve their purpose. Improvements to these networks can be accomplished with incremental steps. The City should advocate for measures that encourage autos and trucks to transition to technology that does not harm the environment.

The community has consistently identified traffic congestion as the most important issue facing the City from a transportation perspective. Traffic volumes on major roadways have increased dramatically in the last two decades as development pressures to the south have mounted. This has impacted not only those major roadways but also local streets and neighborhood connector streets, as drivers search for alternate routes to avoid congestion. These pressures are expected to continue to increase as more regional development and growth occurs. Major developments like Sterling Ranch, expected to consist of more than 12,000 additional homes south of C-470 in Douglas County, have already started to influence traffic in Littleton.

POLICIES

In making decisions that involve public resource allocation, regulatory matters, and physical improvements, among others, Littleton will:

1. Focus on enhancing safety on auto and freight networks.
2. Advance regional partnerships to build consensus and leverage funding toward significant transportation projects.
3. Provide automobile Level of Service (LOS) E or better on Suburban Connectors and Commercial Corridors and LOS D or better on all other streets.
4. Prioritize auto and freight network projects that lead to operational and safety improvements.
5. Enhance the safety of vulnerable user groups on streets and trails.
6. Support connections to employment, retail, and entertainment/recreation land uses given the opportunity.
7. Prioritize safety and mobility over speed with corresponding street design and construction standards.
8. Manage growing demand on the transportation network by building awareness of travel choices.
9. Promote designated truck routes.

OBJECTIVES

In order to achieve the overall Transportation Master Plan goals outlined above, multiple objectives have been developed. The objectives in Table 7 are specific to improving the auto and freight networks in the City of Littleton.

Table 7. Objectives—Auto and Freight

No.	Topic	Objective	Related Goals				
			Connected	Healthy	Inclusive	Prosperous	Sustainable
1	Quality of Life	Achieve high resident satisfaction rates with transportation services	●		●	●	●
3	Quality of Life	Provide people with a sense of personal safety on all transportation modes		●	●		
4	Quality of Life	Provide transportation infrastructure that meets local business needs				●	●
5	Community	Provide transportation facilities that are well integrated with land use and character				●	
9	Community	Establish a transportation planning and implementation process that is flexible and adaptable					●
10	Community	Provide for a community-driven decision-making process for transportation investments			●		●
11	Community	Provide a transportation system the City can afford to maintain					●

Table 7. Objectives—Auto and Freight

No.	Topic	Objective	Related Goals				
			Connected	Healthy	Inclusive	Prosperous	Sustainable
12	Mobility	Provide a reliable transportation system	●		●	●	
13	Mobility	Achieve a balanced mode share	●	●	●	●	●
15	Mobility	Provide travelers with relevant, timely information -- including innovative methods	●	●	●		
21	Auto	Provide a well-connected automotive network	●			●	
22	Auto	Provide for safe automobile travel		●		●	
23	Auto	Provide a resilient and responsive traffic operations system	●				●
24	Auto	Provide an efficient automotive network	●			●	●
25	Auto	Provide a roadway network that allows for excellent emergency response	●	●			
29	Freight	Provide a reliable freight network	●			●	
30	Freight	Provide a well-connected freight network	●			●	
31	Freight	Provide a safe freight network		●		●	

ACTIONS

The actions below convey tangible steps that will lead to achievement of the goals in line with the stated policies.

Capital Investments

Capital investments have been identified to address many of the issues related to auto and freight movement in the City. Table 8 shows these investments. Figure 10 is a map showing the location of the projects on this list.

A strategic **Action** is aimed at seizing a special opportunity or addressing a specific challenge one faces, given limited resources—financial and otherwise—and recognizing that a broader program of new or ongoing activities will also be pursued in the meantime.

Table 8. Auto Projects

No. (map)	Corridor	Intersection or Segment	Existing Condition	Description	Project Life*
1	Belleview Ave	Prince St to Lowell Blvd	No median	Access control, median	Ultimate
2	Sante Fe Dr	Bowles Ave	Traffic signal	Alternative intersection configuration	Interim
3	Sante Fe Dr	Mineral Ave	Traffic signal	Alternative intersection configuration, quadrant roadway, or continuous flow intersection	Interim
4	Ridge Rd	Corridor-wide	Varies	Curb and gutter, geometry, intersections	Ultimate
5	Access Preservation Area	Corridor Wide (Excluding ROW)	No connection	Ensure properties have access to Santa Fe Drive or a new frontage road.	Ultimate
6	S Platte Canyon Rd	Mineral Way	Right-in, right-out	Full movement intersection	Ultimate
7	Bowles Ave	Federal Blvd	Traffic signal	Intersection operation and safety improvements	Interim
8	Belleview Ave	Federal Blvd	Traffic signal	Intersection operation and safety improvements	Ultimate
9	Belleview Ave	Prince St	Traffic signal	Intersection operation and safety improvements	Ultimate
10	Belleview Ave	Santa Fe Dr Interchange	Single-Point Urban Interchange	Intersection operation and safety improvements	Ultimate
11	Bowles Ave	Federal Blvd	Traffic signal	Intersection operation and safety improvements	Ultimate
12	Bowles Ave	Platte Canyon Rd/ Lowell Blvd	Traffic signal	Intersection operation and safety improvements	Ultimate
13	Broadway	Arapahoe Rd	Traffic signal	Intersection operation and safety improvements	Ultimate
14	Broadway	Dry Creek Rd	Traffic signal	Intersection operation and safety improvements	Ultimate
16	Broadway	Jamison Ave	Traffic signal	Intersection operation and safety improvements	Ultimate
17	Broadway	Littleton Blvd	Traffic signal	Intersection operation and safety improvements	Ultimate

Table 8. Auto Projects

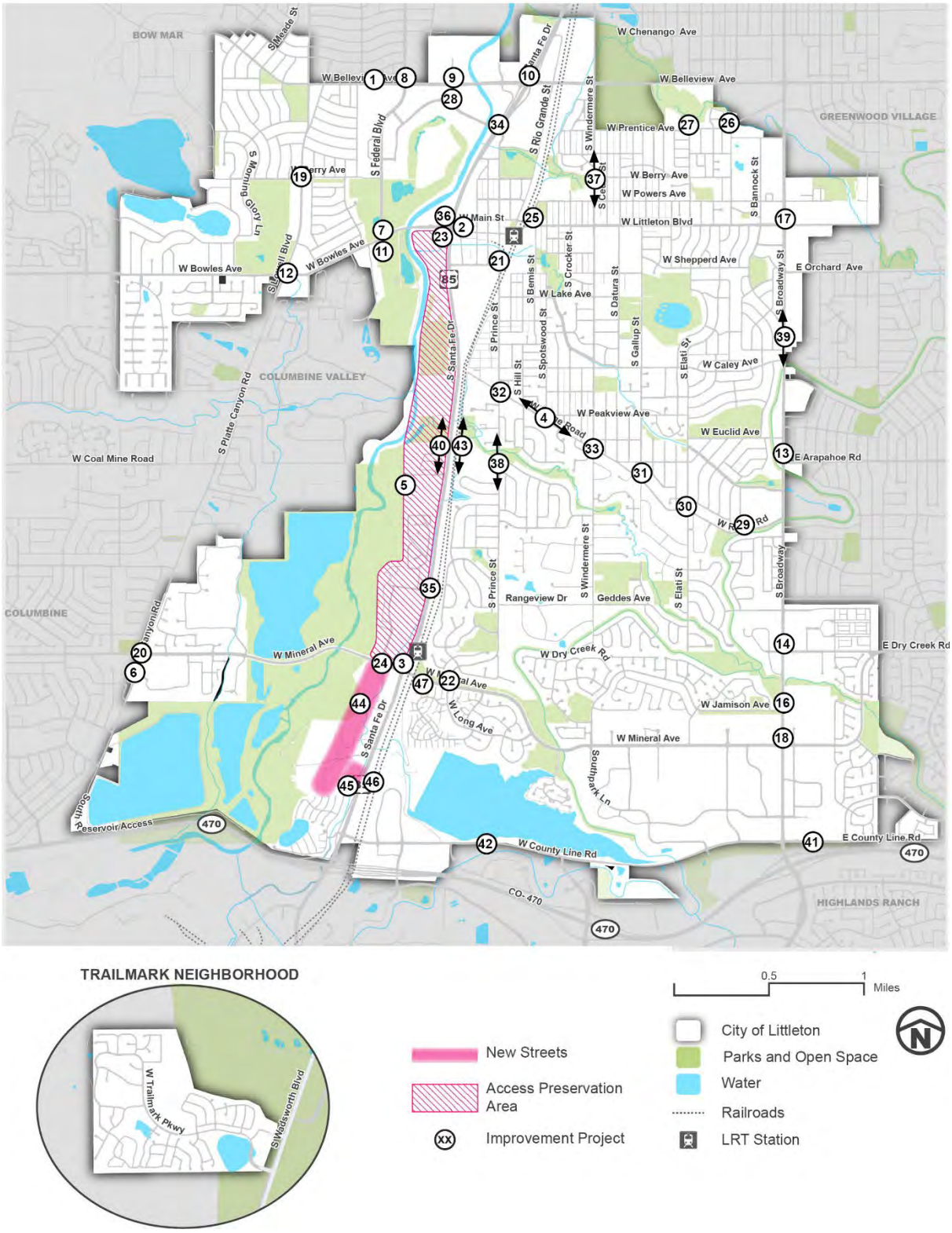
No. (map)	Corridor	Intersection or Segment	Existing Condition	Description	Project Life*
18	Broadway	Mineral Ave	Traffic signal	Intersection operation and safety improvements	Ultimate
19	Lowell Blvd	Berry Ave	Traffic signal	Intersection operation and safety improvements	Ultimate
20	Mineral Ave	Platte Canyon Rd	Traffic signal	Intersection operation and safety improvements	Ultimate
21	Prince St	Church Ave	Traffic signal	Intersection operation and safety improvements	Ultimate
22	Mineral Ave	Jackass Hill Rd	Traffic signal	Intersection operation and safety improvements; pedestrian and bicycle focus	Ultimate
23	Santa Fe Dr	Bowles Ave	Traffic signal	Reconfigure into grade-separated interchange	Ultimate
24	Santa Fe Dr	Mineral Ave	Traffic signal	Reconfigure into grade-separated interchange	Ultimate
25	Littleton Blvd	Main St/ Alamo Ave/ Court Pl/ Bemis St	Yield control	Roundabout	Ultimate
26	Prentice Ave	Delaware St	2-way stop	Roundabout	Ultimate
27	Prentice Ave	Huron St	2-way stop	Roundabout	Ultimate
28	Prince St	Centennial Dr	2-way stop	Roundabout	Ultimate
29	Ridge Rd	Apache St	3-way stop	Roundabout	Ultimate
30	Ridge Rd	Elati St	4-way stop	Roundabout	Ultimate
31	Ridge Rd	Gallup St	4-way stop	Roundabout	Ultimate
32	Ridge Rd	Prince St	4-way stop	Roundabout	Ultimate
33	Ridge Rd	Windermere St	4-way stop	Roundabout	Ultimate
34	Sante Fe Dr	Prince St	Traffic signal	Signal timing and phasing, advanced detection and geometry, NB Left	Ultimate
35	Sante Fe Dr	Aspen Grove Way	Traffic signal	Signal timing and phasing, advanced detection and geometry	Ultimate

Table 8. Auto Projects

No. (map)	Corridor	Intersection or Segment	Existing Condition	Description	Project Life*
36	Sante Fe Dr	Bowles Ave	Traffic signal	Signal timing and phasing, advanced detection and geometry	Ultimate
37	Windermere St	Corridor-wide	Varies	Traffic calming	Ultimate
38	Prince St	Corridor-wide	Varies	Turn lanes, curb and gutter	Ultimate
39	Broadway	Corridor-wide	Varies	V2I and ITS	Ultimate
40	Sante Fe Dr	Corridor-Wide	Varies	V2I and ITS	Ultimate
41	County Line Rd	Broadway to University Blvd	Varies	Widening	Ultimate
42	County Line Rd	Santa Fe Dr to Broadway	Varies	Widening	Ultimate
43	Sante Fe Dr	Corridor-Wide	Varies	Widening	Ultimate
44	South Platte River Pkwy	Corridor Wide (Excluding ROW)	No connection	South Platte River Parkway extension	Ultimate
45	South Platte River Pkwy	Corridor Wide (Excluding ROW)	No connection	Connect new South Platte River Parkway extension to Santa Fe Drive	Ultimate
46	Santa Fe Dr	Dad Clark Gulch	No signal	Traffic signal	Ultimate
47	Mineral Ave	Santa Fe to Jackass Hill Rd	Four-lane roadway	Widen to six lanes and reconstruct sidewalks under RR crossings	Ultimate

*Project life indicates whether the improvement results in a desired final condition (ultimate) or represents a step toward that final condition (interim).

Figure 10. Auto Projects



Programs and Initiatives

1. Develop and utilize a traffic operations and safety checklist of operational and safety improvements that can be implemented as part of other infrastructure investments.
2. Develop a Transportation Demand Management program focused on reducing peak hour congestion through Littleton.
3. Create and maintain an Incident Management Plan.
4. Explore the feasibility of a Traffic Management Center, ideally partnering with adjacent municipalities and other agencies.
5. Evaluate signal/corridor timing every three years.

Regulations and Standards

1. Develop new street design standards for the new street classifications consistent with current industry best practices.

Partnerships and Coordination

1. Maintain partnerships with adjacent municipalities for the US 85 (Santa Fe Drive) Planning and Environmental Linkages (PEL) study.
2. Pursue partnering with Douglas County, Arapahoe County, and Jefferson County on improvements in their jurisdictions that will benefit Littleton residents and businesses.

More Targeted Planning/Study

1. Additional planning for major corridors identified through this process as being key to achieving the City's goals for transportation. These corridors have been identified as those that should be improved for a variety of modes, and a study for each should be conducted to determine how best to address the needs of all users in these key areas of the City, and additional public and stakeholder outreach is required to make sure that the projects proposed are consistent with the local residents' and businesses' needs. They include:
    a. Santa Fe Drive—the US 85 PEL is expected to kick off in 2019 or 2020, in coordination with CDOT and other regional partners. Littleton should take a leadership role in that study.
    b. Littleton Boulevard—Littleton Boulevard represents a prime opportunity to re-envision how people move through a historic part of the City. A multimodal corridor study should be completed that identifies opportunities for enhancing the pedestrian and transit user experience along this corridor.
    c. Broadway—partnering with Centennial, Englewood, Douglas County, Arapahoe County, and RTD
    d. Prince Street
    e. Windermere Street
    f. Ridge Road
    g. Bowles Avenue—partnering with Jefferson County
    h. Belleview Avenue—building on past planning including the recently completed framework study Belleview Avenue Corridor Vision
2. Additional planning for the intersections identified as having safety and operational issues. These should be evaluated in detail to identify cost-effective and implementable solutions.
3. Downtown Mobility Plan to determine how the City can address the parking and circulation issues in and around downtown.

POTENTIAL PARTNERS

Partners for implementation of plan priorities related to Land Use and Community Character include:

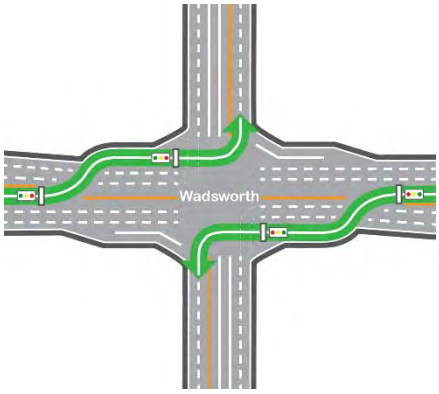
- Area real estate and development community
- Denver Regional Council of Governments
- Regional Transportation District
- SouthPark Owners Association
- South Platte Working Group
- South Suburban Parks and Recreation District
- Tri-County Health Department
- Neighboring Municipalities
- Colorado Department of Transportation (CDOT)

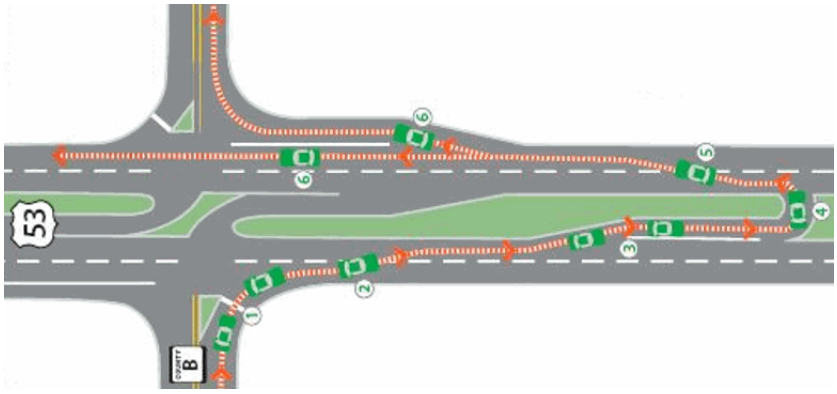
STATE OF THE PRACTICE

Many municipalities and agencies are encountering increased traffic congestion on their streets. Our cities continue to grow and mobility is seen as an essential freedom. Because cars take up a lot of space on our streets, compared to other modes, cities have begun to look for ways to provide the additional auto capaCity needed through innovative operations and management, as well as through innovative, non-traditional engineering solutions. These innovations have been taking the place of traditional capaCity expansions in many cities and will continue to be improved upon. As Littleton searches for ways to optimize the use of limited right-of-way and time, while providing a system that we can afford to maintain, it will be incumbent upon the City to utilize these new strategies. A short sampling of these strategies is provided below, as a start to a toolkit for the City moving forward. Other resources for these solutions are available.

NON-TRADITIONAL INTERSECTIONS

The following non-traditional intersection improvements and reconfigurations should be considered to improve operations.

Description	Photo/Image
Roundabouts: roundabouts can improve operations in many locations where un-due delay is caused by either stop-controlled intersections or traffic signals. Roundabouts can improve traffic flow by nearly eliminating delay when no opposing traffic is present. They also have major safety benefits, reducing the occurrence of crashes that result in injury by 51%. **Typical cost**: $1 million to $2 million	
Continuous Flow Intersection (CFI): CFI's, or Displaced Left Turn Intersections (DLTI), are a way for cities to expand capaCity at an intersection without greatly increasing the intersection footprint. These intersections require additional signals to allow left turns to move to the opposite side of the road prior to the intersection, and then travel through the intersection at the same time as through traffic. These intersections are generally less expensive than massive reconstruction projects, and can work in situations where major corridors intersect. However, this intersection design can be an impediment to pedestrian movements. **Typical Cost**: $10 million to $15 million	

Description	Photo/Image
Quadrant Roadway Intersection: a Quadrant Roadway can facilitate left turn movements in locations where heavy left turns cause congestion. These intersections route some or all left turn traffic to a separate roadway and allow the main intersection to simplify signal timing and increase traffic flow. Typical Cost**: $5 million to $15 million**	
Median U-turn Intersection, Restricted Crossing U-turn Intersection, and others There are other non-traditional intersection types that the City should consider where appropriate, which have varying costs and applications. Many of these simplify operations at the main intersection while providing turn movements via new routes. Typical cost**: $5 million to $15 million**	

OPERATIONAL IMPROVEMENTS

More efficiently operating the current system can allow the City to squeeze every bit of capaCity out of the roadway network it has, at low cost. Strategies, some of which the City already implements, include:

- Traffic signal re-timing: adjusting the timing and phasing of signals and providing better coordination between signals so they operate in sync with each other should be performed periodically. Typical cost: $5,000 per signal.
- Adaptive signal control: install signal detection and communications technology to allow signal timing software to continuously adjust signal timings based on real-time conditions. Typical cost: $20,000 to $50,000 per signal (USDOT).
- Planned Special Event Traffic Management: implement a traffic management program for special events.
- Road Weather Management: implement a management program to handle weather events.
- Incident Management: implement a management program to respond to traffic incidents, including crashes.
- Active Traffic Management: actively manage traffic control devices during periods of congestion through the use of communications technology and Traffic Operations Center.

SAFETY IMPROVEMENTS

Safety innovations are focused on vulnerable users (pedestrians and bicyclists), as well as addressing issues like distracted driving and aggressive driving. In general, to improve safety, projects are focused on ways

to reduce vehicle speeds, and increase driver awareness of people on foot and on bikes.

Vulnerable user safety improvements are discussed in the Active Transportation section.

Operational improvements can also improve safety by decreasing speed differentials and reducing the occurrence of congestion-related crashes.

Geometric improvements, such as improving curves, adding turn lanes, traffic calming, and other treatments can improve safety by reducing the occurrence of and severity of crashes. Signal timing adjustments can also be used to improve safety where congestion or poor signal coordination contributes to crash frequency.

INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

ITS, and emerging vehicle-to-infrastructure (V2I) technologies can be implemented to improve both operations and safety. These technologies are built on a communications backbone, typically fiberoptics, which allow for better management of the transportation system. The City has recently completed a Fiber Master Plan in an effort to plan how to connect its signal infrastructure with fiber, with a goal of developing more robust and nimble traffic operations. See the Mobility Trends chapter for additional information on these technologies.

Chapter 5.
Active Transportation

INTRODUCTION

Developing safe and comfortable “low-stress” walking and bicycling networks is a priority for Littleton. This aligns with a new emphasis on creating “low-stress” walking and bicycling networks in U.S. cities. Low-stress means that people of all ages and abilities feel comfortable walking or bicycling. The best practices for evaluating and designing walking and bicycling networks have changed to emphasize quality in addition to connections to destinations. Historically, walking networks have been built to design minimums resulting in less-than ideal sidewalks and crossings and often challenging conditions for people using wheelchairs or other mobility aids. Likewise, bicycle networks have also been built with minimal resources resulting in bike facilities that only work for the small percentage of people who are comfortable bicycling on almost any type of street with or without dedicated space for bicyclists. Most recently, micromobility devices have become more popular including electric scooters, electric bikes, hoverboards, and electric skateboards. This chapter is focused on considering the needs of people walking, biking, and rolling in the City of Littleton.

LEGACY OF PAST PLANNING

Improvements to Littleton's Active Transportation network have been included in several recent plans. Below are some common themes and the studies that presented them.

Common Themes from Existing Plans

- Make Littleton pedestrian friendly by expanding the pedestrian network, adding pedestrian bridges, extending sidewalks and improving existing sidewalks.
- Improve connections between downtown/river corridor/parks/trails.
  - Complete network of streets in the City that provides connections, choice, calming, and capaCity where appropriate.
- Improve bike facilities.
- Improve multimodal connections between commercial locations/residential developments.
- Improve trail network for transportation around and out of the City.
- Improve intersection crossings.
- Improve connections to light rail.
- Implement traffic calming strategies in neighborhoods.

Littleton Plans & Studies

- Citywide Plan (2014)
- Belleview Avenue Corridor Vision (2018)
- Bicycle and Pedestrian Master Plan (2011)
- Broadway Corridor Study (2009)
- Downtown Neighborhood Plan (2011)
- City of Littleton Parks, Recreation, and Trails Master Plan (2016)
- Neighborhood Traffic Management Program (not dated)
  - South Platte Working Group South Platte Connections Study (2019)

2011 BICYCLE AND PEDESTRIAN MASTER PLAN

The most relevant past plan to Active Transportation is the 2011 *City of Littleton Bicycle and Pedestrian Master Plan*. This plan conducted extensive outreach, inventoried existing bicycle and pedestrian facilities, and made project and program recommendations for improving walking and bicycling in the City of Littleton. Progress on key recommendations is shown in Table 9 and Table 10:

Table 9 Current Progress on Pedestrian Recommendations from 2011 Plan:

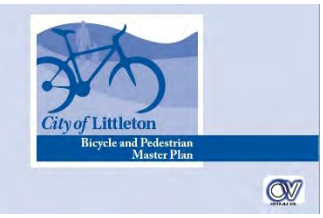
Recommendation	Progress
Pedestrian intersection improvements at Federal Blvd/ Bowles Ave intersection	Planned for Spring of 2020
Pedestrian signal at Federal Blvd and Berry Ave	Curb ramps installed in 2015, full signal installation planned for Spring 2020
Actuated crossing (RRFB) at Prince St/Jackass Hill Rd and High Line Canal Trail spur crossing (south of Sunset Dr)	RRFB planned for installation in 2020; in-street yield to pedestrian sign installed.
Actuated crossing (RRFB) at Prince St and Lee Gulch Trail crossing (near Briarwood Ave)	Complete
Install stairs connecting Mineral Ave elevated sidewalk on east side of LRT tracks up to social path on Jackass Hill Rd behind subdivision	Planned, year to be determined

Table 10 Current Progress on Bicycle Recommendations from 2011 Plan

Recommendation	Progress
Install “L” bicycle routes throughout City of Littleton	Complete
Online bike route mapping	Complete
Coordinate with SRTS to create a back-to-school packets giving info on biking to and from school	Incomplete
Create an educational video about bicycling in Littleton	Complete
Install bicycle route wayfinding signage including destinations	Incomplete
Add more bicycle parking downtown	Complete

KEY ISSUES AND CONSIDERATIONS

Input and discussions for this Transportation Master Plan, through varied *Envision Littleton* community engagement , workshops with City Council and Planning Commission, and interaction with other City boards/commissions, City departments, and partner agencies and organizations, yielded the following list of key items that relate to the active transportation network:



- **Existing Pedestrian Infrastructure**: Currently the City of Littleton has great walking infrastructure downtown and along the Mary Carter Greenway but some challenges exist walking along and crossing Connector Streets and Commercial Corridors.
- **Existing Bicycle Infrastructure**: There is a strong trail system that connects the City of Littleton to the rest of the region, however, there is a lack of low-stress bicycle facilities to make local connections.
- **Complete Bicycle and Pedestrian Networks**: There is a strong desire to improve bicycle and pedestrian networks to make it easier to cross Santa Fe Drive and to connect to downtown Littleton.

LEVEL OF SERVICE

Multiple level of service measures are documented in this Active Transportation chapter. Moving forward, the City of Littleton should continue to update measures of serving pedestrians and bicyclists. Active transportation level of service should be updated with the following considerations:

1. Pedestrian Level of Traffic Stress (for sidewalks and crossings)
2. Walksheds to high-frequency transit stops and schools
3. Bikesheds to high-frequency transit stops and schools

EXISTING NETWORK EVALUATION

In order to understand how existing walking and bicycling facilities are serving the Littleton community, two quality analyses were conducted: *Pedestrian Level of Traffic Stress* and *Bicycle Level of Traffic Stress*. Additionally, multiple network coverage analyses were conducted for walking and bicycling to and from schools and RTD light rail stations. These analyses were conducted based on guidance from the 2018 *FHWA Guidebook for Measuring Multimodal Network Connectivity*.

Pedestrian Analysis

Pedestrian Level of Traffic Stress

In order to quantify the experience of walking along streets in different parts of the City of Littleton, a Pedestrian Level of Traffic Stress analysis was conducted. The Pedestrian Level of Traffic Stress (PLTS) method was developed by the Oregon Department of Transportation. This method uses up to 14 data inputs about sidewalks, streets, and intersections to determine how stressful it typically is for someone to use a sidewalk or street crossing. A simplified PLTS network analysis was completed using the sidewalk network layer. Due to data limitations, segments and intersections were assigned a PLTS score using sidewalk width, adjacent land use, and presence of a traffic control device at a crossing of a Connector Street or Commercial Corridor. The PLTS method helps decision-makers understand the experience of walking along individual street segments and determines whether the experience is low-stress enough for anyone to use or so high-stress that people will likely avoid walking along a street in that area unless it is the only way to go from point “a” to point “b”.

In the City of Littleton, 65% of sidewalks are PLTS 3 or 4 (Table 11). A definition of each PLTS level is presented in Table 12.

Table **11**. Littleton Sidewalk PLTS Levels

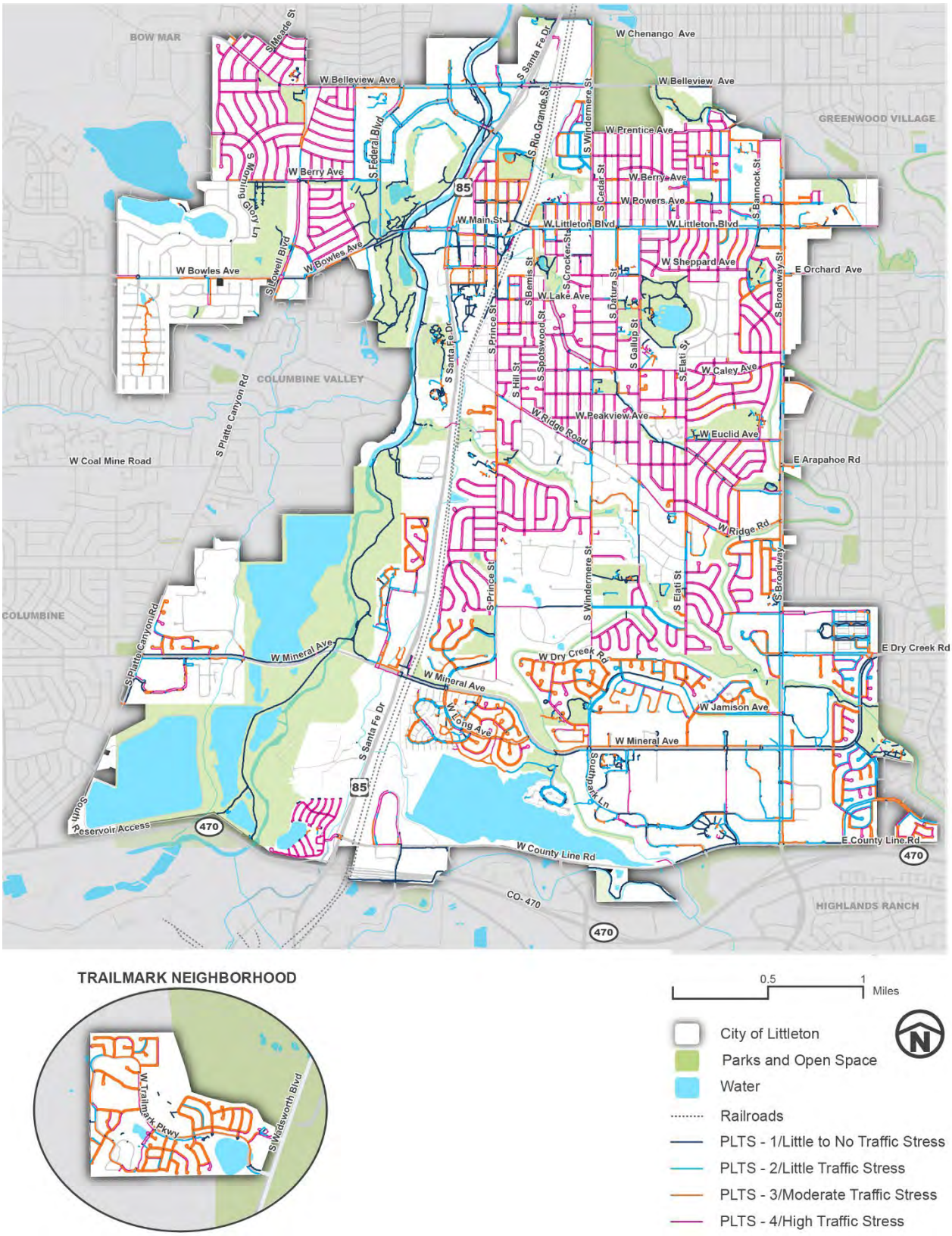
PLTS	Miles	Percent
1	64	20%
2	48	15%
3	61	19%
4	145	46%

Table 12. Pedestrian Levels of Traffic Stress (PLTS)

Level	Definition
PLTS 1	Represents little to no traffic stress and requires little attention to the traffic situation. This is suitable for all users including children 10 years or younger, groups of people and people using a wheeled mobility device (WhMD). The facility is a sidewalk or shared-use path with a buffer between the pedestrian and motor vehicle facility. Pedestrians feel safe and comfortable on the pedestrian facility. Motor vehicles are either far from the pedestrian facility and/or traveling at a low speed and volume. All users are willing to use this facility.
PLTS 2	Represents little traffic stress but requires more attention to the traffic situation than of which young children may be capable. This would be suitable for children over 10, teens and adults. All users should be able to use the facility but, some factors may limit people using WhMDs. Sidewalk condition should be good with limited areas of fair condition. Roadways may have higher speeds and/or higher volumes. Most users are willing to use this facility.
PLTS 3	Represents moderate stress and is suitable for adults. An able-bodied adult would feel uncomfortable but safe using this facility. This includes higher speed roadways with smaller buffers. Small areas in the facility may be impassable for a person using a WhMD and/or requires the user to travel on the shoulder/bike lane/street. Some users are willing to use this facility.
PLTS 4	Represents high traffic stress. Only able-bodied adults with limited route choices would use this facility. Traffic speeds are moderate to high with narrow or no pedestrian facilities provided. Typical locations include high speed, multilane roadways with narrow sidewalks and buffers. This also includes facilities with no sidewalk. This could include evident trails next to roads or 'cut through' trails. Only the most confident or trip-purpose driven users will use this facility.

Most of the sidewalks that are PLTS 3 or PLTS 4 are in residential areas and were given that score because they are 4 feet wide or narrower. In the downtown area many of the sidewalks are PLTS 1 or PLTS 2 but some are PLTS 3 or PLTS 4 further away from Main Street. Most sidewalks along Connector Streets and Commercial Corridors are PLTS 1 or PLTS 2. Figure 11 shows the results of the PLTS analysis.

Figure 11. Pedestrian Level of Traffic Stress



Walksheds

A walkshed analysis was completed to understand the current walking connections to schools and RTD light rail stations. In this case, the sidewalks and trails within the City of Littleton were used as a network along which to route trips of specific distances. Currently 33% of Littleton households are within a half-mile walk of a primary, secondary, or higher education facility. A half-mile walkshed roughly equates to a 10-15 minute walk depending on the walking speed. This distance is used as a standard in determining the walkability of an area (sometimes a 5 minute or ¼ mile walkshed is used—most commonly for measuring connections to bus service). Figure 12 and Figure 13 show the results of this analysis. The existing walkshed coverage is quite good, though dead-end streets or missing sidewalks reduce the full potential walkshed coverage in some areas.

Currently, 6% of Littleton households are within a half-mile walk of the Mineral or Littleton Downtown RTD Light Rail stations, which are the only high frequency transit stops in the City. Walkshed coverage to the Littleton Downtown station is quite good, though the rail lines create a barrier for neighborhoods to the southeast of the station resulting in walking out of direction along Prince Street or Littleton Boulevard to get to the station. The Mineral station walkshed coverage is poor in comparison due to its placement adjacent to the Santa Fe Drive and Mineral Avenue intersection and the lack of a traditional street grid in the vicinity of the station. Walking to the Mineral station also requires out of direction travel for many households within a half-mile.

Maps of the walksheds are shown Figure 12 and Figure 13.

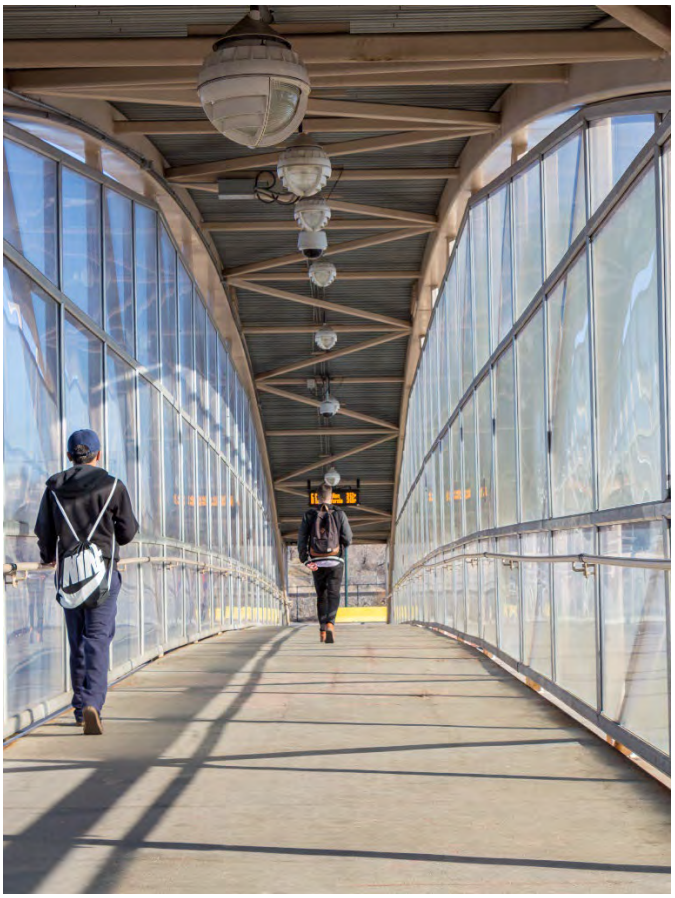
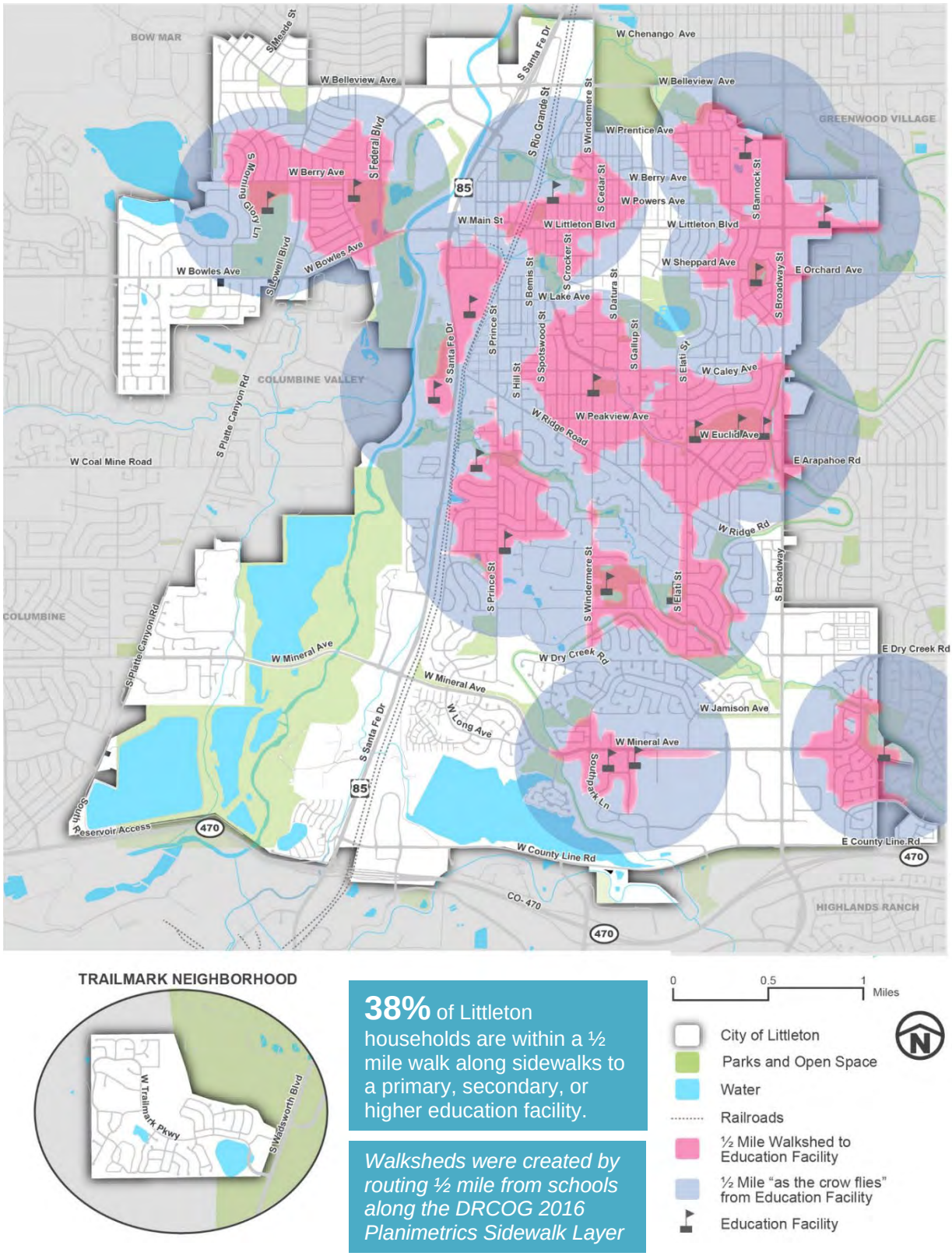


Figure 12. 1/2 Mile Education Facility Walksheds



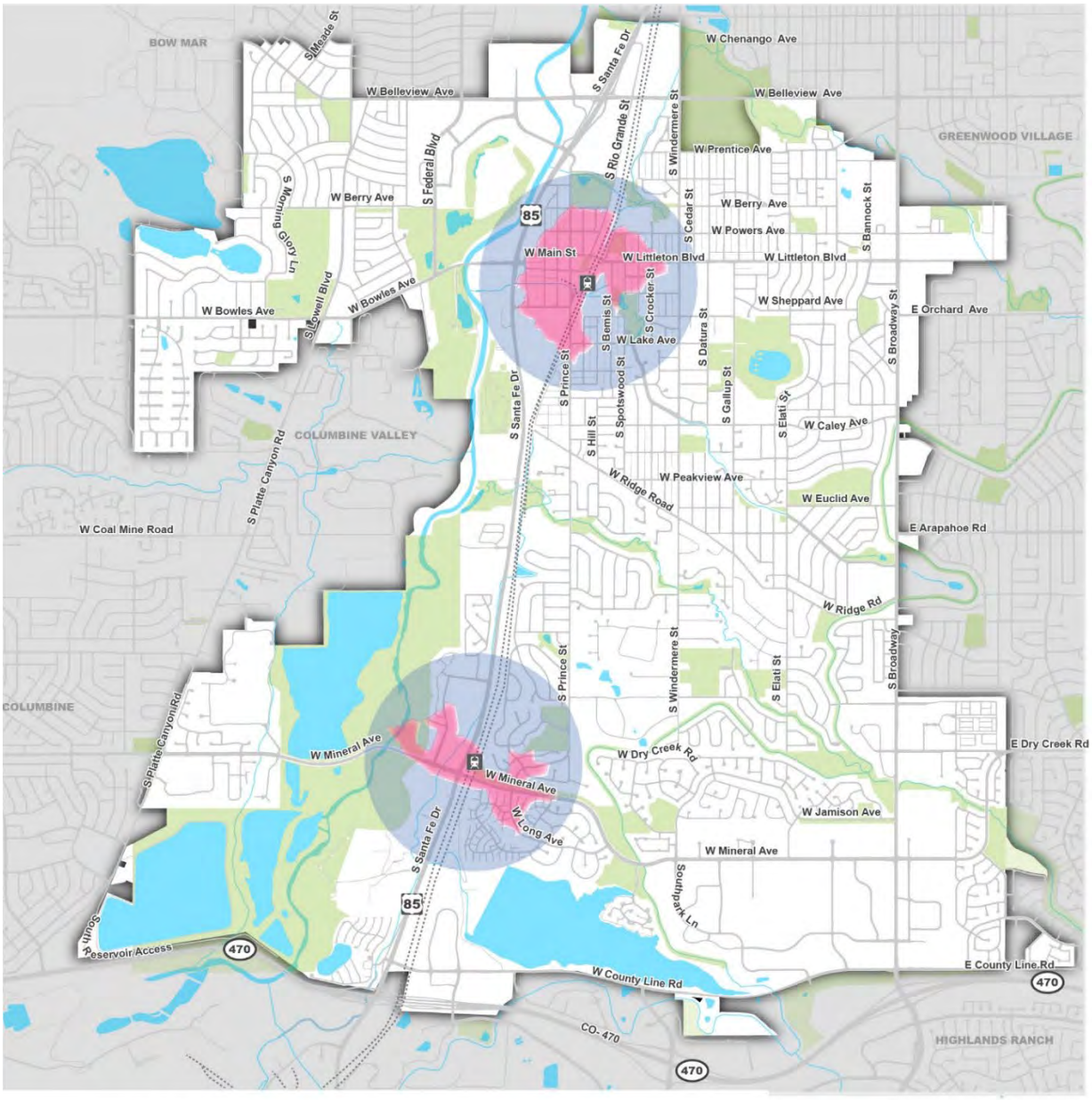
38% of Littleton households are within a ½ mile walk along sidewalks to a primary, secondary, or higher education facility.

Walksheds were created by routing ½ mile from schools along the DRCOG 2016 Planimetrics Sidewalk Layer

0 0.5 1 Miles

- City of Littleton
- Parks and Open Space
- Water
- Railroads
- ½ Mile Walkshed to Education Facility
- ½ Mile "as the crow flies" from Education Facility
- Education Facility

Figure 13. 1/2 Mile LRT Station Walksheds



6% of Littleton households are within a ½ mile walk of the Mineral or Littleton Downtown RTD Light Rail stations, which are the only high frequency transit stops in the City

Walksheds were created by routing ½ mile from schools along the DRCOG 2016 Planimetrics Sidewalk Layer

0.5 1 Miles

- City of Littleton
- Parks and Open Space
- Water
- Railroads
- ½ Mile Walkshed LRT Station
- ½ Mile "as the crow flies" from LRT Station
- LRT Station

Bicycle Analysis

Bicycle Level of Traffic Stress

The Bicycle Level of Traffic Stress (BLTS) method was developed in the 2012 Mineta Transportation Institute report *Low Stress Bicycling and Network Connectivity*. The inputs for this method are bicycle facility type, such as sharrows, bike lanes, protected bike lanes, and separated paths, and other street data such as traffic speed, volume, and curbside use. The analysis is intended to help determine whether a child, an average person, or only the most confident bicyclists would bicycle along a street. A simplified Level of Traffic Stress analysis was completed for streets and trails in the City of Littleton. In this case, the analysis was simplified to “low-stress” or “not low-stress" due to data limitations. Low-stress bicycle facilities were defined as:

- Off-street trails (paved or unpaved)
- Local streets, or
- Shared lanes or bike lanes on streets with a speed limit of 25 or 20 miles per hour and with less than 4,000 ADT

There are currently 60 miles of low-stress bicycle facilities in the City of Littleton (.

Table 13. Existing Low-Stress Bicycle Facilities

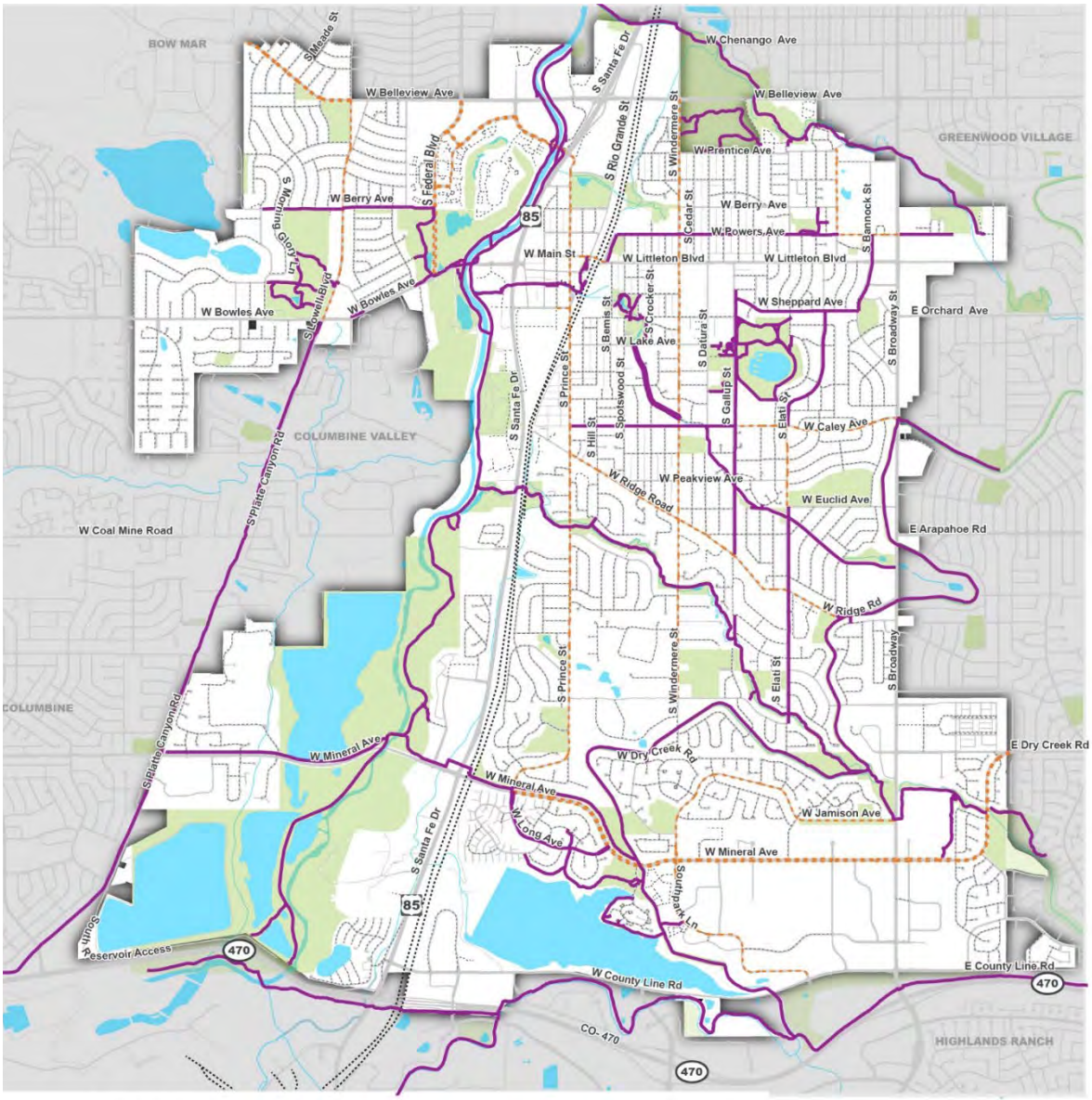
Type	Miles
Bike Lane	2
Bike Shoulder	1
Local Street	2
Trails	50
Shared Lane	3
Shared Parking/Bike Lane	2
Total	**60**

The results of the analysis below show the existing low-stress bicycle network, and identification of key gaps in the network. There is a strong existing trail system and plenty of low traffic volume streets in the City, but Connector Streets and Commercial Corridors pose a barrier both to cross and to travel along for bicyclists. The most direct routes to travel for bicyclists currently tend not to be low-stress facilities. There are 28 miles of projects proposed to complete the low-stress bicycle network in the City of Littleton. These are summarized in Table 14 and shown in Figure 14.

Table 14. Proposed New Low-Stress Bicycle Facilities

Type	Miles
Advisory Bike Lane	2
Bike Lane	1
Buffered Bike Lane & Traffic Calming	2
Protected Bike Lane	14
Shared Use Path	8
Total	**28**

Figure 14. Existing Low Stress Bicycle Facilities



TRAILMARK NEIGHBORHOOD

Low-Stress Bike Routes are defined as:

- Off-street trails (paved or unpaved)
- Local streets
- Shared lanes or bike lanes on streets with a speed limit of 25 or 20 miles per hour and with less than 4,000 ADT

0.5 1 Miles

- City of Littleton
- Parks and Open Space
- Water
- Railroads
- Existing Low-Stress Bicycle Route
- Existing Non-Low-Stress Bicycle Route

Bikesheds

Using the low-stress bicycling network identified above, bikeshed analyses were completed for access to schools and the RTD light rail stations. Currently, 21% of Littleton households are within a half-mile low-stress bike ride of primary, secondary, or higher education facilities (Figure 15). This is relatively low, especially compared to the walkshed analysis shown previously. This number is low because of the lack of low-stress bicycle facilities on Connector Streets and Commercial Corridors which pose a barrier to bicycling.

Currently, 15% of Littleton households are within a 2-mile low-stress bike to the Mineral or Littleton Downtown RTD Light Rail stations (Figure 16). A 2-mile bike ride is a typical bicycle shed distance as it takes the average rider roughly 10 minutes which is the same amount of time as the ½ mile walkshed discussed previously. The existing bikeshed coverage is primarily routed along existing trails, and a lack of on-street low-stress bicycle facilities to connect to the stations reduces the potential bikeshed coverage.

Figure 15. 1/2-Mile Low Stress Bikeshed to Educational Facilities

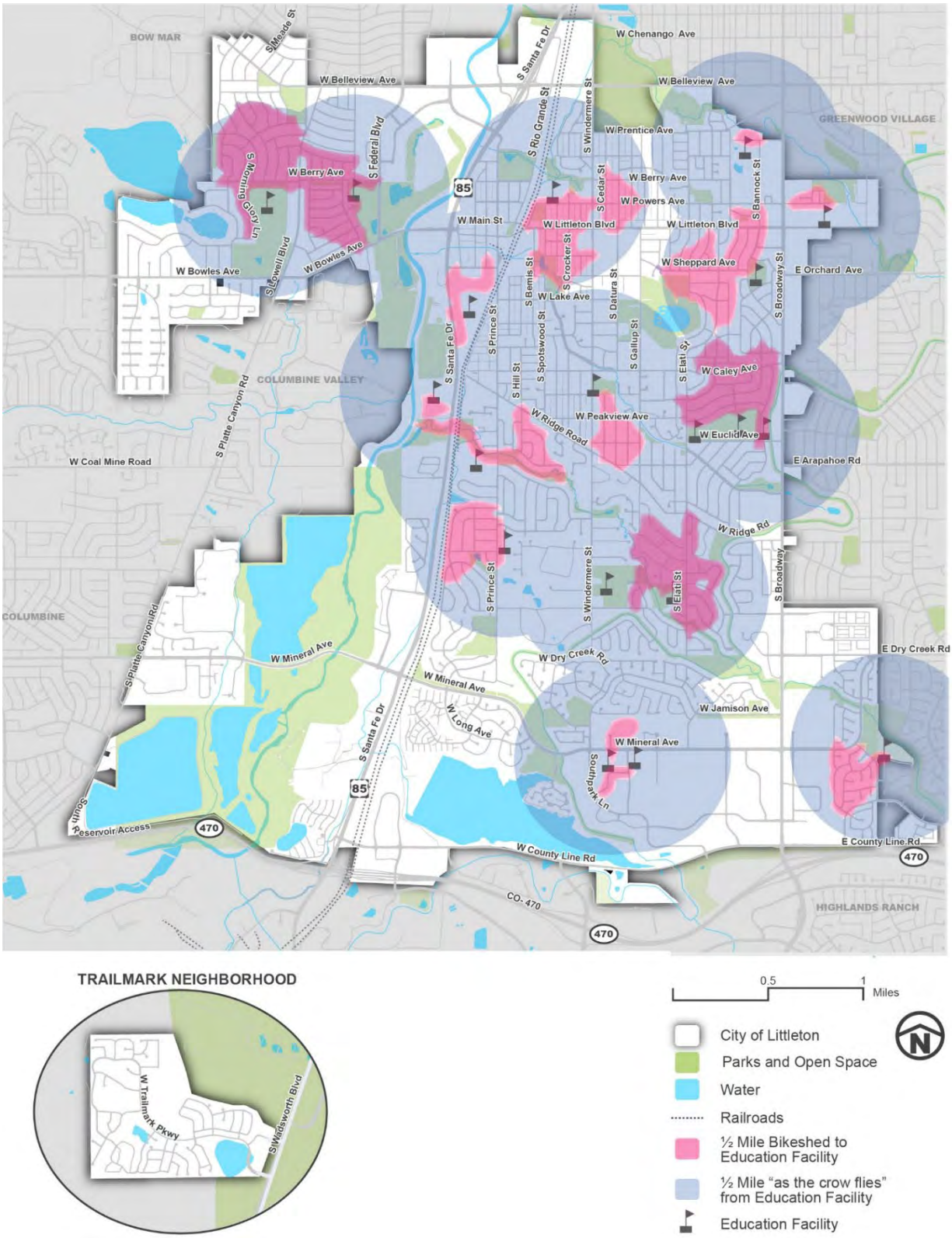
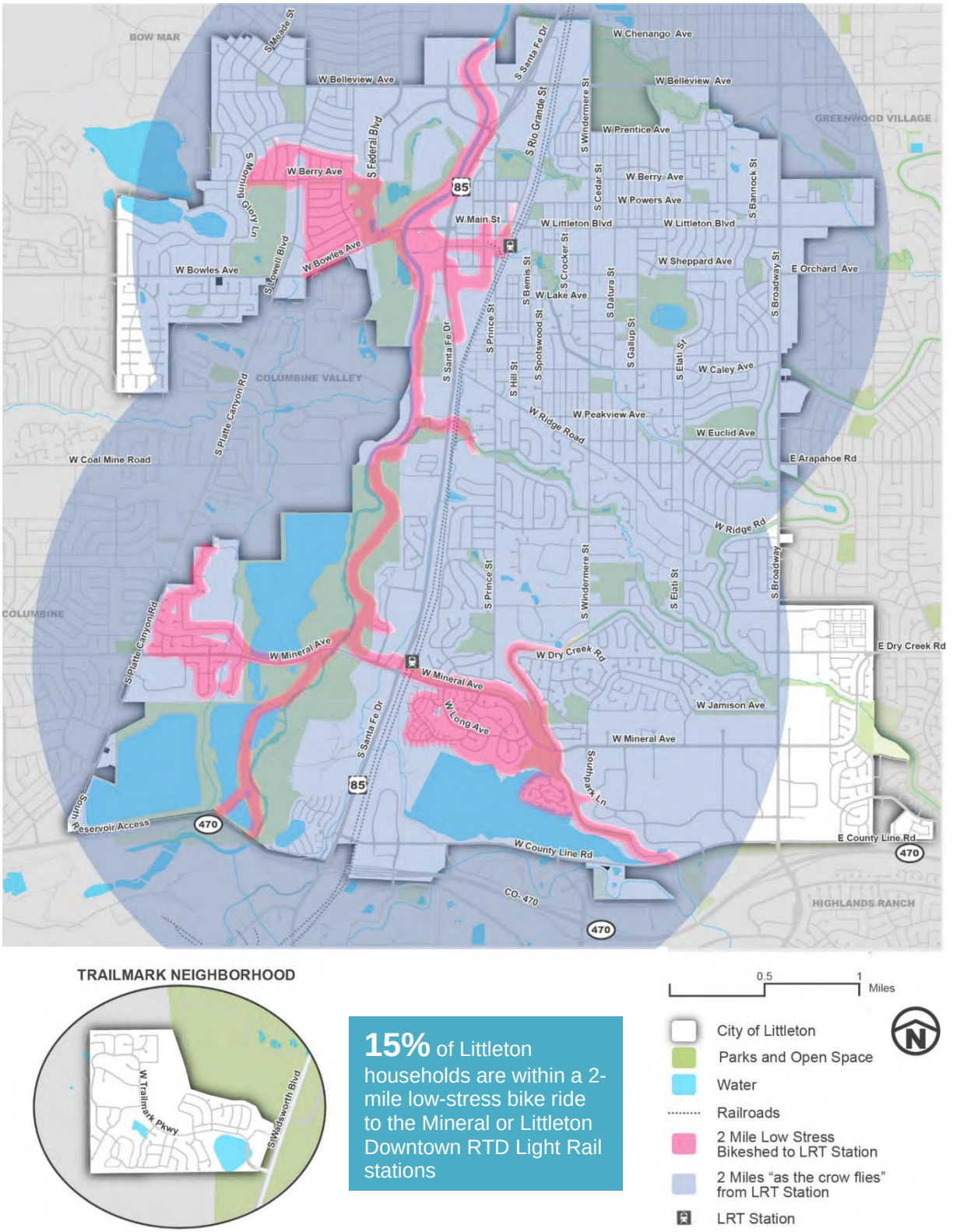


Figure 16. Two-Mile Low Stress Bikeshed to LRT Stations



15% of Littleton households are within a 2-mile low-stress bike ride to the Mineral or Littleton Downtown RTD Light Rail stations

COMPLETE BICYCLE AND PEDESTRIAN NETWORKS

In order to connect people in the City of Littleton with more destinations more easily by walking and biking, a vision for complete bicycle and pedestrian networks was developed. The vision was developed by examining the existing network, conducting a gaps assessment, and making recommendations for completing the bicycle and pedestrian networks.

PEDESTRIAN NETWORK

At a high level, gaps in the pedestrian network were identified using sidewalk widths in the City. To better focus improvement efforts, pedestrian priority areas were identified in the City. These correspond with downtown, the area around both RTD light rail stations, and along streets in the City including:

- Bowles Avenue/ Littleton Boulevard
- Prince Street
- Windermere Street
- Gallup Street
- Elati Street
- Broadway
- Mineral Avenue
- Ridge Road
- Caley Avenue
- Belleview Avenue

The United States Access Board 2002 *ADA Accessibility Guidelines* (ADAAG) require a minimum clear width of 3 feet on all accessible routes (including sidewalks). If only 3 feet are provided than 5 foot by 5 foot passing areas must be provided “at reasonable intervals not to exceed 200 feet.” However, the United States Access Board created proposed *Public Rights-of-Way Accessibility Guidelines* (PROWAG) in 2011 which state that the minimum clear width on all accessible routes (including sidewalks) should by 5 feet which is the minimum width required for two people in a typical wheelchair to pass each other. The PROWAG guidelines state that in constrained locations, the absolute minimum width is 4 feet. Taking these requirements into account, the design minimum clear width of sidewalks should be 5 feet with allowance for a 4-foot minimum in locations where 5 feet is infeasible.

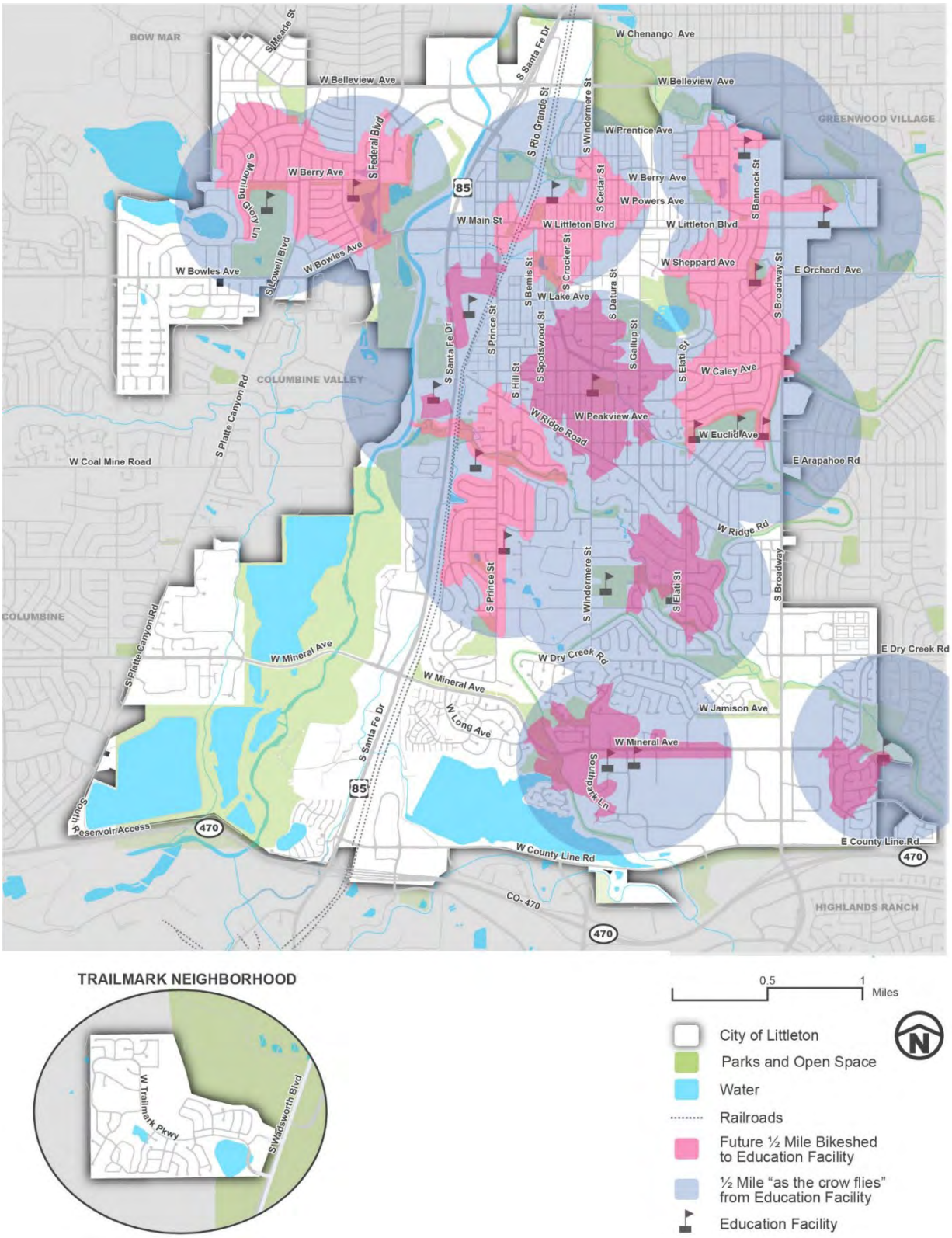
BICYCLE NETWORK

Building off the existing low-stress bicycle network described in the Existing Network Evaluation section, key gaps in the bicycle network were identified. The NACTO *Contextual Guidance for Selecting All Ages & Abilities Bikeways* decision matrix was used to identify what type of bicycle facility would be most appropriate to create a low-stress connection given the existing number of lanes, motor vehicle speed, and motor vehicle volume. This guide recommends the following types of bicycle facilities based upon motor vehicle speed, volume, number of lanes, and operational characteristics:

- Shared Street
- Bicycle Boulevard
- Bike Lane
- Buffered Bike Lane & Traffic Calming
- Protected Bike Lane
- Shared Use Path

The results of this analysis are shown in Figure 17 and Figure 18.

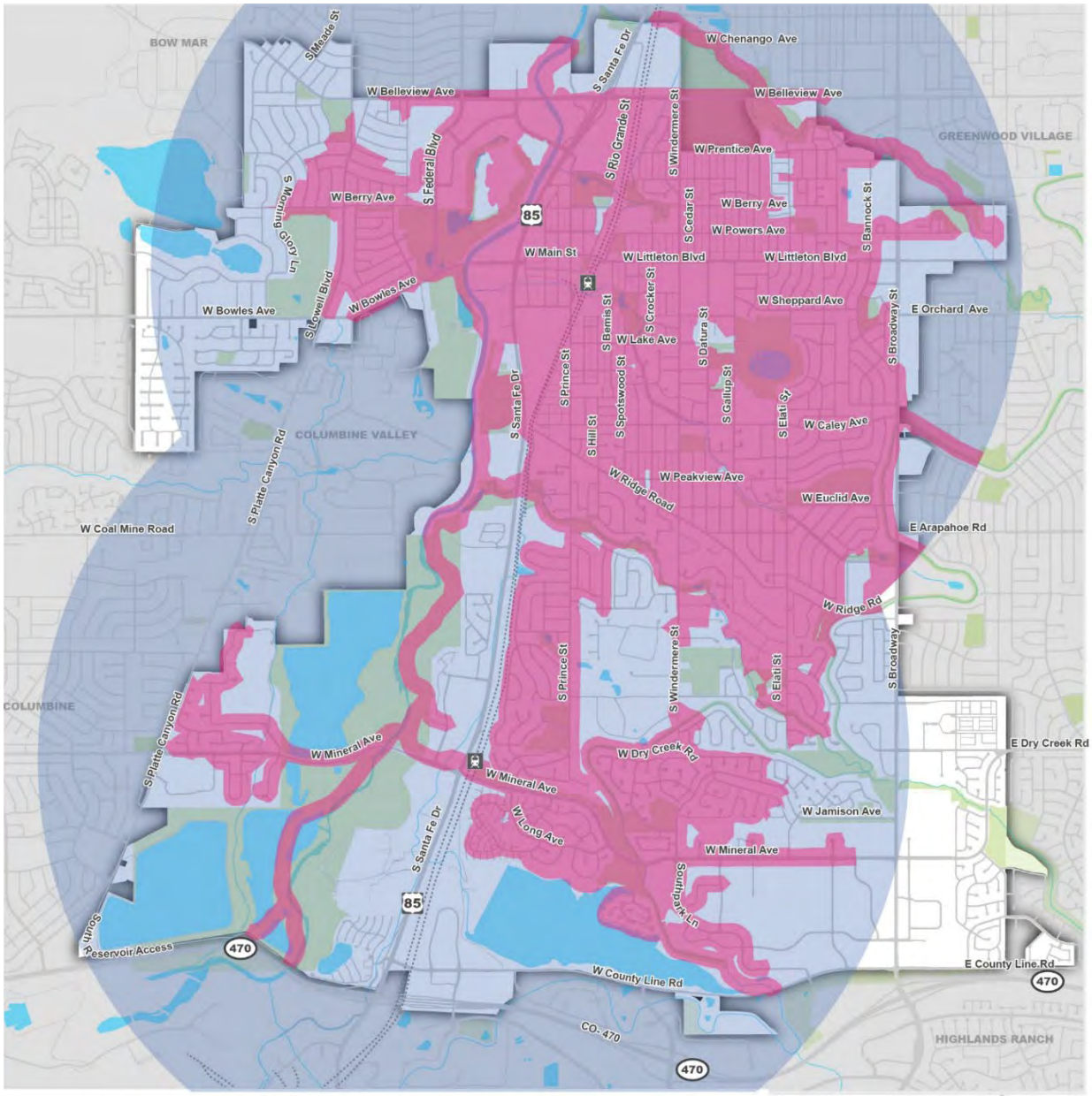
Figure 17. Future 1/2-Mile Low Stress Bikeshed to Educational Facilities



0.5 1 Miles

- City of Littleton
- Parks and Open Space
- Water
- Railroads
- Future ½ Mile Bikeshed to Education Facility
- ½ Mile "as the crow flies" from Education Facility
- Education Facility

Figure 18. Future Two-Mile Low Stress Bikeshed to LRT Stations



Once the Low-Stress Bicycle Network is complete...

76% of Littleton households will be within a 2-mile low-stress bike ride to the Mineral or Littleton Downtown RTD Light Rail stations or Broadway bus stops.

4.6x more people connected

0.5 1 Miles

- City of Littleton
- Parks and Open Space
- Water
- Railroads
- Future 2 Mile Low Stress Bikeshed to LRT Station
- 2 Miles "as the crow flies" from LRT Station
- LRT Station

FRAMEWORK FOR ACTION

The framework for action below is organized in four tiers: (1) Goals, (2) Policies, (3) Objectives, and (4) Actions. All are intended to mesh with and support the other aspects of this Transportation Master Plan.

GOALS

Improving Active transportation in the City of Littleton will help to achieve all five overarching goals of this Transportation Master Plan.

- **Connected:** By improving connections for people walking and bicycling, more people will be connected to more destinations no matter what mode they choose to use to get around.
- **Healthy:** Active Transportation is the healthiest way for people to move around. If more people are able to walk and bicycle for more trips in the City of Littleton then more people will be able to achieve an active and healthy lifestyle.
- **Inclusive**: By elevating Active Transportation as a priority for transportation, people of all ages, abilities, and backgrounds will be able to move around the City of Littleton in ways that are best suited to their needs and lifestyle.
- **Prosperous:** People that walk or bicycle to businesses tend to visit businesses more and spend more on average than people driving past businesses. Providing Active Transportation connections to businesses will support local economic prosperity.
- **Sustainable:** Walking and bicycling are both zero-emissions modes of travel which also have a very small impact on pavements in comparison to driving. With an increase in the number of people walking and bicycling, transportation and infrastructure emissions will be reduced.

POLICIES

Existing Policies

The installation of “bikeways” is enabled by the Littleton City Code, Chapter 9 Traffic Code, Section 1-7 Bikeways. There is currently a lack of other detailed policies for implementing pedestrian and bicycle facilities.

Proposed Policies

In making decisions that involve public resource allocation, regulatory matters, and physical improvements, among others, Littleton will:

Planning

1. Develop a Complete Networks Plan.
2. Develop a Transportation Demand Management Plan.
3. Implement a comprehensive bicycle and pedestrian count program like the vehicle count program. Consider installation of permanent continuous counters in key locations and as part of upcoming projects.
4. Consider installing an all ages and abilities bicycle facility for every new bicycle project. All ages and abilities bicycle facilities are low-stress for all potential users, spanning from children to seniors.
5. Update City Code to address burgeoning micromobility industry. Include operating rules such as number of permits, speed limits, whether users should use sidewalks, bike lanes, or general purpose lanes depending on speeds. Establish any restricted areas for the operation of micromobility units.

Maintenance

1. Consider including bicycle and pedestrian facility upgrades as part of every infrastructure project, including resurfacing projects.
    a. Develop a resurfacing checklist that considers bicycle facilities - https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/resurfacing/

2. Consider bicycle and pedestrian detection for signal actuation in every new traffic signal installation
3. Maintain a fleet of smaller snow removal vehicles to plow trails, shared use paths, and protected bike lanes
4. Update City Code to require residents/businesses to clear sidewalks within 24 hours; existing code states, “within a reasonable time after every snowfall”
5. Evaluate existing sidewalk policy/code

Development

1. In development proposals, limit curb cuts along proposed planned bicycle and pedestrian routes.
2. Require maintaining clear sidewalks or bicycle lanes during building or street construction or provide a detour: http://www2.oaklandnet.com/oakca1/groups/pwa/documents/memorandum/oak061424.pdf
3. Encourage new developments to provide secure indoor parking and other end-of-trip facilities for bicyclists.
4. Encourage development to utilize grid street networks and limit the use of cul-de-sacs.

OBJECTIVES

In order to achieve the overall Transportation Master Plan goals outlined above, multiple objectives have been developed. The objectives in Table 15 are specific to improving active transportation networks in the City of Littleton.

Table 15. Objectives—Active Transportation Networks

No.	Topic	Objective	Related Goals				
			Connected	Healthy	Inclusive	Prosperous	Sustainable
1	Quality of Life	Achieve high resident satisfaction rates with transportation services	●		●	●	●
2	Quality of Life	Provide spaces that people can enjoy within the public right-of-way		●		●	
3	Quality of Life	Provide people with a sense of personal safety on all transportation modes		●	●		
4	Quality of Life	Provide transportation infrastructure that meets local business needs				●	●
6	Community	Minimize transportation-related air quality degradation		●			●
7	Community	Minimize transportation-related water quality degradation		●			●
8	Community	Minimize transportation-related noise impacts		●		●	●
11	Community	Provide a transportation system the City can afford to maintain					●
13	Mobility	Achieve a balanced mode share	●	●	●	●	●
14	Mobility	Provide high-quality transportation systems people can afford to use	●		●	●	
15	Mobility	Provide travelers with relevant, timely information -- including innovative methods	●	●	●		
16	Active	Provide a well-connected, direct bicycling network	●	●			●
17	Active	Provide a safe biking environment	●	●	●		●
18	Active	Provide a well-connected pedestrian network	●	●			
19	Active	Provide a safe walking environment	●	●	●		
20	Active	Provide healthy transportation choices		●			●
26	Transit	Connect people effectively to the transit system	●			●	

ACTIONS

The actions below convey tangible steps that will lead to achievement of the goals in line with the stated policies.

A strategic **Action** is aimed at seizing a special opportunity or addressing a particular challenge one faces, given limited resources—financial and otherwise—and recognizing that a broader program of new or ongoing activities will also be pursued in the meantime.

Capital Investments

Capital investments have been identified to address many of the issues related to Active Transportation in the City. Table 16 presents these investments. Figure 19 is a map showing the location of the projects listed in Table 16.

Table 16. Active Transportation Capital Investments

No.	Corridor	Intersection or Segment	Existing Condition	Description	Project Life
1	Caley Ave	Prince St to Broadway	Shared lane	Advisory bike lane or bike lane	Ultimate
2	Powers Ave	Court Pl to Delaware St	Shared lane	Advisory bike lane or bike lane	Ultimate
3	Berry Ave	Blue Sage Dr to Federal Blvd	Shared lane	Bike lane	Ultimate
4	Powers Ave	Delaware St to Broadway	Shared lane	Bike lane	Ultimate
5	Elati St	Shepperd Ave to High Line Canal	Shared lane	Bike lane	Ultimate
6	Delaware St	Lehow Ave to Powers Ave	Shared lane	Bike lane	Ultimate
7	Windermere St	Ridge Rd to High Line Canal Trail	Shared lane	Buffered bike lane and traffic calming	Ultimate
8	Windermere St/Jamison Ave	Mineral Ave to Broadway	Bike lane/ bike shoulder	Buffered bike lane and traffic calming	Ultimate
9	Belleview Ave	City Limits/ Prospect Rd to Irving St	Bike lane/ none	Protected bike lane	Ultimate
10	Windermere St	City Limits/ Layton Ave to Littleton Blvd	Bike lane/ shared parking	Protected bike lane	Ultimate
11	Windermere St	Littleton Blvd to Ridge Road	Bike lane/ shared parking	Protected bike lane	Ultimate
12	Ridge Rd	Prince St to Broadway	Bike lane	Protected bike lane	Ultimate

Table 16. Active Transportation Capital Investments

No.	Corridor	Intersection or Segment	Existing Condition	Description	Project Life
13	Alamo Ave	Prince St to Court Pl	None	Protected bike lane	Ultimate
14	Main St	Prince St to Court Pl	None	Protected bike lane	Ultimate
15	Church Ave	Santa Fe Dr to Prince St	None	Protected bike lane	Ultimate
16	Federal Blvd	Belleview Ave to Bowles Ave	Bike lane	Protected bike lane	Ultimate
17	Lowell Blvd	Belleview Ave to Bowles Ave	Shared lane	Protected bike lane	Ultimate
18	Prince St	Centennial Dr to Mineral Ave	Bike lane/ shared lane/ shared parking/ bike lane/ bike shoulder	Protected bike lane	Ultimate
19	Southpark Ln	Mineral Ave to County Line Rd	Shared lane	Protected bike lane	Ultimate
20	Centennial Dr/ Prentice Ave/ Progress Ave	Federal Blvd to Prince St	Bike lane	Protected bike lane	Ultimate
21	Broadway	High Line Canal Trail south of Arapahoe Rd to Ridge Road	None	Shared use path	Ultimate
22	Broadway	Bannock St to Caley Ave	None	Shared use path	Ultimate
23	Belleview Ave	Irving St to City Limits	None	Shared use path	Ultimate
24	Mineral Ave	Broadway to E Dry Creek Rd	Shared lane	Shared use path	Ultimate
25	Broadway	Jamison Ave to City Limits	None	Shared use path	Ultimate
26	Broadway	Powers Ave	Traffic signal	Bicycle intersection improvements	Ultimate
27	Santa Fe Dr	Prince St	Traffic signal	Bicycle intersection improvements	Ultimate

Table 16. Active Transportation Capital Investments

No.	Corridor	Intersection or Segment	Existing Condition	Description	Project Life
28	Prince St	Alamo Ave	Traffic signal	Bicycle intersection improvements	Ultimate
29	Santa Fe Dr	Belleview Ave	Traffic signal - SPUI	Bicycle intersection improvements	Interim
30	Lowell Blvd	Berry Ave	Traffic signal	Bicycle intersection improvements	Ultimate
31	Mary Carter Greenway	Bowles Ave	Grade-separated crossing	Bridge widening	Ultimate
32	Middlefield Rd	Bowles Ave	Traffic signal	Bicycle intersection improvements	Ultimate
33	Prince St	Caley Ave	Cross traffic does not stop	Bicycle intersection improvements	Ultimate
34	Bannock St	Littleton Blvd	Traffic signal	Bicycle intersection improvements	Ultimate
35	Windermere St	Littleton Blvd	Traffic signal	Bicycle intersection improvements	Ultimate
36	Prince St	Main St	Traffic signal	Bicycle intersection improvements	Ultimate
37	Jackass Hill Rd/ Long Ave	Mineral Ave	Traffic signal	Bicycle intersection improvements	Ultimate
38	Santa Fe Dr	Mineral Ave	Traffic signal	Bicycle intersection improvements	Interim
39	Apache St/ High Line Canal Trail	Ridge Rd	3-way stop	Bicycle intersection improvements	Ultimate
40	Elati St	Ridge Rd	4-way stop	Bicycle intersection improvements	Ultimate
41	Gallup St	Ridge Rd	4-way stop	Bicycle intersection improvements	Ultimate
42	Prince St	Ridge Rd	4-way stop	Bicycle intersection improvements	Ultimate
43	Windermere St	Ridge Rd	4-way stop	Bicycle intersection improvements	Ultimate

Table 16. Active Transportation Capital Investments

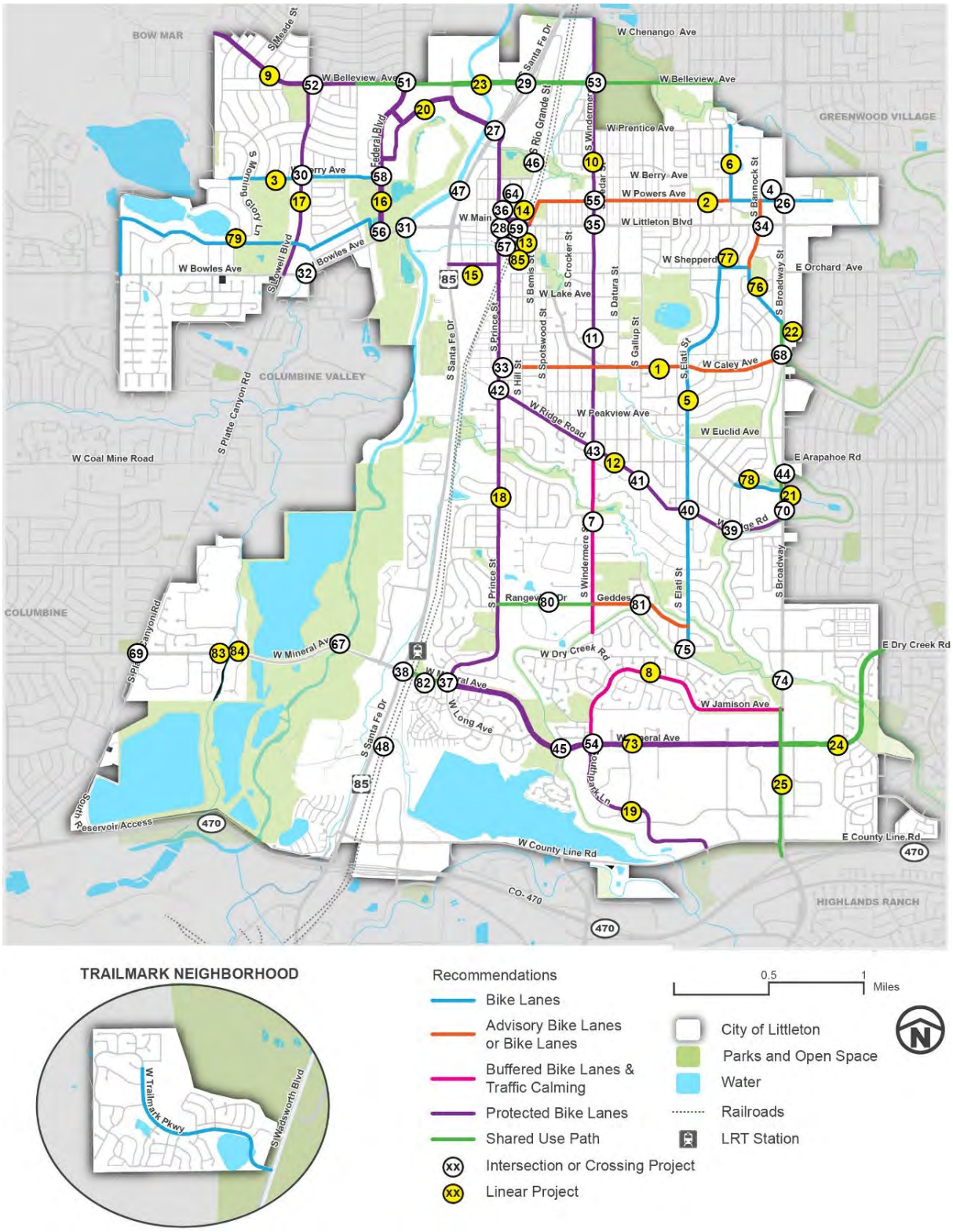
No.	Corridor	Intersection or Segment	Existing Condition	Description	Project Life
44	Broadway	High Line Canal Trail (S of Arapahoe Rd)	Cross traffic does not stop	Grade-separated	Ultimate
45	Mineral Ave	Peninsula Dr/ High Line Canal Trail	Traffic signal	Grade-separated	Ultimate
46	Rio Grande St	Slaughterhouse Gulch Trail	None	Grade-separated	Ultimate
47	Santa Fe Dr	Slaughterhouse Gulch Trail	None	Grade-separated	Ultimate
48	Santa Fe Dr	Dad Clark Gulch	Bridge (no connection)	Grade-separated	Ultimate
51	Federal Blvd	Belleview Ave	Traffic signal	Protected bicycle intersection	Ultimate
52	Lowell Blvd	Belleview Ave	Traffic signal	Protected bicycle intersection	Ultimate
53	Windermere St	Belleview Ave	Traffic signal	Protected bicycle intersection	Ultimate
54	Southpark Ln	Mineral Ave	Traffic signal	Protected bicycle intersection	Ultimate
55	Windermere St	Powers Ave	Traffic signal	Protected bicycle intersection	Ultimate
56	Federal Blvd	Bowles Ave/ Trail Crossing	Traffic signal	Raised crossing in channelized right turn lane	Ultimate
57	Prince St	Little's Creek Trail	Pedestrian warning signage	RRFB/ raised pedestrian crossing	Ultimate
58	Berry Ave	Federal Blvd	Cross traffic does not stop	Pedestrian signal	Ultimate
59	Bega Park Trail	Alamo Ave	Pedestrian warning signage	RRFB/ raised pedestrian crossing	Ultimate
64	Bega Park Trail	Main St	Pedestrian warning signage	RRFB/ raised pedestrian crossing	Ultimate
67	Mary Carter Greenway	Mineral Ave	Grade-separated crossing	Bridge widening	Ultimate

Table 16. Active Transportation Capital Investments

No.	Corridor	Intersection or Segment	Existing Condition	Description	Project Life
68	Broadway	Caley Ave/ High Line Canal Trail	Traffic signal	Signal phasing changes	Ultimate
69	Platte Canyon Rd	Mineral Ave/ Ken Caryl Rd	Traffic signal	Signal phasing changes	Ultimate
70	Broadway	Ridge Rd/ High Line Canal Trail	Traffic signal	Signal phasing changes	Ultimate
73	Mineral Ave	Jackass Hill Rd to Broadway	Bike lane	Protected bike lane	Ultimate
74	Broadway	Lee Gulch	Cross traffic does not stop	Grade-separated	Ultimate
75	Elati St	Highline Canal	Dirt path	Improve connection	Ultimate
76	Bannock St	Powers Ave to Broadway	Shared lane/ none	Bike lane	Ultimate
77	Shepperd Ave	Bannock St to Elati St	Shared parking/ bike lane	Bike lane	Ultimate
78	Sterne Pkwy	Apache St to Broadway	None	Bike lane	Ultimate
79	Tule Lake Dr	Sheridan Blvd/ City Limits to Federal Blvd	None	Bike lane	Ultimate
80	Rangeview Dr	Windermere St to Prince St	Path	Shared use path	Ultimate
81	Geddes Ave	Windermere St to Elati St	None	Advisory bike lane or bike lane	Ultimate
82	Mineral Ave	Between Santa Fe Dr & Jackass Hill Rd	Path	Shared use path	Ultimate
83	Mineral Ave	Wolff St to Polo Ridge Dr	Path	Trail crossing improvements	Ultimate
84	Mineral Ave	Polo Ridge Dr	RRFB	Pedestrian signal or other improvement	Ultimate
85	Little's Creek Flume Trail Connection	RR Tracks	No connection	Trail connection across flume	Ultimate
86	City-wide	15.1-mi	Varies	Missing sidewalks	Ultimate
87	City-wide	32.5-mi	Varies	Narrow sidewalks	Ultimate

*Project life indicates whether the improvement results in a desired final condition (ultimate) or represents a step toward that final condition (interim).

Figure 19. Active Transportation Projects



Programs and Initiatives

1. Develop and fund a sidewalk improvement program, aimed at addressing highest need areas and facilities.
2. Create a bike map that is easy to understand and use and can be integrated into mobile mapping applications.

Regulations and Standards

1. Update street design standards to include best practices from National Association of City Transportation Officials (NACTO), Federal Highway Administration (FHWA), Manual on Uniform Traffic Control Devices (MUTCD), and American Association of State Highway and Transportation Officials (AASHTO).

Partnerships and Coordination

1. The City of Littleton should coordinate with CDOT, RTD, and adjacent municipalities where appropriate to implement Active Transportation projects.
2. The City of Littleton should coordinate with neighboring or regional agencies in applications for grant funding to implement Active Transportation projects.

More Targeted Planning/Study

1. Create a bicycle wayfinding program that includes region-wide and City-specific system maps posted in key locations, as well as comprehensive, easy-to-understand signing.

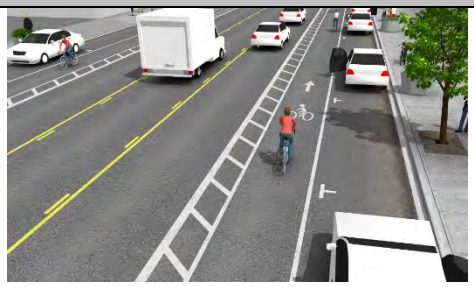
STATE OF THE PRACTICE

Since the first *City of Littleton Bicycle and Pedestrian Master Plan* was completed in 2011, there have been many new progressive design and planning guidance documents published for improving walking and bicycling facilities in cities. The National Association of City Transportation Officials (NACTO) has published very thorough and easy-to-use guidance documents that help achieve the principles of designing for all ages and abilities. For linear bicycle facilities, the NACTO *Urban Bikeway Design Guide* (2014) and *Designing for All Ages and Abilities* guide (2017) are valuable references. For bicycle design at intersections, the NACTO *Don't Give Up at the Intersection* guide (2019) is a great resource. Below are examples of best practices from these guides that the City of Littleton will consider when implementing the complete bicycle and pedestrian networks identified in this document.

BICYCLE TRAVEL LANES

Description	Photo/Image
Protected Bike Lane/ Cycle Track: A protected bike lane is a street-level bicycle facility that are protected from motor vehicle traffic by a raised physical barrier which can include concrete curbs, bollards, planters, and/or on-street parking. Typically when the protected bike lane is raised it is referred to as a cycle track.	Protected Bike Lane, Source: NACTO Raised Cycle Track, Source: NACTO
Two-Way Protected Bike Lane/ Cycle Track: A two-way protected bike lane is a wider protected bike lane only on one side of the street that allows for two-way bicycle travel. Typically when a two-way protected bike lane is raised it is referred to as a two-way cycle track. Because one direction of bicycle travel is running against the expected direction of traffic, special design considerations should be made to ensure the visibility and safety of bicyclists on this type of facility.	Source: NACTO

BICYCLE TRAVEL LANES

Description	Photo/Image
Buffered Bike Lane: Buffered bike lanes are a street-level bicycle facility that are separated from motor vehicle traffic by a painted buffer space usually two to three feet in width.	 Source: NACTO
Conventional Bike Lane: A conventional bike lane is a street-level bicycle facility that is immediately adjacent to motor vehicle traffic.	Source: NACTO
Advisory Bike Lane: Advisory bike lanes work like a narrow two-way local street. Bicyclists travel in the advisory bike lane and motor vehicles must yield to bicyclists. If there is oncoming traffic then motor vehicles must yield to the bicyclist and the oncoming motor vehicle before passing. Centerlines are not compatible with advisory bike lanes. Oftentimes advisory bike lanes allow the installation of a bike facility without the need to remove existing on-street parking lanes.	Source: City of Alexandria, VA/Hillary Orr
Bicycle Boulevards: Streets with low automobile traffic volumes that are designed to prioritize bicyclists of all ages and abilities. Typically Bicycle Boulevards are installed on local streets with minimal design treatments except at intersections. Typical elements of a Bicycle Boulevard include: traffic calming, through-traffic diversion, pavement markings and wayfinding signage.	Partial Closure - Except Bicycles, Source: NACTO

BICYCLE INTERSECTION TREATMENTS

Description	Photo/Image
Bicycle Signal: Dedicated signal for bicyclists to be provided in addition to a traffic signal when bicycle-specific traffic movements are desired such as a protected bicycle phase or a leading bicycle interval phase. A dedicated bicycle facility should be a prerequisite to installing a bicycle signal so that bicyclists are not mixed in with motor vehicle traffic and unable to make it to the front of the queue.	Source: NACTO
Bike Box: A bike box is a dedicated space for bicyclists at the front of a traffic lane at an intersection. Bike boxes allow for large volumes of bicyclists to queue at the head of an intersection which allows them to clear the intersection more quickly. They also increase their visibility to adjacent motor vehicle drivers, reducing the likelihood of a “right-hook” crash where a vehicle turns right across the path of a through bicyclists. Bike boxes must be installed with a no turn on red sign for motor vehicle drivers.	Source: NACTO
Protected Bicycle Intersection: A protected bicycle intersection involves installing physical barriers in the intersection to extend the protection for bicyclists from turning motor vehicles and allow for additional space for bicycle queuing ahead of stopped motor vehicles.	Source: bicycledutch.wordpress.com
Intersection Crossing Markings—“Crossbike”: Markings that indicate to bicyclists where to travel when crossing an intersection and indicate to motor vehicle drivers where to expect crossing bicyclists.	

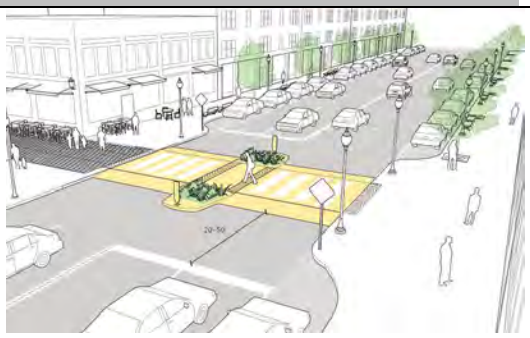
BICYCLE INTERSECTION TREATMENTS

Description	Photo/Image
Two-Stage Turn Queue Box Marking that indicates where to wait to make a two-stage turn. A two-stage turn is typically when a bicyclist wants to make a left turn but does not want to merge across multiple lanes of traffic. The bicyclists pulls off to the right at the far side of an intersection and turns and waits for the signal to cross, effectively making a left turn.	 Source: NACTO

PEDESTRIAN & BICYCLE INTERSECTION TREATMENTS

Description	Photo/Image
Median Refuge Island: A median with refuges for pedestrians and bicycles and enhanced crossing markings and signage. The refuges allow for two-stage crossings of a street—crossing one direction of traffic to reach the refuge and then crossing the other direction of traffic.	 Source: NACTO
Curb Extension: A curb extension (also sometimes called a bulb-out or bump-out) is an extension of the sidewalk or curbline at an intersection that is roughly the same width as the parallel parking lane. Curb extensions reduce crossing distances for pedestrians and slow motor vehicle traffic by narrowing the roadway.	 Source: NACTO

PEDESTRIAN & BICYCLE INTERSECTION TREATMENTS

Description	Photo/Image
Raised Crossing: Elevating a pedestrian or bicycle crossing to the level of the sidewalk or adjacent curb. Motor vehicles must slow down to traverse the raised crossing which improves yielding compliance to crossing pedestrians or bicyclists. Raised crossings are easier for pedestrians of all ages and abilities to traverse because the flush crossing eliminates the need to travel down a ramp off of the sidewalk and back up a ramp at the other side of the street.	 Source: NACTO
Reduce Corner Radii: The design radius of intersection corners determines the speed with which someone can take a turn at that intersection. Designing intersections with small corner radii can reduce motor vehicle speeds, increase driver awareness, shorten pedestrian crossings, provide additional space for improved ADA ramp design, and improve traffic control device visibility.	Source: Dan Burden
Rectangular Rapid Flashing Beacons (RRFB): Rectangular rapid flashing beacons (RRFBs) alert drivers to the presence of a pedestrian or bicyclist crossing, and are installed along with a pedestrian, bicycle, or school crossing warning sign. RRFBs are presently installed in multiple locations in Littleton.	Source: NACTO

Chapter 6.
Transit

INTRODUCTION

Transit plays an important role in defining Littleton's transportation system. In addition to alleviating the burden on the roadway network and providing mobility options, transit can help to anchor vibrant, people-oriented centers of activity within the City.

Transit includes all fixed-route bus and rail routes, as well as demand-response transportation available to the general public. In Littleton, these services are predominately provided by RTD, although the City operates the Shopping Cart fixed-route bus and Omnibus demand-response shuttle. The Shopping Cart and Omnibus provide transit services to disabled residents and residents age 55 or older. Shopping Cart is a scheduled fixed-route service operating Monday-Saturday, shuttling passengers to/from area grocery stores and the Streets of Southglenn. Omnibus is scheduled by appointment only, Monday-Friday, with ride priority given to medical trips (top priority), grocery shopping, and hair/barber trips. Maps summarizing the City's transit routes, frequency, and ridership can be found in the Existing City chapter.

88.6% of Littleton households are within a ½ mile walk of a bus or rail stop.

The average Littleton household has **1,346** transit trips available within ½ mile per week.[1]

THE CITY'S ROLE IN PUBLIC TRANSIT

The reasons someone might choose to take a bus or train, instead of driving alone, go well beyond the service planning jurisdiction of RTD (which includes factors such as the schedule and trajectory of the route). Achieving a transportation network that optimizes transit ridership requires the participation of employers (who dictate a large percentage of overall trips), developers (who have some control over how housing, retail, and office space will incentivize certain modes of travel), municipalities

like Littleton (which generally own and operate the streets, sidewalks, and trails), and the public itself.

RTD was created by the state legislature and collects tax within its borders to fund a transit system. RTD has always worked closely with the municipalities of the region, and Littleton in particular has a history of leadership when it comes to connecting its residents with opportunities through transit expansion. The City was instrumental in building the region's first suburban light rail line.

As an example, several of the Denver region's municipalities have taken an even more proactive role in guiding transit service. In the 1990s, the City of Boulder established its own vision for transit by establishing the Community Transit Network (CTN), which has led the City to fund additional bus service beyond what RTD would typically have been able to provide in their City[2]. In a similar move, the City and County of Denver will ask voters in November 2019 to approve a change in City charter to allow the public works department to offer transportation services, essentially enabling the creation of a transit agency housed within the City.

[1] https://alltransit.cnt.org/metrics/?addr=littleton
[2] https://www-static.bouldercolorado.gov/docs/BOULDER_TMP-SOS_Final_Rept_COMP-1-201311011558.pdf?_ga=2.112863436.956415599.1557545591-1894891957.1557437939

As Littleton works toward the goals of Envision Littleton, RTD and other regional partners such as DRCOG can provide administrative resources and institutional knowledge to support the City's public transit goals. These partners can also serve as conduits for access to additional state and federal funding to bolster local investments in capital projects related to transit service (such as traffic operations or station amenities).

LEGACY OF PLANNING

The following plans previously developed in Littleton and in the region provided an essential foundation for preparing this Transit element of the Transportation Master Plan.

- RTD FasTracks (Southwest Corridor Extension Environmental Evaluation)
- RTD Regional BRT Feasibility Study
- City of Littleton Mineral Station Area Framework
- RTD Mobility Hub Guidelines

Key takeaways from past planning efforts include:

- Extension of light rail service along the southwest lines from Mineral station to a new Park-n-Ride station in Highlands Ranch at C-470 & Lucent Blvd. New station would include 1,000 parking spaces. Interim station (not included in original FasTracks system) is being considered at Sante Fe Drive & C-470. This station would include 404 parking spaces.
- Broadway/Lincoln identified as top-priority BRT corridor through three tiers of screening based on ridership, travel demand, congestion/delay, and viability.
- "Community Support" identified as key criteria for successful BRT implementation.
- Enhanced safety amenities and character based design guidelines needed for light rail stations.
- Implement character-based design guidelines.
- Shift in thinking from "transit stops" to "mobility hubs" to allow for flexibility and maximize community benefit. (Four stops/stations in Littleton).

KEY ISSUES AND CONSIDERATIONS

Input and discussions for this Transportation Master Plan, through varied *Envision Littleton* community engagement, workshops with City Council and Planning Commission, and interaction with other City boards/commissions, City departments, and partner agencies and organizations, yielded the following list of key items that relate to the transit network:

- **Resident Satisfaction & Usage**: Transit services in Littleton receive generally high support from residents, but satisfaction with bus service has declined somewhat in recent years. Compared with other cities in the region, Littleton has a slightly higher rate of commuting via transit.
- **Level of Service:** Includes considerations of frequency, coverage, and reliability of bus and rail service. While nearly all households in Littleton have access to transit service of some kind, the usefulness of that service varies—in general, bus routes run infrequently and most trips within the City require a transfer.
- **Stops & Stations**: Enhancements to transit stops/stations can be a useful tool for achieving desired community character (particularly for areas among the mixed-use designations).
- **Specialized Service**: The City operates fixed-route (Shopping Cart) and demand-response (Omnibus) shuttle services targeted at providing for the mobility needs of those with disabilities as well as people over the age of 55.

More information on each of these key issues is provided in Table 17.

Table 17. Peer Cities—Transit at a Glance

City	2018 Population (Estimate)	% of Population Commuting By Public Transit[3]
Littleton, CO	48,007	6
Wheat Ridge, CO	31,400	5
Englewood, CO	34,690	5
Lakewood, CO	156,789	5
Broomfield, CO	69,267	4
Centennial, CO	110,831	3
Commerce City, CO	58,449	2
Arvada, CO	117,268	2

RESIDENT SATISFACTION & USAGE

Overall, Littleton's transit network and usage compares favorably to peer cities within the region and elsewhere in the country. As shown in the table below, Littleton has a greater percentage of transit commuters than comparable cities (even those with more extensive bus and rail coverage).

More than four out of five respondents to the Littleton Resident Survey rated light rail and Shopping Cart/Omnibus service "good" or "excellent[4]." Still, local bus routes within the City are generally underutilized, and respondents to the resident survey rate bus travel as the least convenient mode.

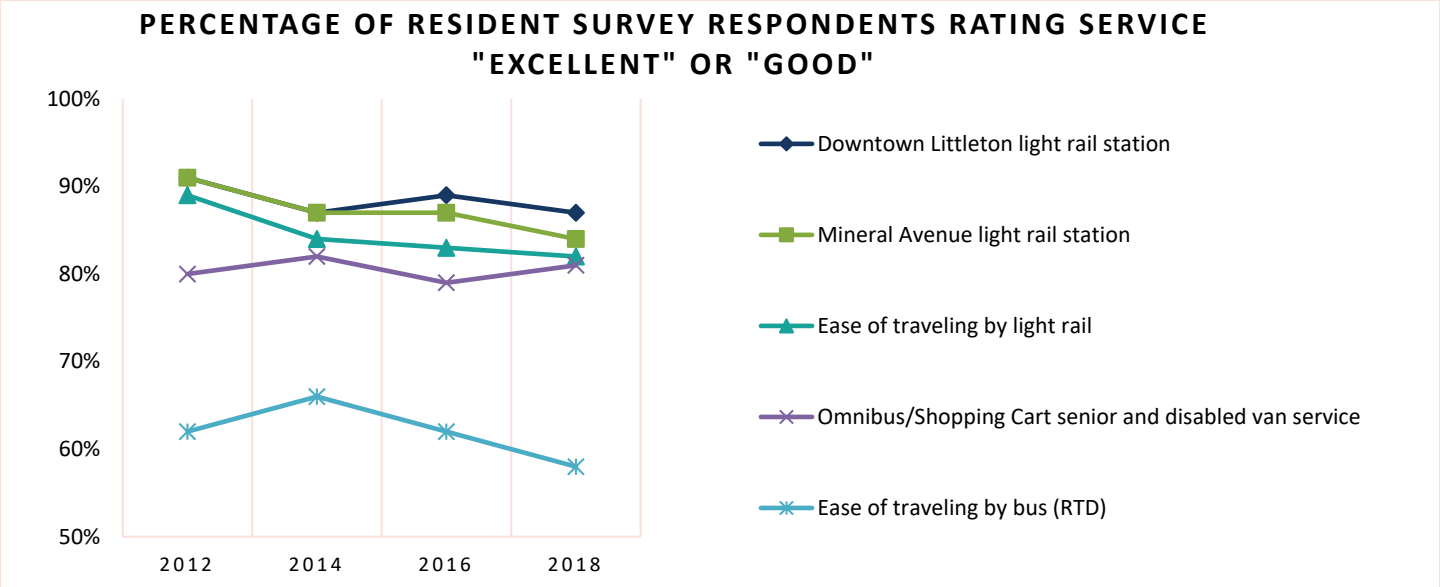
SERVICE QUALITY

Level of Service

For transit, LOS refers to the availability, frequency, comfort, and convenience of transit for people who make trips via transit on either bus or rail. The percentage of citizens with convenient access to high-quality transit is used to measure how well transit services are meeting Littleton's needs (Figure 20). It must be acknowledged that Littleton is but a part of RTD and does not provide the majority of transit service in the City. Moving forward, the City of Littleton will continue to update measures of transit service.

[3] https://transitcenter.org/wp-content/uploads/2018/10/BusReport_Spreads.pdf
[4] https://www.littletongov.org/home/showdocument?id=16730

Figure 20. Percentage of Citizens With Convenient Access to High-Quality Transit



The key measurements to update are:

2. Ridership within the City (measured by boardings and alightings)
3. Households within one mile of high-frequency transit stop/station
4. Jobs within 30-minute transit ride
5. Ratio of transit travel time vs. auto travel time at peak hour on key corridors
6. Utilization of parking near high-frequency transit stop/station
7. Number and subject of submitted complaints or satisfactions
8. Stop/Station environment (percentage of stops with high quality amenities)

Frequency

High-frequency transit service (defined as busses or trains arriving every 15-minutes or less) is among the most important factors contributing to increased ridership as well as people's satisfaction with transit service[5]. **Currently, Littleton's only high-frequency service is along the C and D light rail lines during peak commuting hours.**

RTD's service standards stipulate a minimum of 25 boardings per vehicle hour to warrant consideration for 15-minute frequency[6]. Table 18 shows 2017 boardings per hour for each bus route that serves Littleton (note that ridership figures include segments of the route outside City limits). Candidates for shorter headways include routes along Broadway, Lowell Boulevard/ Federal Boulevard, and Littleton Boulevard.

Table 18. Transit Route Performance

Route	Boardings per Hour (Route-Wide)
C	72*
D	95*
0 (0L)	34* (59)*
36 (36L)	27* (30)*
29	35*
59	14
66	23*
67	14
402L	14
403	12
* Warrants 15-minute frequency consideration	

[5] http://transitcenter.org/publications/whos-on-board-2019/

[6] http://rtd-denver.com/documents/serviced/service-standards-7-2016.pdf

Coverage

Nearly all Littleton residents live within a half-mile of a bus or rail stop, and ridership is relatively strong on the C and D light rail lines compared with other lines in the RTD network, as well as the bus routes along Broadway and Littleton Boulevard (Table 19).

Reliability

Littleton can improve speed and reliability of existing transit service by prioritizing the movement of buses along key segments and at certain intersections. RTD analysis of average ridership and bus speed shows that buses generally operate adequately within Littleton[7]. However, the corridor along Littleton Boulevard and through downtown experiences regular delay. Improvements would serve the existing strong ridership in the corridor and encourage transit growth in the future. Broadway is an ideal candidate for future improvements.

Table 19. Coverage

City	% of households within 1/2 mile of transit stop[6]	Available transit trips within 1/2 mile of average household[1]
Littleton, CO	89%	1,346
Wheat Ridge, CO	98%	1,259
Englewood, CO	95%	1,337
Lakewood, CO	94%	1,276
Broomfield, CO	57%	644
Centennial, CO	69%	556
Commerce City, CO	65%	726
Arvada, CO	89%	681

STOPS AND STATIONS

Stops and stations can play a significant role in determining how well transit serves riders overall, and whether or not people choose to make trips via a fixed-route bus or rail network[8]. The way people access stops and stations, as well as the amenities they experience while waiting or transferring, can also have a symbiotic relationship with land use goals. For Littleton, enhancements to transit stops/stations can be a useful tool for achieving desired community character (particularly for corridor mixed use areas).

Top 5 Bus Segments (by Ridership)

1. Church Ave/ Sante Fe Dr/ Bowles Ave (Downtown Station to Federal Blvd)
2. Broadway (Arapahoe Rd to Littleton Blvd)
3. Broadway (Mineral Ave to Ridge Rd)
4. Littleton Blvd (Broadway to Downtown Station)
5. Federal Blvd (Bowles to North limit)

Littleton is home to four locations identified in RTD's 2019 Mobility Hub Guidelines report. The two light rail stations are identified as Tier 2, meaning they have more daily activity (boardings plus alightings) than 95% of stops in the region. Two additional locations, at S Broadway/W Littleton Blvd and Arapahoe Community College, are in the 90th percentile for daily activity, and therefore qualify as Tier 3 mobility hub candidates. Additional stops along Broadway and Littleton Boulevard experience above-average activity, and would be good candidates for amenity improvements such as benches, shelters, lighting, and passenger information as appropriate.

Top Ten Transit Stops/Stations (by Daily Boardings)

1. Downtown Light Rail
2. Mineral Light Rail
3. Broadway at Littleton Blvd
4. Arapahoe Community College
5. Littleton Blvd at Broadway
6. Littleton Blvd at Windermere St
7. Broadway at Arapahoe Rd
8. Littleton Blvd at Datura St
9. Littleton Blvd at Cherokee St
10. Broadway at Mineral Ave

[7] http://www.rtd-denver.com/documents/serviced/RTD-networkAnalysis-032016.pdf

[8] https://transitcenter.org/wp-content/uploads/2018/10/BusReport_Spreads.pdf

SPECIALIZED SERVICES

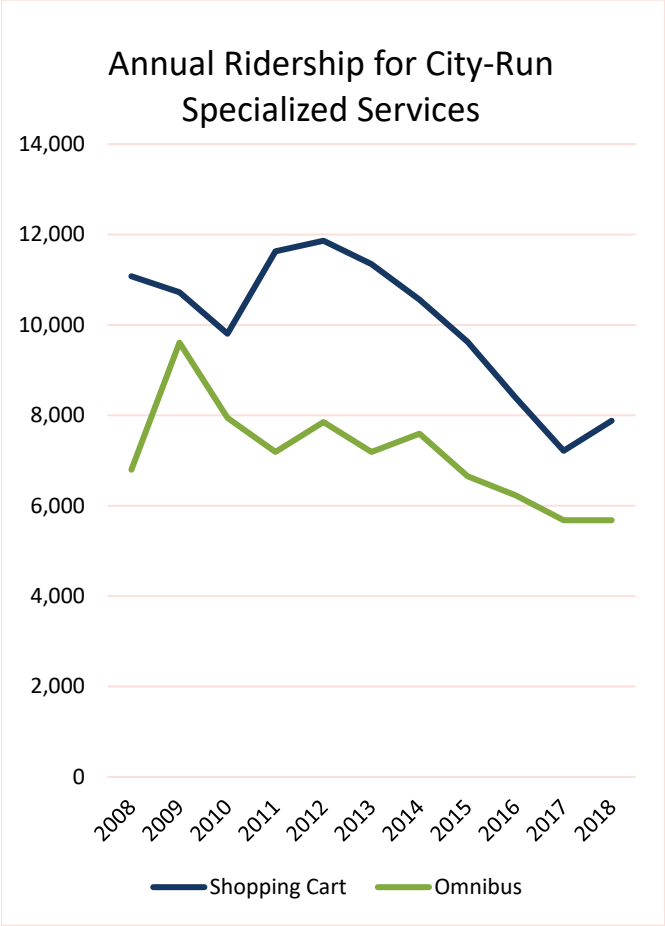
The City operates fixed-route (Shopping Cart) and demand-response (Omnibus) shuttle services targeted at providing for the mobility needs of those with disabilities as well as people over the age of 55. Shopping Cart connects select apartment complexes with grocery stores and other services. Omnibus is available by appointment only, and prioritizes rides for: 1) medical trips, 2) grocery shopping, 3) hair & barber, 4) other activities. Both services are donation-based.

Ridership on both Shopping Cart and Omnibus has declined somewhat in recent years (Figure 21). However, **Omnibus has nearly doubled its riders-per-mile since 2008**, and continues to attract new riders, becoming more efficient. Increased efforts to communicate Omnibus service with residents could improve ridership.

These specialized services serve a critical need, given the large elderly population in the City. The Littleton Resident Survey and the Envision Littleton outreach efforts indicate citizen support for both Shopping Cart and Omnibus, with some respondents citing them as among the amenities they value most about living in Littleton.

Omnibus and Shopping Cart complement existing RTD Access-a-Ride demand-response service coverage in the area (available to those with physical and/or cognitive disabilities for fares ranging from $5 to $20 per one-way trip).

Figure 21. Shopping Cart and Omnibus Ridership



FRAMEWORK FOR ACTION

The framework for action below is organized in four tiers: (1) Goals, (2) Policies, (3) Objectives, and (4) Actions. All are intended to mesh with and support the other aspects of this Transportation Master Plan.

GOALS

Littleton has its own distinct character, and the community has articulated its vision for transportation. Improving transit service (through operations and/or amenity enhancements) can play an important role helping Littleton achieve its transportation goals. Transit aligns with the City's established TMP goals as follows:

Goal 1: Connected
Transit helps decrease traffic congestion by moving more people per vehicle. It also creates activity around stops and stations, ensuring access to employment and commercial destinations.

Goal 2: Healthy
Bus and train riders have less than a tenth of the per-mile crash rate as automobile occupants. In addition, communities with higher transit ridership experience significantly fewer traffic fatalities overall.[9]

[9] https://www.apta.com/wp-content/uploads/Resources/resources/reportsandpublications/Documents/APTA-Hidden-Traffic-Safety-Solution-Public-Transportation.pdf

Goal 3: Inclusive
Transit service gives mobility options to people who cannot afford to own a car or who cannot drive (including the elderly and those with disabilities).

Goal 4: Prosperous
Transit-oriented development (TOD) can help Littleton work toward desired land-use and community character goals at the City's LRT stations and along key corridors such as Broadway and Littleton Boulevard.

Goal 5: Sustainable
Buses and trains offer significant reductions in greenhouse gas emissions on a per-person basis compared with cars. In addition, investments in high-capaCity transit are associated with increased property values for nearby homes and businesses.[10]

POLICIES

In making decisions that involve public resource allocation, regulatory matters, and physical improvements, among others, Littleton will:

1. Advocate for maintenance and enhancement of existing RTD bus and rail service in Littleton.
2. Improve ADA connections and trip-planning services connecting to fixed-route transit network.
3. Prioritize key stops and stations as mobility hubs to promote mode choice and tech integration.
4. Pursue regional public and private partnerships with neighboring municipalities to fund high-capaCity transit improvements (including light rail and BRT).
5. Prioritize the safety of vulnerable user groups on trains, buses, and at stations and stops.
6. Demand and support connections to employment, retail, and entertainment/recreation opportunities.

Manage growing demand on the transportation network by building awareness of travel choices.

OBJECTIVES

In order to achieve the overall Transportation Master Plan goals outlined above, multiple objectives have been developed. The objectives in Table 20 are specific to improving the transit network in the City of Littleton.

Table 20. Goals and Objectives—Transit Network

No.	Topic	Objective	Related Goals				
			Connected	Healthy	Inclusive	Prosperous	Sustainable
1	Quality of Life	Achieve high resident satisfaction rates with transportation services	●		●	●	●
2	Quality of Life	Provide spaces that people can enjoy within the public right-of-way		●		●	

[10]"Transit-Oriented Development in the United States - The National ...." https://www.nap.edu/catalog/23360/transit-oriented-development-in-the-united-states-experiences-challenges-and-prospects. Accessed 6 Aug. 2019.

Table 20. Goals and Objectives—Transit Network

No.	Topic	Objective	Related Goals				
			Connected	Healthy	Inclusive	Prosperous	Sustainable
3	Quality of Life	Provide people with a sense of personal safety regardless of transportation mode		●	●		
4	Quality of Life	Provide transportation infrastructure that meets local business needs				●	●
5	Community	Provide transportation facilities that are well integrated with land use and character				●	
6	Community	Minimize transportation-related air quality degradation		●			●
7	Community	Minimize transportation-related water quality degradation		●			●
8	Community	Minimize transportation-related noise impacts		●		●	●
9	Community	Establish a transportation planning and implementation process that is flexible and adaptable					●
10	Community	Provide for a community-drive decision-making process for transportation investments			●		●
11	Community	Provide a transportation system the City can afford to maintain					●
12	Mobility	Provide a reliable transportation system	●		●	●	
13	Mobility	Achieve a balanced mode share	●	●	●	●	●
14	Mobility	Provide high-quality transportation systems people can afford to use	●		●	●	
15	Mobility	Provide travelers with relevant, timely information -- including innovative methods	●	●	●		
26	Transit	Connect people effectively to the transit system	●			●	
27	Transit	Provide an efficient transit system with regional partners	●		●		
28	Transit	Provide safe & comfortable transit stops and stations			●	●	

ACTIONS

The actions below convey tangible steps that will lead to achievement of the goals in line with the stated policies.

Capital Investments

Capital investments have been identified to address many of the issues related to transit in the City. Table 21 presents these investments. Figure 22 is a map showing the location of the projects on this list.

A strategic **Action** is aimed at seizing a special opportunity or addressing a particular challenge one faces, given limited resources—financial and otherwise—and recognizing that a broader program of new or ongoing activities will also be pursued in the meantime.

Table 21. Capital Investments

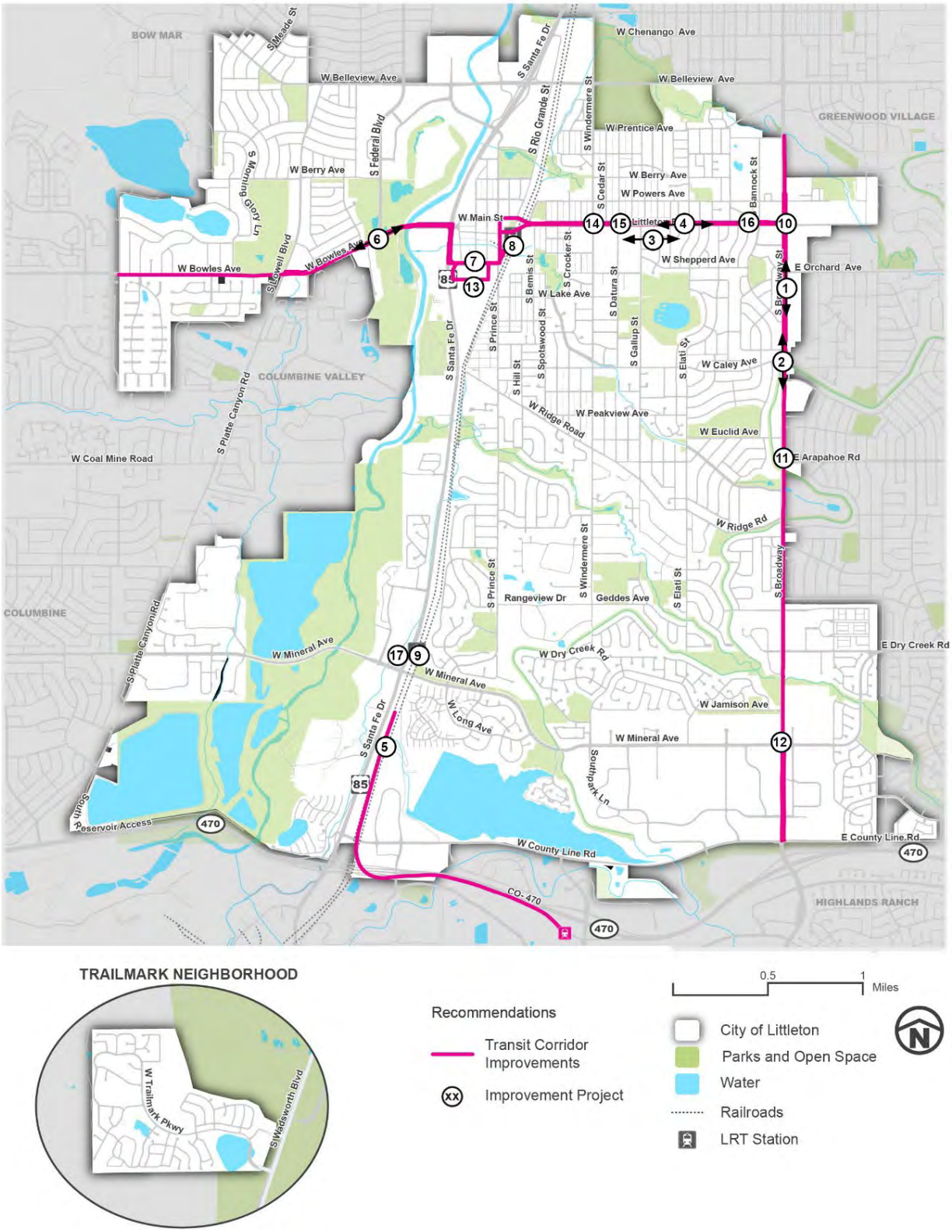
No.	Corridor	Intersection or Segment	Existing Condition	Description	Project Life*
1	Broadway	Corridor Wide	Standard bus service	BRT	Ultimate
2	Broadway	Corridor Wide	No transit prioritization	Transit speed and reliability improvements	Interim
3	Littleton Blvd	Corridor Wide	No circulator	Circulator Shuttle	Ultimate
4	Littleton Blvd	Corridor Wide	No transit prioritization	Transit speed and reliability improvements	Interim
5	Sante Fe Dr	Corridor Wide	No light rail service	Relieve burden on parking via full light rail extension	Ultimate
6	Bowles Ave	Corridor	No transit prioritization	Transit speed and reliability improvements	Ultimate
7	Downtown	District	No transit prioritization	Transit speed and reliability improvements - transit signal priority, queue jumps, or other operational improvements	Ultimate
8	Downtown	Station	361 parking spaces in surface lot	Station improvements (rider information, wayfinding, parking lot reconfiguration)	Ultimate
9	Mineral Ave/ Sante Fe Dr	Station	1,200 spaces in surface lot	Station improvements (rider information, wayfinding, parking lot reconfiguration)	Ultimate
10	Broadway	Littleton Blvd	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	Ultimate

Table 21. Capital Investments

No.	Corridor	Intersection or Segment	Existing Condition	Description	Project Life*
11	Broadway	Arapahoe Rd	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	Ultimate
12	Broadway	Mineral Ave	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	Ultimate
13	Downtown	Arapahoe Community College	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	Ultimate
14	Littleton Blvd	Windermere St	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	Ultimate
15	Littleton Blvd	Datura St	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	Ultimate
16	Littleton Blvd	Bannock St	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	Ultimate
17	Mineral Ave/ Sante Fe Dr	Station	Inadequate parking at Mineral Station	Parking garage (1500 spaces)	Ultimate

*Project life indicates whether the improvement results in a desired final condition (ultimate) or represents a step toward that final condition (interim).

Figure 22. Transit Projects



Programs and Initiatives

1. Maintain Omnibus and Shopping Cart service. Consider additional uses for City-owned shuttles (including downtown parking relief, special event access, and connections to community resources).
2. Pursue EcoPasses Programs. RTD's EcoPasses provide unlimited transit rides. They can be purchased on a per-employer, district, or development-wide basis. Littleton should consider instituting EcoPass incentives and/or recommendations for developers and employers within the City in order to improve transit ridership.

Regulations and Standards

1. Establish Standards for Stop/Station Enhancements: All stops should be connected to the pedestrian network. RTD service standards recommend shelter installation at all stops with more than 40 boardings per day. Improvements to access and wayfinding should serve populations that might otherwise rely on demand-response service.

Partnerships and Coordination

1. Advocated for service frequency increases (especially at peak hours) on bus routes servicing Broadway (including 0, 0L, 66) and Littleton Boulevard/Downtown/Bowles Avenue corridor (including 66, 36, 36L, 29).
2. Build support from regional partners to leverage available state and federal funding pools. Developing that support starts with collaboration with neighboring municipalities (including Centennial, Highlands Ranch, and Englewood). Possible mechanisms include informal coordination, inter-governmental agreements (IGA), memoranda of understanding (MOU), and transportation management associations (TMA) or organizations (TMO).

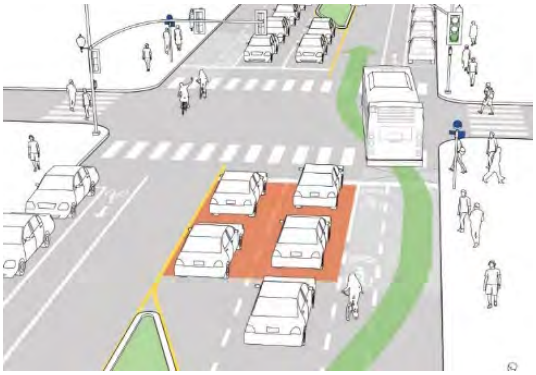
More Targeted Planning/Study

1. Consider opportunities for stop consolidation (in partnership with RTD) to improve transit speeds and maximize investments in amenities.
2. Consider circulator shuttle service east from downtown along Littleton Boulevard corridor. Route would connect downtown with Littleton High School along future mixed-use corridor, serving vulnerable populations north of roadway and population centers throughout. Vehicles could be City-owned and operated, managed by RTD, or provided through partnerships with private companies. Autonomous vehicle technology has been applied in similar settings in several cities across the U.S.[11]

[11] https://www.nlc.org/sites/default/files/2018-10/AV%20MAG%20Web.pdf

STATE OF THE PRACTICE

Transit is evolving. Cities across the world are recognizing the potential for optimizing existing bus service and re-thinking the relationship between rapid transit (bus and rail) and land use. The Transit Cooperative Research Program (TCRP) has published detailed guidance for bus transit improvements in the Bus Rapid Transit Practitioner's Guide (2007). The National Association of City Transportation Officials (NACTO)'s Transit Street Design Guide (2016) illustrates common transit design treatments. Below are examples of best practices from these guides that the City of Littleton will consider when implementing transit operations improvements identified in this document.

Description	Photo/Image
Transit Lanes: Creating dedicated bus lanes requires pavement markings (typically a solid white line and "BUS ONLY" stencil at intersections) as well as signage (overhead or curbside) to indicate lane restrictions. Can be center- or side-running, offset (to allow parking between bus lane and curb), all hour or peak-hour only **Typical Cost[12]:** $100,000 per route mile (re-striping)	
Transit Signal Priority (TSP): Active TSP involves modifying traffic signal timing or phasing when buses are present. Bus arrival information can be communicated to traffic systems via GPS, optical, or high-bandwidth (such as fiber) signals. TSP requires dedicated transit space at intersections to maximize benefits. Variations include transit signal progression (pre-timed cycles for transit), conditional (signal priority only to late vehicles), adaptive (incorporates continuous bus detection along corridors to optimize signal timing). **Typical Cost[7]:** $30,000 per intersection	
Queue bypass: Queue jump or queue bypass lanes allow buses to bypass traffic at intersections by using short dedicated lanes alongside TSP. This movement can take place in conjunction with vehicular right turns (assuming low enough traffic volumes) space formerly dedicated to parking, or a new dedicated lane. **Typical Cost:** a) In cases of parking removal or use of right turn lane AND where TSP is already present: negligible b) In cases where a new lane must be constructed: $300,000 per intersection	

[12] TCRP-BRT Practioner's Guide, Exhibit S-1

Description	Photo/Image
Bus Bulb: Extending the curb allows buses to stop in-lane, eliminating a primary source of transit delay. Additionally, extended bus stops allow more space for pedestrians, reduce intersection crossing distances, and create placemaking opportunities. **Typical Cost:** $60,000 per extension	
Bus Rapid Transit (BRT): The Federal Transit Administration (FTA) defines BRT as a “rapid mode of transportation that can provide the quality of rail transit and the flexibility of buses.” Functionally, BRT is a suite of improvements to bus service on existing roadways (including a combination of all design tactics previously discussed) that allows for the reliability and consistency of rail service. The core elements of BRT service as identified by the Institute for Transportation & Development Policy (ITDP) include dedicated right-of-way, busway alignment, off-board fare collection, intersection treatments, and platform-level boarding. **Typical Cost:** Varies, but average cost for BRT in countries like the United States is approximately $16 million per mile (as opposed to $60 million per mile for light rail).	
Mobility Hub: A mobility hub is a place where transit service, pedestrians, bicyclists, and shared mobility options intersect. It is designed to be a safe, attractive place where people can access the transit and/or mobility system. Amenities might include shelters, lighting, wayfinding, bike-share or parking, rideshare drop-off, and placemaking elements. **Typical Cost:** Varies, but improvements range from approximately $30,000 to $250,000 per station. Popular transit stations such as the one at Sante Fe Drive and Mineral Avenue (which currently predominantly serves as a Park-n-Ride) offer the potential for improving multimodal connections and integrated trip planning.	

Chapter 7.
Mobility Trends

INTRODUCTION

Beyond mode-specific policies, capital investments, programs, and strategies, Littleton is committed to providing excellent service to the traveling public in general. The ability to respond to citizens' mobility needs is likely to be affected by a variety of forces as this Transportation Master Plan evolves. Achieving the vision for the future, set forth in the *Envision Littleton* process, will require a holistic view of mobility. Major technological advancements are occurring in the transportation industry that could change everything from how cars function to how people plan each day's travel. As these technologies evolve, the City must be prepared to remain flexible in order to ensure that these technologies serve overarching mobility and safety goals. Finally, the City must remain transparent in its efforts to plan and program improvements in order to build toward long-term goals and maintain the engagement of the community. These and other objectives will help the City stay true to the Mission laid out in this plan.

LEGACY OF PAST PLANNING

As described in the introduction to this plan, the City has a long history of planning that has resulted in many great strides forward for the mobility framework of the City. Building upon that legacy, the City will incorporate ideas and standards that have been developed but also create new, modern policies and projects for today's and tomorrow's mobility needs.

KEY ISSUES AND CONSIDERATIONS

Input and discussions for this TMP, through varied *Envision Littleton* community engagement, workshops with City Council and Planning Commission, and interaction with other City boards/commissions, City departments, and partner agencies and organizations, yielded the following list of key items that relate to general mobility trends:

- **Transparency**: the public and stakeholders have a strong desire to be involved in planning and for the City to be transparent in allocation of resources.
- **Technology**: transportation technologies are changing and advancing rapidly. There is a desire to be prepared for the impacts these technologies will have on our ability to move around the City and the region.
- **Cost-effectiveness**: there is an acknowledgment that resources are limited, and that transportation infrastructure costs have increased significantly in the past several decades. Therefore, it will be important to innovate and use every dollar effectively.

TRANSPARENCY

The City of Littleton is home to a community that takes pride in its civic traditions and identity. As the City works to realize the future described by *Envision Littleton* and maintain its shared values, maintaining an open, inclusive process will be critical. The City will offer clear updates on its progress toward community goals, and welcome ongoing discussion with the public.

TECHNOLOGY

The City of Littleton is well-positioned to be a major regional force in helping to determine the way technology impacts the region's mobility systems.

The Mobility Choice Initiative, a partnership of the Denver Metro Chamber, DRCOG, RTD, and CDOT recently developed a Mobility Choice Blueprint (MCB). The MCB is an effort to document how transportation technology is impacting our daily lives and prepare for that change. The MCB states, "The disruptive forces of new transportation technologies, demographic changes, and shifting societal values are compelling us to change our vision of the Denver region's mobility future."[13]

The MCB categorized mobility technology into five types of established and emerging systems:

[13] https://www.mobilitychoiceblueprintstudy.com/

- **Shared Mobility** is defined as "a wide range of transportation options involving fleet ownership or operation of various modes of transportation." These include:
    - Micromobility—personal shared transportation devices like bikes, mopeds, and electric scooters.
    - Carsharing—rental cars that are available for use by the hour or mile. These can be located in one spot or able to be parked anywhere within a service area.
    - Ridehailing—Uber or Lyft or other services that provide on-demand point-to-point rides in privately owned autos.
    - Microtransit—"privately owned and operated shared transportation system that can offer fixed routes and schedules, as well as flexible routes and on-demand scheduling."
    - Public Transit—traditional public transportation via bus and rail that usually operates on a fixed route and schedule.
- **Vehicle Technology** refers to the emergence of Connected, Automated, and Electric Vehicles.
    - Connected Vehicles incorporate technology that allows the on-board computers to communicate with other vehicles and with sensors and other infrastructure on the ground.
    - Automated Vehicles incorporate technology that assist with operation of the vehicle. They perform some of the tasks to drive the vehicle, and driverless vehicles require no human operator.
    - Electric Vehicles are powered by electric motors using energy from batteries that are charged at home or at charging stations.
- **Transportation Systems Optimization** refers to the systems that are emerging to better manage and optimize the transportation networks, using real-time data. Emerging technologies include adaptive signal control, transit signal priority, and the sensors and communications infrastructure to allow remote management of the systems.
- **Travel Information and Payment** refers to technology that could allow for easy, quick trip planning and payment, regardless of mode. Mobile devices can unlock the universe of travel options for users in the palm of their hand.
- **Freight and Delivery Logistics** are changing rapidly as more people use online services (e-commerce) for everyday purchases. E-commerce companies will continue to push technology that allows for faster delivery at lower cost, including the incorporation of Connected, Automated, and Electric delivery vehicles.

The impact of these technologies on existing travel behaviors remains to be seen. However, early analysis is beginning to reveal some trends. While fully autonomous vehicles remain in the early pilot stages, some analysis suggests self-driving cars could be common within the next several decades (ranging from 24% to 87% adoption rate by 2045)[14]. The impact of this change on issues like traffic congestion remains to be seen, although some studies[15] suggest technology could induce additional demand for car travel and ultimately exacerbate traffic issues.

Some emerging technologies are already changing travel behavior in places like Littleton. A report published by the University of Kentucky linked the emergence of transportation network companies (TNC) such as Uber and Lyft with a decrease in transit ridership—however, other services based on new technology encouraged more people to ride buses and trains[16].

COST EFFECTIVENESS

A critical aspect of the City's renewed focus on strategic planning is a commitment to data-driven decision-making and priority-based budgeting. In order to maximize taxpayer dollars and leverage funding from state, federal, and private sector sources, Littleton will

[14] https://www-sciencedirect-com.aurarialibrary.idm.oclc.org/science/article/pii/S0965856415300628

[15] https://www.sciencedirect.com/science/article/pii/S0306261919305823?via%3Dihub

[16] http://usa.streetsblog.org/wp-content/uploads/sites/5/2019/01/19-04931-Transit-Trends.pdf

work to solve short-term problems in ways that contribute to long-term goals.

The sample toolkits in each chapter of this plan outline cost-effective strategies for addressing mobility challenges. These, combined with responsible stewardship of City resources, will allow the City to use the funds available in the most efficient manner possible.

FRAMEWORK FOR ACTION

The framework for action below is organized in four tiers: (1) Goals, (2) Policies, (3) Objectives, and (4) Actions. All are intended to mesh with and support the other aspects of this Transportation Master Plan.

GOALS

Consistent with the Anchored, Connected, Active, and Engaged Guiding Principles, responsiveness to trends is also important to the City's transportation goals.

- **Connected:** Ability to adapt and provide services as conditions change and at reasonable cost will be increasingly important.
- **Healthy:** Healthy choices will be dependent on the City's ability to best utilize technology to encourage an active lifestyle.
- **Inclusive:** Technology and cost-effective improvements can be used to provide services to under-served populations with the right planning.
- **Prosperous:** Being transparent and responsive, while providing excellent overall mobility allows the City to help its citizens be prosperous.
- **Sustainable:** Constantly refining and adjusting our outlook will help us respond to environmental and fiscal pressures.

POLICIES

In making decisions that involve public resource allocation, regulatory matters, and physical improvements, among others, Littleton will:

1. Coordinate Traffic Management Center technology and operations with adjacent municipalities and CDOT.
2. Partner with neighboring municipalities and the private sector as needed to manage the introduction of new technologies to Littleton.
3. Transition government fleets to alternative fuel vehicles where feasible.
4. Be transparent about prioritization and implementation of capital improvements.
5. Continuously evaluate new technologies and trends.
6. Prioritize key stops and stations as mobility hubs to promote mode choice and tech integration.

OBJECTIVES

In order to achieve the overall Transportation Master Plan goals outlined above, multiple objectives have been developed. The objectives in Table 22 are specific to responding to mobility trends in the City of Littleton.

Table 22. Objectives—General Mobility

No.	Topic	Objective	Related Goals				
			Connected	Healthy	Inclusive	Prosperous	Sustainable
1	Quality of Life	Achieve high resident satisfaction rates with transportation services	●		●	●	●
2	Quality of Life	Provide spaces that people can enjoy within the public right-of-way		●		●	
3	Quality of Life	Provide people with a sense of personal safety on all transportation modes		●	●		
4	Quality of Life	Provide transportation infrastructure that meets local business needs				●	●
5	Community	Provide transportation facilities that are well integrated with land use and character				●	
9	Community	Establish a transportation planning and implementation process that is flexible and adaptable					●
10	Community	Provide for a community-driven decision-making process for transportation investments			●		●
11	Community	Provide a transportation system the City can afford to maintain					●
12	Mobility	Provide a reliable transportation system	●		●	●	
14	Mobility	Provide high-quality transportation systems people can afford to use	●		●	●	
15	Mobility	Provide travelers with relevant, timely information -- including innovative methods	●	●	●		
21	Auto	Provide a well-connected automotive network	●			●	
22	Auto	Provide for safe automobile travel		●		●	
24	Auto	Provide an efficient automotive network	●			●	●
29	Freight	Provide a reliable freight network	●			●	
30	Freight	Provide a well-connected freight network	●			●	
31	Freight	Provide a safe freight network		●		●	

ACTIONS

The actions below convey tangible steps that will lead to achievement of the Goals in line with the stated Policies.

Capital Investments

No capital investments have been identified as part of this plan for this category.

Programs and Initiatives

1. Consider testing or piloting integrated corridor management in partnership with neighboring municipalities.

2. Develop incentives and/or improve ridehailing and ridesharing operations to serve our citizens needs and improve access to services.

    a. Implement curbside management standards and smart parking practices.

    b. Pilot neighborhood-scale mobility hubs that simplify multimodal trips and create safe, inviting spaces for all residents.

3. Pilot smart parking technologies (including real-time information and variable payment) in busy locations such as downtown and in the vicinity of light rail stations.

4. Develop and use a traffic operations and safety checklist of operational and safety improvements that can be implemented as part of other infrastructure investments.

Regulations and Standards

1. Participate in the development of a regional compact defining common standards for micromobility services.

Partnerships and Coordination

1. Explore the feasibility of a Traffic Management Center, ideally partnering with adjacent municipalities and other agencies.

More Targeted Planning/Study

None at this time.

A strategic **Action** is aimed at seizing a special opportunity or addressing a particular challenge one faces, given limited resources - financial and otherwise—and recognizing that a broader agenda of new or ongoing activities will also be pursued in the meantime.

Chapter 8.
Complete Network Recommendations

RECOMMENDATIONS

A complete network of streets in the City that provides connections, choice, calming, and capacity while meeting the needs of the community will be the result of implementing the projects defined in previous sections. These projects and strategies, combined, will allow the City to realize its transportation Goals, and ultimately deliver upon the Mission defined by the community. The networks presented in Figure 23 trough Figure 27 are intended to present a path to completion of these networks so that all people can choose the mode that best suits their travel needs and lifestyles. A summary of the actions required for critical corridors is provided in Figure 23 trough Figure 27.

A summary of the Capital investments has been included in each of the modal chapters and in the Implementation chapter.

Figure 23. Proposed Street Types

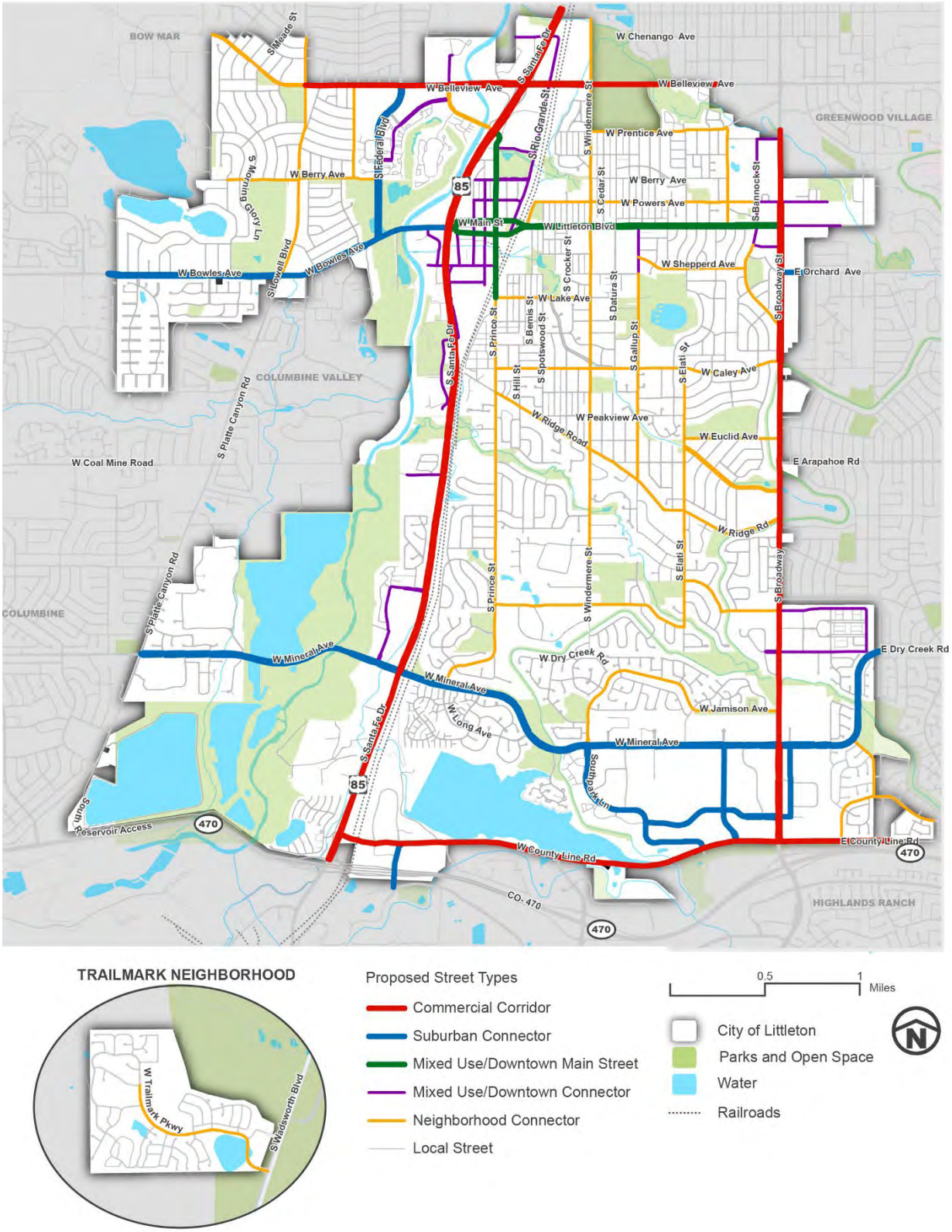


Figure 24. Pedestrian Priority Streets

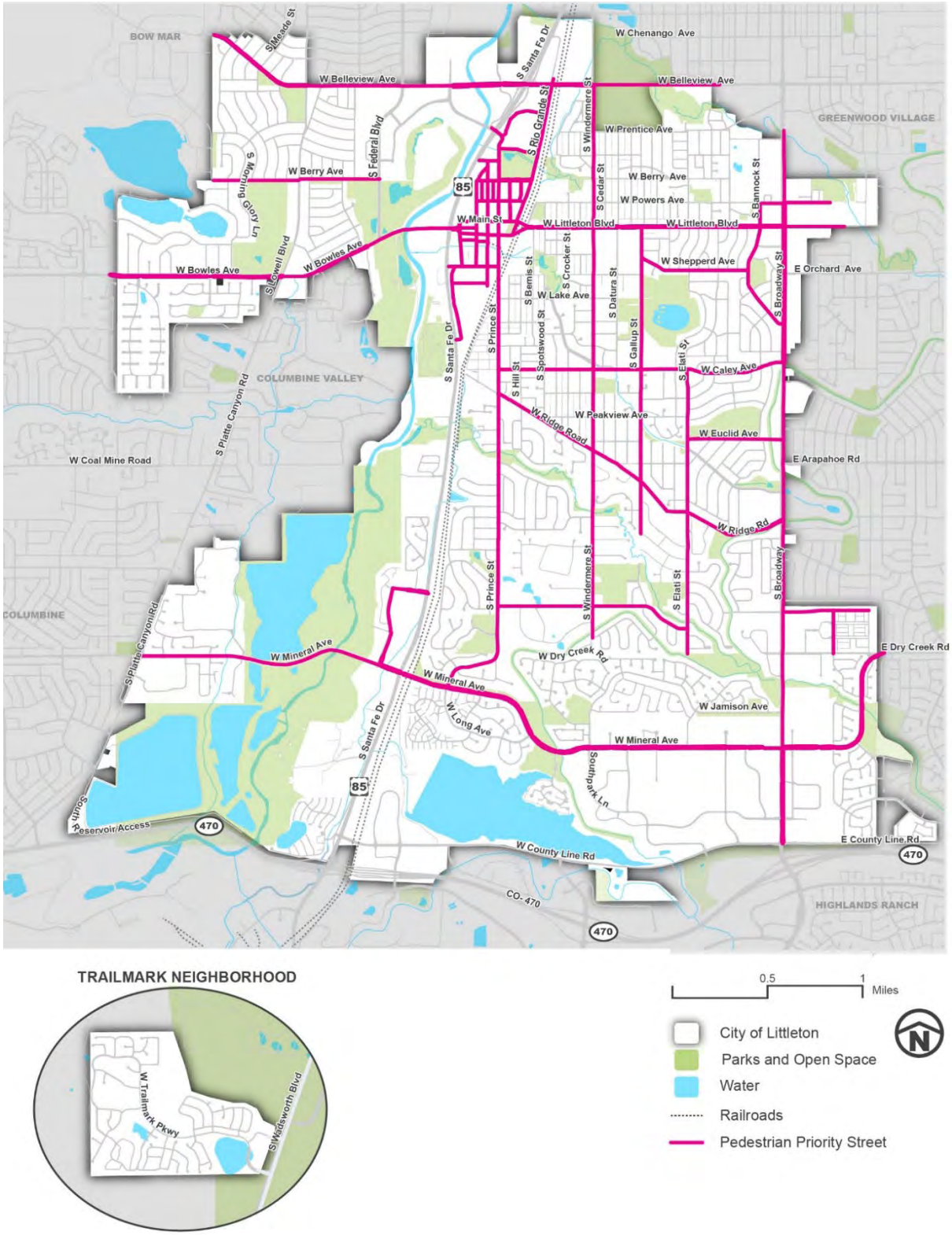


Figure 25. Bike Priority Streets

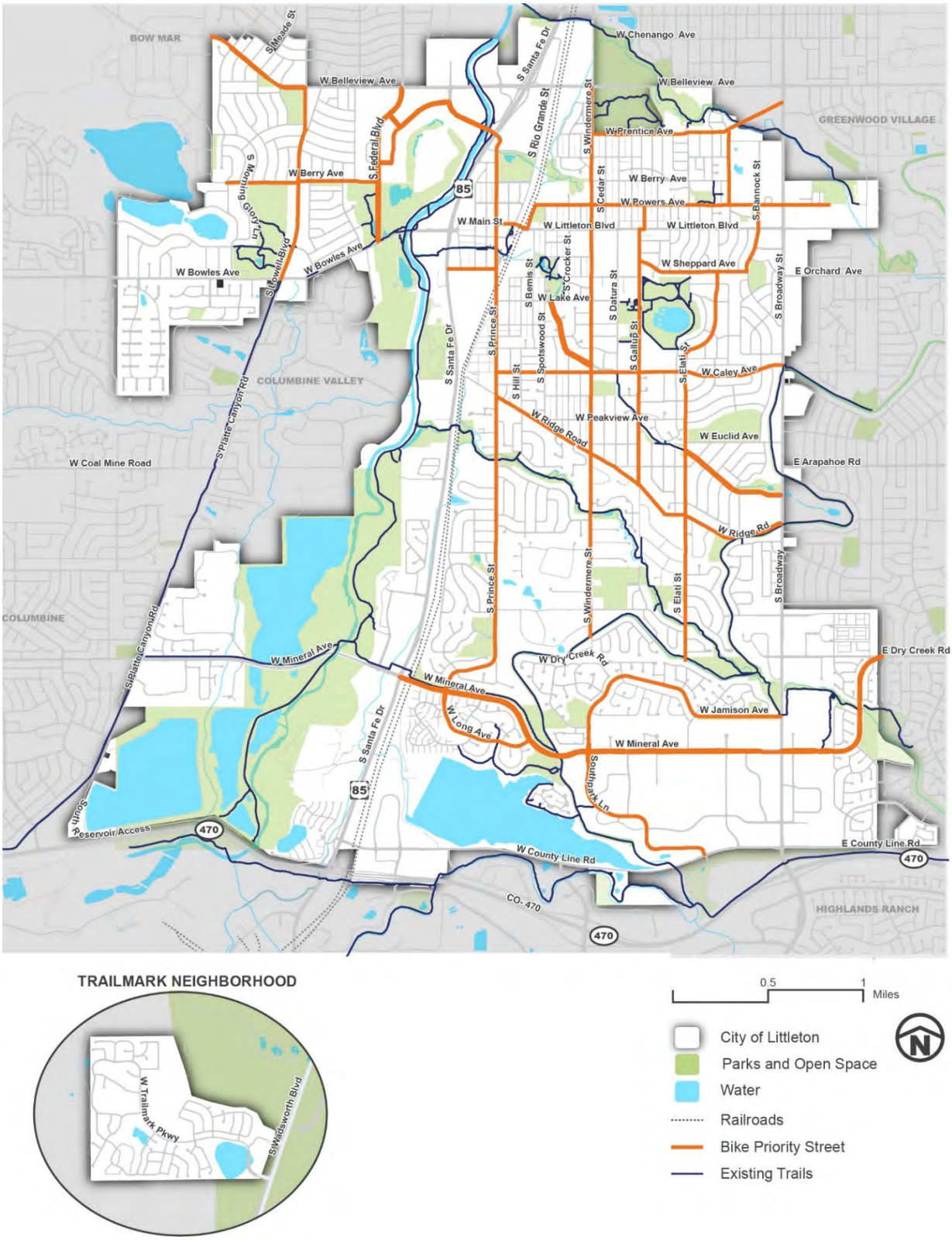
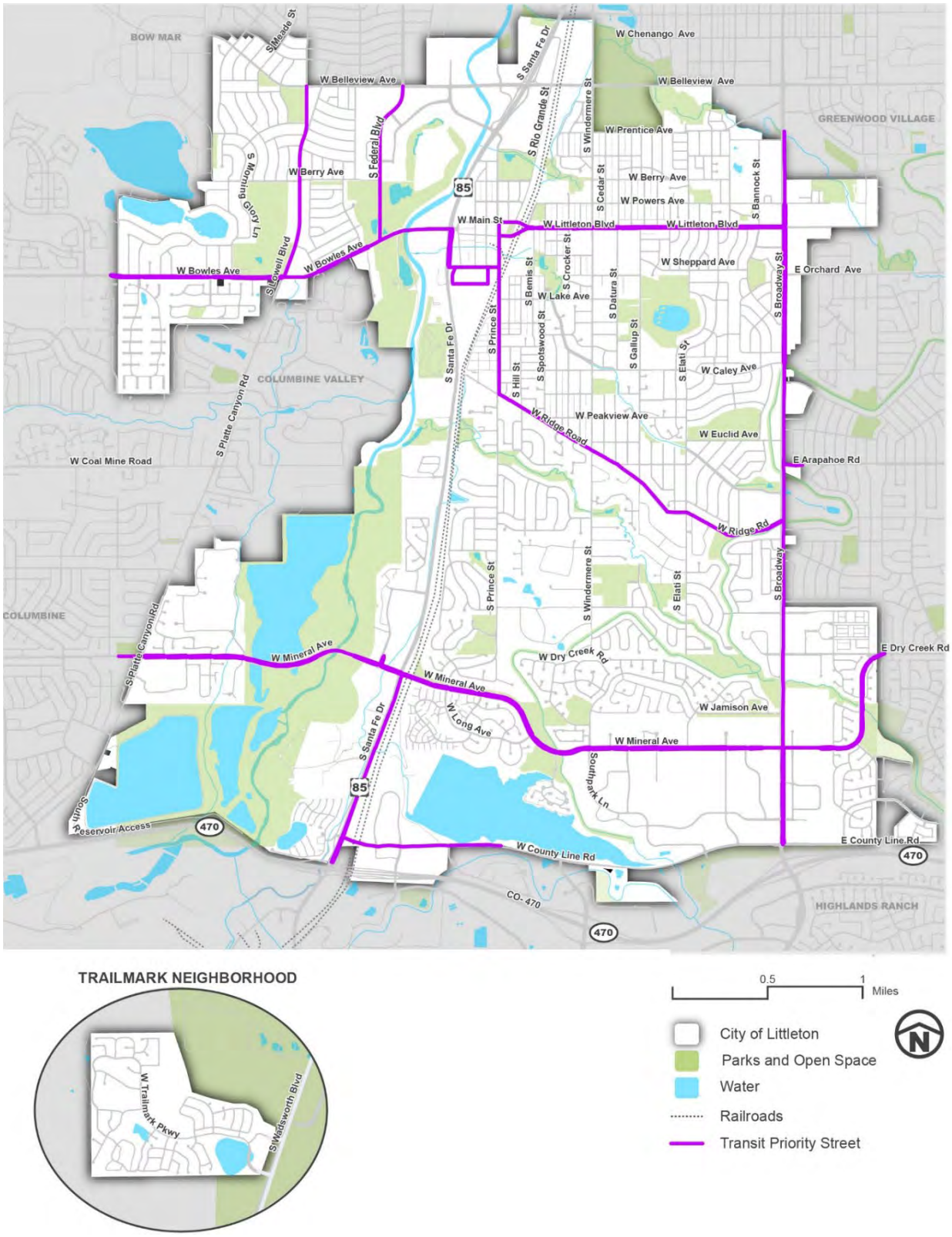


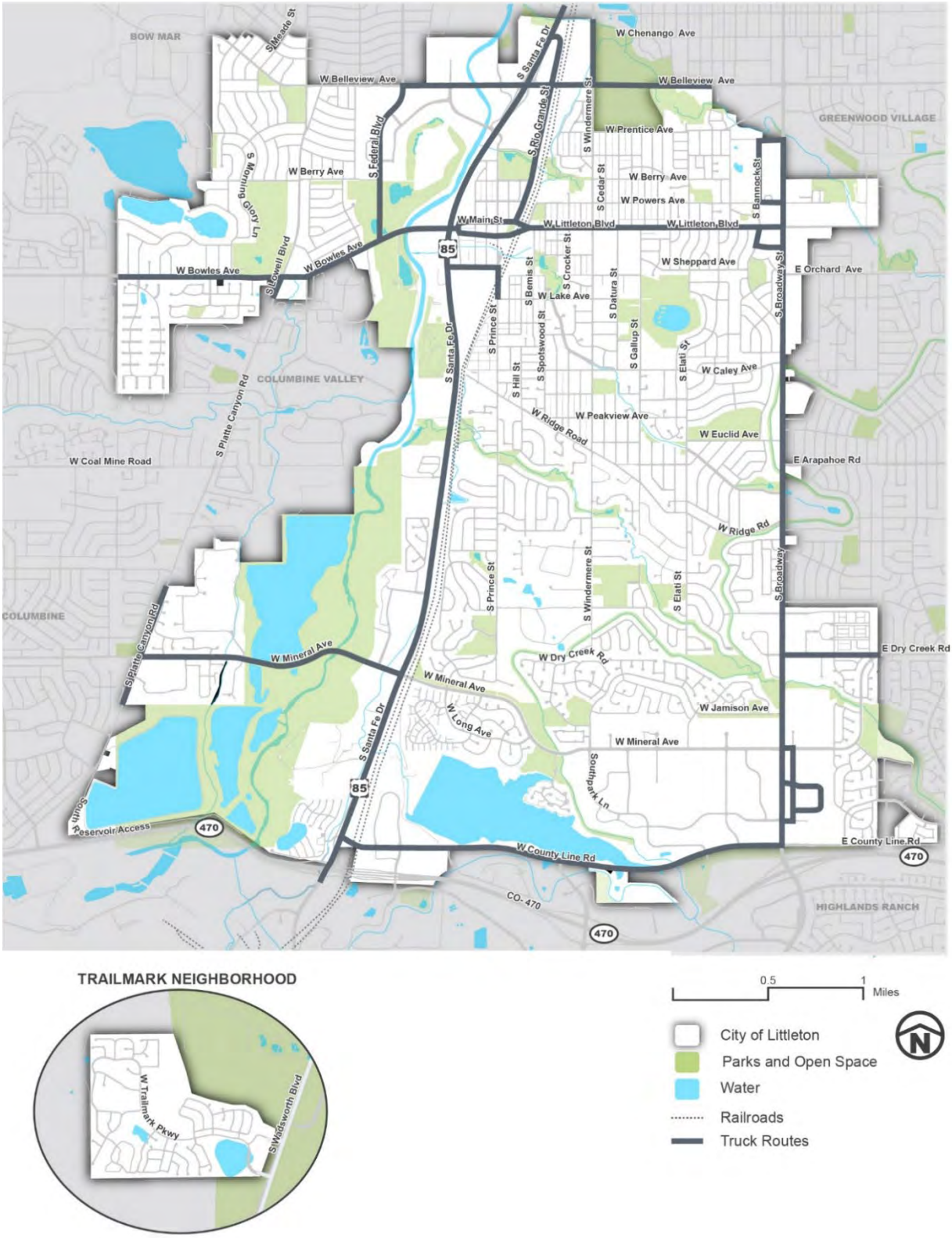
Figure 26. Transit Priority Streets



0.5 1 Miles

- City of Littleton
- Parks and Open Space
- Water
- Railroads
- Transit Priority Street

Figure 27. Existing Truck Routes



CRITICAL CORRIDOR MAPS

Summaries of the actions to be taken on critical corridors are provided in Figure 28 through Figure 31.

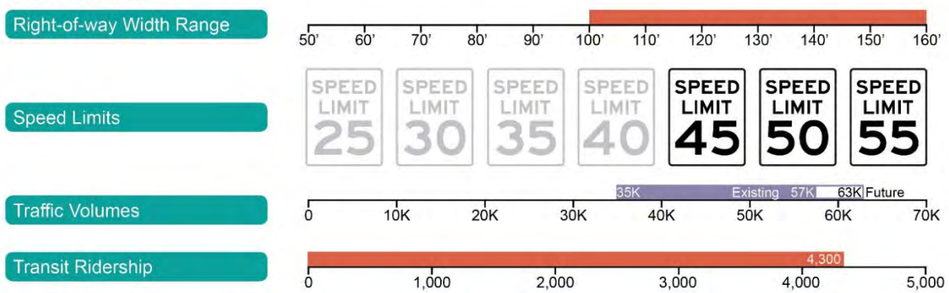
Figure 28. Critical Corridor: Santa Fe Drive

Critical Corridor: Santa Fe Drive (US 85)

Santa Fe Drive is a state and federal highway that has long served as Littleton's connection to the rest of the region. Today, it is a mix of limited access expressway and commercial arterial. It carries a massive amount of traffic through the city and serves not just Littleton's north-south travel needs, but also as a primary route for traffic moving through the City.

The future of Santa Fe Drive is as the City's main north-south auto and freight route. Santa Fe Drive is unique in that the corridor is flanked on either side by premium transit (LRT) or active transportation (Mary Carter Greenway) facilities. These adjacent multimodal corridors allow Santa Fe Drive to be an auto and freight mover.

STATISTICS:



STRATEGIES AND PROJECTS:

The City should approach the upcoming Planning and Environmental Linkages study (PEL) with a clear vision of the desired outcomes. These include but are not limited to:

- A desire to reconnect the city to the South Platte River. This includes a concerted effort to extend downtown Littleton towards the river. Santa Fe Drive is a major physical and psychological barrier between these two areas, and any project along this corridor, particularly at downtown Littleton, should improve this condition, not worsen it.
- A desire to make the area between the river and the Santa Fe Drive corridor between Bowles Avenue and Mineral Avenue a useful and attractive place for businesses and residents alike. This should include access preservation and enhancement and parallel routes that will benefit regional traffic by allowing local circulation to occur off the mainline.
- A desire to explore transit improvements, including the potential extension of LRT to Highlands Ranch and/or Sterling Ranch to the south. Other transit improvements include an RTD Park-n-Ride expansion (garage) at Mineral Station, and increased LRT frequencies.
- A desire to alleviate traffic congestion at the intersections of Bowles Avenue & Santa Fe Drive and Mineral Avenue & Santa Fe Drive.

In addition to and related to the PEL, the City should pursue other strategies in this corridor, including but not limited to:

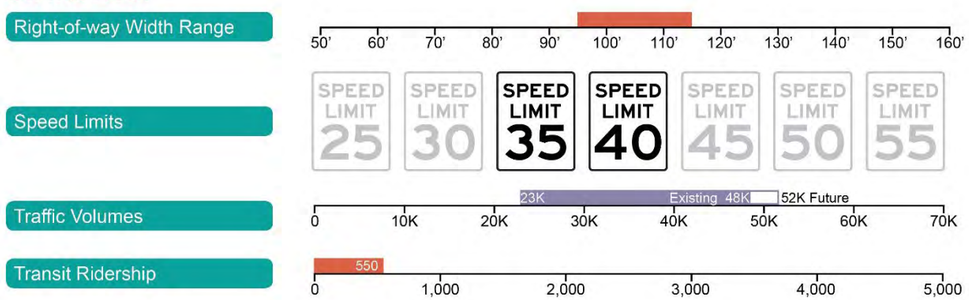
- Implement near-term operational improvement projects:
  - Alternative intersection at Mineral Avenue and Bowles Avenue intersections
  - Safety and operational improvements at Bowles Avenue and Prince Stree intersections
  - Pursue grade-separated interchange at Mineral Avenue and Bowles Avenue
- Improve downtown connections at north and south ends of downtown to alleviate congestion at Bowles Avenue.
- Create a downtown mobility and land use plan that identifies a vision for connecting downtown to the river, and establishes the desired Santa Fe Drive alignment (both horizontal and vertical).
- Pursue regional partners to proceed with the extension of LRT to Highlands Ranch.
- Study connecting South Platte River Parkway, west of Santa Fe Drive, into downtown to serve local traffic.

Figure 29. Critical Corridor: Broadway

Critical Corridor: S Broadway

Broadway currently serves a number of uses. It is the most traveled transit corridor (beside the LRT lines), it serves as a regional automotive and truck route, and it provides direct property access to a mix of general commercial uses and even some single-family residential uses. Broadway is one of the most dangerous places to be as a pedestrian or bicyclist in the City, and its wide footprint and fast speeds mean that those who attempt to cross it are vulnerable to being struck by autos.

STATISTICS:



STRATEGIES AND PROJECTS:

The future of Broadway is as the City's eastern transit Boulevard. Because the right-of-way is wide, Broadway is a prime candidate for exclusive transit lanes with Bus Rapid Transit service. Repurposing underutilized road space for transit will allow Broadway to evolve into an asset for Littleton, and will generate economic activity. Broadway has been identified as a Tier 1 BRT corridor by RTD and the City should dedicate resources to working with partner municipalities to take transit service on the corridor to the next level.

As the transit vision evolves, other modes, particularly auto and freight, must be accommodated. Broadway currently carries as many as 48,ooo vehicles per day on some segments and experiences a significant amount of congestion.

Sacrificing space for transit vehicles will likely mean providing for auto mobility in other, innovative ways, which could include alternative intersection treatments, adaptive signal controls, or other applications of new technology.

Special attention must be paid to the residential land uses on the corridor.

Specific actions include:

- Partner with RTD, Centennial, Englewood, Denver, Douglas County and Arapahoe County to study the future of the corridor.
- Implement quick action projects to enhance transit speeds and reliability.
- Implement quick action safety projects for pedestrians, bicyclists, and motorists.

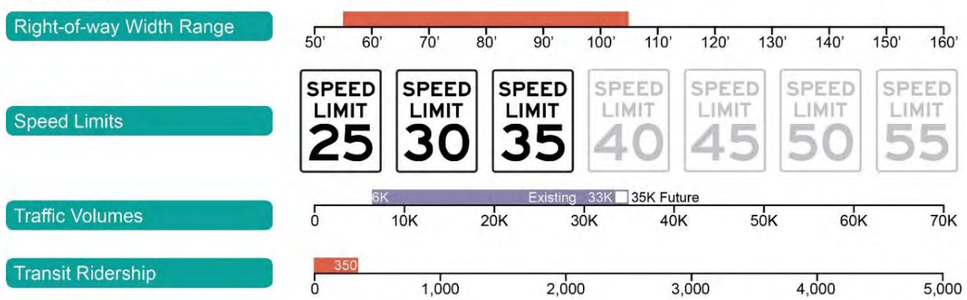
Figure 30. Critical Corridor: Littleton Boulevard, Main/Alamo, Bowles Avenue

Critical Corridor: Littleton Blvd / Main St / Alamo Dr / Bowles Ave

This corridor, which passes directly through downtown Littleton, currently serves as the main east-west route through the northern part of the City. At the heart of the City, Littleton Boulevard and Main Street have a rich history as a place to go, a place to do business, and a place to be with the community. Bowles Avenue is a major regional connection for Jefferson county residents to the rest of the metro area. It is constrained by tight right-of-way through the City. It also serves a key connection to the Mary Carter Greenway.

The Comprehensive Plan envisions Littleton Boulevard transitioning to a mixed use corridor and extension of downtown, while respecting its history.

STATISTICS:



STRATEGIES AND PROJECTS:

The future of this corridor is as Littleton's Main Street. This corridor is many things to many people, but at its core it is the identity of Littleton. Extending the positive aspects of Downtown Littleton and Main Street to the east along Littleton Boulevard and reconnecting civic uses east of the railroad tracks will bring a better sense of connection with the downtown area and the rest of the community. With Littleton High School anchoring the east end of the corridor, the transformation of Littleton Blvd into a mixed use urban arterial will create a place that generates activity and contributes to the City's prosperity.

The corridor has the potential to serve as a true place, not just a place to move cars.

Specific Actions include:

- Conduct a corridor study that builds upon the foundation in this TMP.
  - Create an access control plan to address redevelopment concerns.
- Implement quick action projects to enhance transit speeds and reliability.
- Implement quick action safety projects for pedestrians, bicyclists, and motorists.
- Advocate for increased transit frequency along the corridor with RTD.
- Enhance bicycle connections to the Powers Avenue bicycle priority street north of Littleton Boulevard to the east and through Bowles Grove Park and Valley Vista Park north of Bowles Avenue to the west..
- Enhance the pedestrian environment, particularly on the east end.

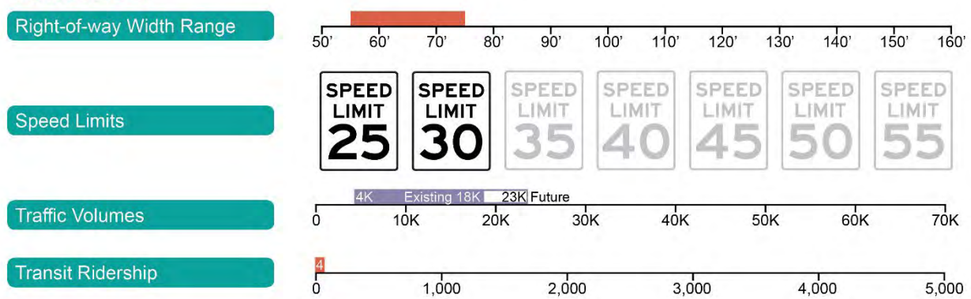
Finally, the City should conduct a Downtown Mobility Plan and Streetscape Plan.

Figure 31. Critical Corridor: Prince and Windermere

Critical Corridor: Prince St/ Windermere St

Prince Street and Windermere Street are parallel north-south roadways, extending through the majority of the City. These roadways serve the primarily residential communities to the south and the mixed uses to the north, including the downtown area. The roadways are generally two-lane connector facilities providing access to local roadways and direct access to residential and commercial uses. The future of these facilities are as complete streets that continue to provide local access to residents and businesses of Littleton. Both Prince Street and Windermere Street are identified as pedestrian priority streets where widening narrow sidewalks will better serve the community. Both roadways are also recommended for bicycle improvements along the majority of their extents, including protected bike lanes along Prince Street and protected or buffered bike lanes along Windermere.Street.

STATISTICS:



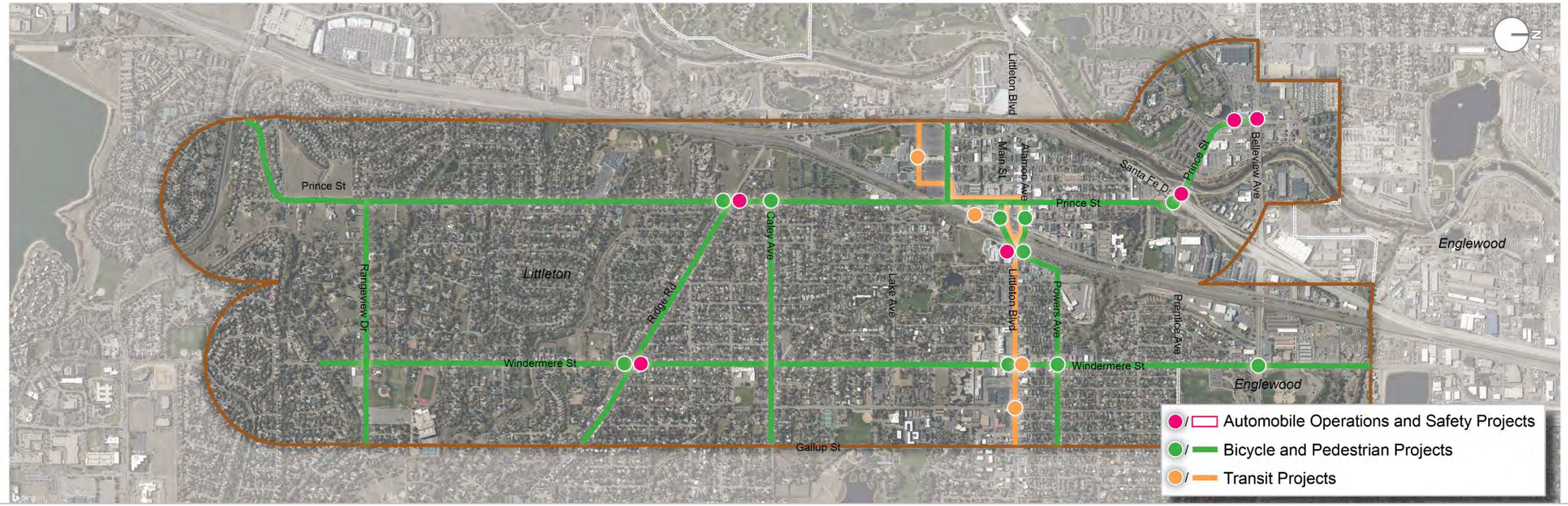
STRATEGIES AND PROJECTS:

The City should conduct corridor studies for these two important connector corridors. Because these corridors are the main connections for the central neighborhoods to the commercial and downtown areas at the northern end of the city, they serve an important role in the way Littleton residents move within their City. These corridors have experienced increased travel demand pressures because regional facilities have been overloaded.

A key action will be to determine the extent that these regional pressures will continue and how the City can mitigate these issues.

Strategies to examine include but are not limited to:

- Widening narrow sidewalks and bridging sidewalk gaps.
- Installing protected bike lanes along Prince Street.
- Installing protected or buffered bike lanes along Windermere Street.
- Implementing safety and operational improvements at designated intersections along both facilities.
- Implementing traffic calming along Windermere Street from Ridge Road to Rangeview Drive.



Chapter 9. *Implementation*

COVER PAGE

INTRODUCTION

The projects, strategies, and plans identified in previous chapters represent the path toward meeting the City's transportation mission. However, the plans and projects identified in this Transportation Master Plan are currently unfunded and there does not currently exist a method for prioritizing projects based on the City's goals and objectives. Historically, the City has not had a dedicated funding stream for capital transportation improvements. This has added to the strain on the transportation infrastructure experienced through the years, as resources have become tighter. A greater and greater share of City funds have been allocated to maintaining the current system as it has grown, making it harder to fund improvements.

In order to achieve its transportation mission, the City will need to identify new revenue streams, and dedicate funding to the projects and plans that it deems most important. This chapter outlines several actions the City can take to meet these needs.

This Transportation Master Plan is a living document that will be updated, amended, and modified through the annual budget process. Based on 3-year and 5-year outlooks, the City will develop an annual work plan for priority projects and plans.

FUNDING SOURCES

The purpose of this chapter is to provide a list of projects ranked by alignment to the goals and objectives outlined in the prior chapters of this plan. This information is intended to support the initial funding discussions both internally within the City as well as with potential regional, State and federal funding partners. Included in this chapter is a review of Local verses Regionally Significant Projects and the associated conceptual funding assumptions for each. Additionally, a conceptual analysis of a potential dedicated transportation sales tax is discussed as well as an overview of potential federal, State and regional funding programs that could be targeted to support implementation of the Regionally Significant Projects.

CAPITAL COST SUMMARY

Table 22 summarizes the TMP's estimated capital costs by project category. Additionally, the costs are separated between Local Projects and Regionally Significant Projects. As discussed in more detail in the following sections, the purpose of this separation is to initiate the discussion with potential regional, State and federal funding partners regarding cost sharing to implement the Regionally Significant Projects.

Reflecting the separation of Projects, Regionally Significant Projects account for approximately 85 percent of the TMP Program with cost estimates totaling $620.5 million. Local Projects account for the remaining 15 percent and total approximately $113.4 million. Auto Projects (55.8 percent) account for the largest categories of improvements, followed by Transit Projects (36.7 percent) and Active Transportation Projects (7.5 percent). Within the Local Projects, Auto Projects still account for the largest share of costs (50.1 percent), however Active Transportation Projects (48.6 percent) surpass Transit Projects (1.3 percent).

Table 23. Estimated Capital Costs by Project Category

Project Categories	Costs (2019$, in millions)			Percent of Total Program		
	Local Projects	Regionally Significant Projects	Total		Max Federal Funding: Local Share of Regionally Significant Projects	Moderate Federal Funding: Local Share of Regionally Significant Projects
Auto	$56.8	$353.0	$409.8	56%	$35.3	$88.3
Active Transportation	$55.1	$0.0	$55.1	8%	$0.0	$0.0
Transit	$1.5	$267.5	$269.0	37%	$66.9	$80.2
Total	$113.4	$620.5	$733.9	100%	$102.2	$168.5

With $113.4 million in Local Projects, and $102.2 million to $168.5 million in Local Share, the City of Littleton's projected total capital costs are between $215.6 million and $281.9 million.

CONCEPTUAL TRANSPORTATION SALES TAX ANALYSIS

For this financial analysis it was assumed that the City's existing revenue sources would be available to implement the TMP projects. Reflecting the primary and most significant dedicated transportation revenue source used by other municipalities within Colorado, the first funding source evaluated was the potential role an increase in the City's sales and use tax could play in funding the program of projects. According to the City's Fiscal Year (FY) 2018 Comprehensive Annual Financial Report (CAFR), the existing 3 percent sales and use tax generated approximately $33.8 million in revenue last year. Based on the FY 2018 level, Table 24 provides an estimate of the incremental additional revenue that could be generated if the sales tax rate was increased by 0.25 percent, 0.5 percent, 0.75 percent, and 1 percent. As indicated in the table, on an annual basis the additional sales tax revenue would range from $2.8 million to $11.3 million in these conceptual scenarios. On a pay-as-you-go implementation approach, these annual levels would not support timely implementation of the TMP.

However, these funds could be used to issue debt to support accelerated implementation of a portion of the TMP. For the purpose of this conceptual analysis, it was assumed bonds would be issued against the incremental sales tax levels using the following assumptions: interest rate of 5 percent, repayment term of 30 years, and a debt service coverage ratio of 1.2x. Based on these assumptions, bond proceeds would range from $36 million to $145 million and would provide funding for between 4.9 percent and 19.8 percent of the total program.

Table 24. Estimate of Incremental Additional Revenue with Sales Tax Rate Increase

Conceptual Sale Tax Rate Increase	Annual Levels (2019$, in millions)	Percent Share of Total Program	Conceptual Bond Proceeds (2019$, in millions)[17]	Percent Share of Total Program
0.25% Increase	$2.8	0.4%	$36	4.9%
0.50% Increase	$5.6	0.8%	$72	9.8%
0.75% Increase	$8.5	1.2%	$108	14.7%
1.0% Increase	$11.3	1.5%	$145	19.8%

LOCAL PROJECTS ANALYSIS

This section identifies the Local Projects that would likely require 100 percent of project funds to come from the City. These projects are contained within the City limits and tend to have localized impacts on the transportation network. Therefore, these projects are unlikely to be eligible for funding from the Colorado Department of Transportation (CDOT), the Regional Transportation District (RTD), and Denver Regional Council of Governments (DRCOG), and this analysis assumes the City is solely responsible for funding these projects. As shown in the second table below, the total cost estimate for Local Projects is $113.4 million.

Table 25 indicates that the conceptual annual sales tax levels described in the prior section under a pay-as-you-go implementation approach would cover between 2 percent and 10 percent of the Local Projects costs. Under the assumption that bonds are issued, the 0.25, 0.5 and the 0.75 percent sales tax increase would fund 32 percent, 63 percent and 95 percent of the Local Projects costs. The remaining increment (1.0 percent) would cover more than 100 percent of the Local Projects providing additional capaCity to fund ongoing operation and maintenance of the Local Projects and a share of the costs for the Regionally Significant Projects. Table 26 summarizes the projects defined as local.

Table 25. Conceptual Sale Tax Rate Increase

Conceptual Sale Tax Rate Increase	Annual Levels (2019$, in millions)	Percent Share of Local Projects ($102.7 M)	Conceptual Bond Proceeds (2019$, in millions) 18	Percent Share of Local Projects ($102.7 M)
0.25% Increase	$2.8	2%	$36	32%
0.50% Increase	$5.6	5%	$72	63%

[17] Please note that HDR assists clients evaluate and apply for strategic funding. For the avoidance of doubt, the City is aware of the “Municipal Advisor Rule” of the Securities and Exchange Commission (effective July 1, 2014) and the “independent municipal advisor” exemption from the definition of “advice.” The City understands that HDR Engineering Inc. is not a registered municipal advisor and is not subject to the fiduciary duty established in Section 15B(c)(1) of the Securities and Exchange Act. HDR uses financial information and interest rates publically available or provided by a client’s Municipal Financial Advisor to complete the requested financial analysis. In evaluating funding sources, the City will be responsible for deciding to use or pursue funding/financing.

[18] Ibid

Table 25. Conceptual Sale Tax Rate Increase

Conceptual Sale Tax Rate Increase	Annual Levels (2019$, in millions)	Percent Share of Local Projects ($102.7 M)	Conceptual Bond Proceeds (2019$, in millions) 18	Percent Share of Local Projects ($102.7 M)
0.75% Increase	$8.5	7%	$108	95%
1.0% Increase	$11.3	10%	$145	100%

Table 26. Local Project Summary

Local Project Type	Corridor	Intersection or Segment	Existing Condition	Description	Cost (2019$, in millions)
Auto Operations and Safety	Belleview Ave	Prince St to Lowell Blvd	No median	Access control, median	$1.5
Auto Operations and Safety	Ridge Rd	Corridor-wide	Varies	Curb and gutter, geometry, intersections	$5.0
Auto Operations and Safety	S Platte Canyon Rd	Mineral Dr	Traffic Signal	Full movement intersection	$0.2
Auto Operations and Safety	Bowles Ave	Federal Blvd	Traffic Signal	Intersection operation and safety improvements	$0.5
Auto Operations and Safety	Belleview Ave	Federal Blvd	Traffic Signal	Intersection operation and safety improvements	$1.0
Auto Operations and Safety	Belleview Ave	Prince St	Traffic Signal	Intersection operation and safety improvements	$0.5
Auto Operations and Safety	Belleview Ave	Santa Fe Dr Interchange	Single-Point Urban Interchange	Intersection operation and safety improvements	$1.0
Auto Operations and Safety	Bowles Ave	Federal Blvd	Traffic Signal	Intersection operation and safety improvements	$4.3
Auto Operations and Safety	Bowles Ave	Platte Canyon Rd/Lowell Blvd	Traffic Signal	Intersection operation and safety improvements	$1.0
Auto Operations and Safety	Broadway	Arapahoe Rd	Traffic Signal	Intersection operation and safety improvements	$1.0

Table 26. Local Project Summary

Local Project Type	Corridor	Intersection or Segment	Existing Condition	Description	Cost (2019$, in millions)
Auto Operations and Safety	Broadway	Dry Creek Rd	Traffic Signal	Intersection operation and safety improvements	$0.5
Auto Operations and Safety	Broadway	Jamison Ave	Traffic Signal	Intersection operation and safety improvements	$0.5
Auto Operations and Safety	Broadway	Littleton Blvd	Traffic Signal	Intersection operation and safety improvements	$1.5
Auto Operations and Safety	Broadway	Mineral Ave	Traffic Signal	Intersection operation and safety improvements	$1.0
Auto Operations and Safety	Lowell Blvd	Berry Ave	Traffic Signal	Intersection operation and safety improvements	$1.0
Auto Operations and Safety	Mineral Ave	Platte Canyon Rd	Traffic Signal	Intersection operation and safety improvements	$0.8
Auto Operations and Safety	Prince St	Church Ave	Traffic Signal	Intersection operation and safety improvements	$0.5
Auto Operations and Safety	Mineral Ave	Jackass Hill Rd	Traffic Signal	Intersection operation and safety improvements; pedestrian and bicycle focus	$1.0
Auto Operations and Safety	Littleton Blvd	Main St/Alamo Ave	Yield Control	Roundabout	$2.0
Auto Operations and Safety	Prentice Ave	Delaware St	2-Way Stop	Roundabout	$0.3
Auto Operations and Safety	Prentice Ave	Huron St	2-Way Stop	Roundabout	$0.3
Auto Operations and Safety	Prince St	Centennial Dr	2-Way Stop	Roundabout	$1.5
Auto Operations and Safety	Ridge Rd	Apache St	3-Way Stop	Roundabout	$1.0
Auto Operations and Safety	Ridge Rd	Elati St	4-Way Stop	Roundabout	$1.0
Auto Operations and Safety	Ridge Rd	Gallup St	4-Way Stop	Roundabout	$1.0

Table 26. Local Project Summary

Local Project Type	Corridor	Intersection or Segment	Existing Condition	Description	Cost (2019$, in millions)
Auto Operations and Safety	Ridge Rd	Prince St	4-Way Stop	Roundabout	$1.0
Auto Operations and Safety	Ridge Rd	Windermere St	4-Way Stop	Roundabout	$1.0
Auto Operations and Safety	Santa Fe Dr	Prince St	Traffic Signal	Signal timing and phasing, advanced detection and geometry, NB Left	$0.1
Auto Operations and Safety	Santa Fe Dr	Aspen Grove Way	Traffic Signal	Signal timing and phasing, advanced detection and geometry	$0.1
Auto Operations and Safety	Santa Fe Dr	Bowles Ave	Traffic Signal	Signal timing and phasing, advanced detection and geometry	$0.1
Auto Operations and Safety	Windermere St	Corridor-wide	Varies	Traffic Calming	$2.0
Auto Operations and Safety	Prince St	Corridor-wide	Varies	Turn lanes, curb and gutter	$10.0
Auto Operations and Safety	Broadway	Corridor-wide	Varies	V2I and ITS	$2.0
Auto Operations and Safety	Santa Fe Dr	Corridor-Wide	Varies	V2I and ITS	$1.0
Auto CapaCity	Santa Fe Dr	Corridor Wide (Excluding ROW)	No connection	Access Preservation	$8.0
Auto CapaCity	South Platte River Pkwy	Corridor Wide (Excluding ROW)	No connection	Connect new South Platte River Parkway extension to Santa Fe Drive	$1.5
Auto CapaCity	Santa Fe Dr	Dad Clark Gulch	No signal	Traffic signal	$0.3
Auto CapaCity	Mineral Ave	Santa Fe to Jackass Hill Rd	Four-lane roadway	Widen to six lanes and reconstruct sidewalks under RR crossings	$2.0
Active Transportation	Caley Ave	Prince St to Broadway	Shared lane	Advisory bike lane or bike lane	$0.2

Table 26. Local Project Summary

Local Project Type	Corridor	Intersection or Segment	Existing Condition	Description	Cost (2019$, in millions)
Active Transportation	Powers Ave	Windermere St to Delaware St	Shared lane	Advisory bike lane or bike lane	$0.1
Active Transportation	Berry Ave	Blue Sage Dr to Federal Blvd	Shared lane	Bike lane	$0.1
Active Transportation	Powers Ave	Delaware St to Broadway	Shared lane	Bike lane	>$0.1
Active Transportation	Elati St	Shepperd Ave to High Line Canal	Shared lane	Bike lane	$0.3
Active Transportation	Delaware St	Lehow Ave to Powers Ave	Shared lane	Bike lane	$0.1
Active Transportation	Windermere St	Ridge Rd to Rangeview Dr	Shared lane	Buffered bike lane and traffic calming	$0.2
Active Transportation	Windermere St/Jamison Ave	Mineral Ave to Broadway	Bike lane/ bike shoulder	Buffered bike lane and traffic calming	$0.3
Active Transportation	Belleview Ave	City Limits/ Prospect Rd to Irving St	Bike lane/ none	Protected bike lane	$0.3
Active Transportation	Windermere St	City Limits/ Layton Ave to Littleton Blvd	Bike lane/ shared parking	Protected bike lane	$0.2
Active Transportation	Windermere St	Littleton Blvd to Ridge Road	Bike lane/ shared parking	Protected bike lane	$0.1
Active Transportation	Ridge Rd	Prince St to Broadway	Bike lane	Protected bike lane	$0.3
Active Transportation	Alamo Ave	Prince St to Court Pl	None	Protected bike lane	$1.0
Active Transportation	Main St	Prince St to Court Pl	None	Protected bike lane	>$0.1
Active Transportation	Church Ave	Santa Fe Dr to Prince St	None	Protected bike lane	>$0.1

Table 26. Local Project Summary

Local Project Type	Corridor	Intersection or Segment	Existing Condition	Description	Cost (2019$, in millions)
Active Transportation	Federal Blvd	Belleview Ave to Bowles Ave	Bike lane	Protected bike lane	$0.3
Active Transportation	Lowell Blvd	Belleview Ave to Bowles Ave	Shared lane	Protected bike lane	$0.2
Active Transportation	Prince St	Centennial Dr to Mineral Ave	Bike lane/ shared lane/ shared parking/ bike lane/ bike shoulder	Protected bike lane	$0.7
Active Transportation	Southpark Ln	Mineral Ave to County Line Rd	Shared lane	Protected bike lane	$0.2
Active Transportation	Centennial Dr/ Prentice Ave/ Progress Ave	Federal Blvd to Prince St	Bike lane	Protected bike lane	$0.2
Active Transportation	Broadway	High Line Canal Trail south of Arapahoe Rd to Ridge Road	None	Shared use path	$0.2
Active Transportation	Broadway	Bannock St to Caley Ave	None	Shared use path	$0.1
Active Transportation	Belleview Ave	Irving St to City Limits	None	Shared use path	$1.5
Active Transportation	Mineral Ave	Broadway to E Dry Creek Rd	Shared lane	Shared use path	$0.5
Active Transportation	Broadway	Jamison Ave to City Limits	None	Shared use path	$0.5
Active Transportation	Broadway	Powers Ave	Traffic signal	Bicycle intersection improvements	$0.1
Active Transportation	Santa Fe Dr	Prince St	Traffic signal	Bicycle intersection improvements	$0.5

Table 26. Local Project Summary

Local Project Type	Corridor	Intersection or Segment	Existing Condition	Description	Cost (2019$, in millions)
Active Transportation	Prince St	Alamo Ave	Traffic signal	Bicycle intersection improvements	$0.1
Active Transportation	Santa Fe Dr	Belleview Ave	Traffic signal - SPUI	Bicycle intersection improvements	$0.3
Active Transportation	Lowell Blvd	Berry Ave	Traffic signal	Bicycle intersection improvements	$0.1
Active Transportation	Mary Carter Greenway	Bowles Ave	Grade-separated crossing	Bridge widening	$1.0
Active Transportation	Middlefield Rd	Bowles Ave	Traffic signal	Bicycle intersection improvements	$0.1
Active Transportation	Prince St	Caley Ave	Cross traffic does not stop	Bicycle intersection improvements	$0.2
Active Transportation	Bannock St	Littleton Blvd	Traffic signal	Bicycle intersection improvements	$0.1
Active Transportation	Windermere St	Littleton Blvd	Traffic signal	Bicycle intersection improvements	$0.1
Active Transportation	Prince St	Main St	Traffic signal	Bicycle intersection improvements	$0.1
Active Transportation	Jackass Hill Rd/ Long Ave	Mineral Ave	Traffic signal	Bicycle intersection improvements	$0.1
Active Transportation	Santa Fe Dr	Mineral Ave	Traffic signal	Bicycle intersection improvements	$1.0
Active Transportation	Apache St/ High Line Canal Trail	Ridge Rd	3-way stop	Bicycle intersection improvements	$0.2
Active Transportation	Elati St	Ridge Rd	4-way stop	Bicycle intersection improvements	$0.2
Active Transportation	Gallup St	Ridge Rd	4-way stop	Bicycle intersection improvements	$0.2

Table 26. Local Project Summary

Local Project Type	Corridor	Intersection or Segment	Existing Condition	Description	Cost (2019$, in millions)
Active Transportation	Prince St	Ridge Rd	4-way stop	Bicycle intersection improvements	$0.2
Active Transportation	Windermere St	Ridge Rd	4-way stop	Bicycle intersection improvements	$0.2
Active Transportation	Broadway	High Line Canal Trail (S of Arapahoe Rd)	Cross traffic does not stop	Grade-separated	$3.0
Active Transportation	Mineral Ave	Peninsula Dr/ High Line Canal Trail	Traffic signal	Grade-separated	$3.0
Active Transportation	Rio Grande St	Slaughterhouse Gulch Trail	None	Grade-separated	$5.0
Active Transportation	Santa Fe Dr	Slaughterhouse Gulch Trail	None	Grade-separated	$6.0
Active Transportation	Santa Fe Dr	Dad Clark Gulch	Bridge (no connection)	Grade-separated	$6.0
Active Transportation	Federal Blvd	Belleview Ave	Traffic signal	Protected bicycle intersection	$0.8
Active Transportation	Lowell Blvd	Belleview Ave	Traffic signal	Protected bicycle intersection	$0.8
Active Transportation	Windermere St	Belleview Ave	Traffic signal	Protected bicycle intersection	$0.8
Active Transportation	Southpark Ln	Mineral Ave	Traffic signal	Protected bicycle intersection	$0.8
Active Transportation	Windermere St	Powers Ave	Traffic signal	Protected bicycle intersection	$0.8
Active Transportation	Federal Blvd	Bowles Ave/ Trail Crossing	Traffic signal	Raised crossing in channelized right turn lane	$0.1
Active Transportation	Prince St	Little's Creek Trail	Pedestrian warning signage	RRFB/ raised pedestrian crossing	$0.2

Table 26. Local Project Summary

Local Project Type	Corridor	Intersection or Segment	Existing Condition	Description	Cost (2019$, in millions)
Active Transportation	Berry Ave	Federal Blvd	Cross traffic does not stop	Pedestrian signal	$0.2
Active Transportation	Bega Park Trail	Alamo Ave	Pedestrian warning signage	RRFB/ raised pedestrian crossing	$0.2
Active Transportation	Bega Park Trail	Main St	Pedestrian warning signage	RRFB/ raised pedestrian crossing	$0.2
Active Transportation	Mary Carter Greenway	Mineral Ave	Grade-separated crossing	Bridge widening	$1.0
Active Transportation	Broadway	Caley Ave/ High Line Canal Trail	Traffic signal	Signal phasing changes	>$0.1
Active Transportation	Platte Canyon Rd	Mineral Ave/ Ken Caryl Rd	Traffic signal	Signal phasing changes	>$0.1
Active Transportation	Broadway	Ridge Rd/ High Line Canal Trail	Traffic signal	Signal phasing changes	>$0.1
Active Transportation	Mineral Ave	Jackass Hill Rd to Broadway	Bike lane	Protected bike lane	$0.4
Active Transportation	Broadway	Lee Gulch	Cross traffic does not stop	Grade-separated	$5.0
Active Transportation	Elati St	Highline Canal	Dirt path	Improve connection	$0.1
Active Transportation	Bannock St	Powers Ave to Broadway	Shared lane/ none	Bike lane	$0.1
Active Transportation	Shepperd Ave	Bannock St to Elati St	Shared parking/ bike lane	Bike lane	>$0.1
Active Transportation	Sterne Pkwy	Apache St to Broadway	None	Bike lane	>$0.1

Table 26. Local Project Summary

Local Project Type	Corridor	Intersection or Segment	Existing Condition	Description	Cost (2019$, in millions)
Active Transportation	Tule Lake Dr	Sheridan Blvd/ City Limits to Federal Blvd	None	Bike lane	$0.3
Active Transportation	Rangeview Dr	Windermere St to Prince St	Path	Shared use path	$0.3
Active Transportation	Geddes Ave	Windermere St to Elati St	None	Advisory bike lane or bike lane	$0.1
Active Transportation	Mineral Ave	Between Santa Fe Dr & Jackass Hill Rd	Path	Shared use path	$0.2
Active Transportation	Mineral Ave	Wolff St to Polo Ridge Dr	Path	Trail crossing improvements	$0.3
Active Transportation	Mineral Ave	Polo Ridge Dr	RRFB	Pedestrian signal or other improvement	$0.1
Active Transportation	Little's Creek Flume Trail Connection	RR Tracks	No connection	Trail connection across flume	$1.0
Active Transportation	City-wide	15.1-mi	Varies	Missing sidewalks	$2.9
Active Transportation	City-wide	32.5-mi	Varies	Narrow sidewalks	$3.9
Transit	Broadway	Corridor Wide	No transit prioritization	Transit speed and reliability improvements	$0.4
Transit	Littleton Boulevard	Corridor Wide	No circulator	Circulator Shuttle	TBD
Transit	Littleton Boulevard	Corridor Wide	No transit prioritization	Transit speed and reliability improvements	$0.2
Transit	Bowles Ave.	Corridor	No transit prioritization	Transit speed and reliability improvements	$0.1
Transit	Downtown	District	No transit prioritization	Transit speed and reliability improvements - transit signal	$0.1

Table 26. Local Project Summary

Local Project Type	Corridor	Intersection or Segment	Existing Condition	Description	Cost (2019$, in millions)
				priority, queue jumps, or other operational improvements	
Transit	Downtown	Station	361 parking spaces in surface lot	Station improvements (rider information, wayfinding, parking lot reconfiguration)	$0.1
Transit	Mineral Ave/Santa Fe Dr	Station	1,200 spaces in surface lot	Station improvements (rider information, wayfinding, parking lot reconfiguration)	$0.1
Transit	Broadway	Littleton Blvd	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	$0.1
Transit	Broadway	Arapahoe Rd	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	$0.1
Transit	Broadway	Mineral Ave	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	$0.1
Transit	Downtown	Arapahoe Community College	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	$0.1
Transit	Littleton Blvd	S Windermere St	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	$0.1
Transit	Littleton Blvd	S Datura St	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	$0.1
Transit	Littleton Blvd	S Bannock St	Varies	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	$0.1
				Total	**$113.4**

REGIONALLY SIGNIFICANT PROJECTS ANALYSIS

The ~~remaining~~ Regionally Significant Projects are summarized in Table 27 and result in a total cost estimate of $583.0 million. As in Table 28, the annual sales tax increments on a pay-as-you-go implementation approach would cover

between 0.5 percent and 1.8 percent of the Regionally Significant Projects costs. Under the assumption that bonds are issued and the Local Projects are funded first, the 0.25 percent, 0.5, and 0.75 percent sales tax increase increments do not have any remaining bond proceeds available to support the Regionally Significant Projects. The remaining bond proceeds under the 1.0 percent sales tax increase increment could provide 5 percent of the Regionally Significant Projects total costs.

Table 27. Regionally Significant Projects

Regionally Significant Project Type	Corridor	Intersection or Segment	Existing Condition	Description	Cost (2019$, in millions)
Auto	Santa Fe Drive	Bowles Avenue	Traffic Signal	Reconfigure into grade-separated interchange	$150.0
Auto	Santa Fe Drive	Mineral Avenue	Traffic Signal	Reconfigure into grade-separated interchange	$75.0
Auto	Santa Fe Drive	Corridor Wide (Excluding ROW)	No connection	Access Preservation	$8.0
Auto	Santa Fe Drive	Bowles Avenue	Traffic Signal	Alternative intersection configuration	$15.0
Auto	Santa Fe Drive	Mineral Avenue	Traffic Signal	Alternative intersection configuration, quadrant roadway, or continuous flow intersection	$15.0
Auto	County Line Road	Santa Fe Dr to Broadway	Varies	Widening	$20.0
Auto	County Line Road	Broadway to University Ave	Varies	Widening	$20.0
Auto	Santa Fe Drive	Corridor-Wide	Varies	Widening	$50.0
Transit	Broadway	Corridor Wide	Standard bus service	BRT	$64.0
Transit	Santa Fe Drive	Corridor Wide	No light rail service	Relieve burden on parking via full light rail extension (cost shown)	$166.0
Transit	Mineral Ave/Santa Fe Dr	Station	Inadequate parking at Mineral Station	Parking garage (1500 spaces)	$37.5
				Total	**$620.5**

Table 28. Conceptual Sale Tax Rate Increase

Conceptual Sale Tax Rate Increase	Annual Levels (2019$, in millions)	Percent Share of Regionally Significant Projects ($583 M)	Remaining Conceptual Bond Proceeds (2019$, in millions)	Percent Share of Regionally Significant Projects ($583 M)
0.25% Increase	$2.8	0.5%	$0	0.0%
0.50% Increase	$5.6	0.9%	$0	0.0%
0.75% Increase	$8.5	1.4%	$0	0.0%
1.0% Increase	$11.3	1.8%	$32	5.1%

CONCEPTUAL FINANCIAL STRATEGIES ANALYSIS

For the purposes of the TMP Financial Analysis, two conceptual financial strategies were evaluated to provide an estimate of the level of funding the City of Littleton would need to generate in order to provide local match funds for potential federal, State and regional funds (Table 29). For each of the conceptual financial strategies, it was assumed that the City would fully fund the $113.4 million required for the Local Projects. The two conceptual strategies for the Regionally Significant Projects reflect the following assumptions regarding the allocation of costs among Federal programs, State/Regional programs, and the City of Littleton:

- Maximum Federal Participation:
  - Transit Projects: 50 percent Federal; 25 percent State/Regional; and 25 percent City of Littleton
  - Active Transportation and Auto Projects: 80 percent Federal; 10 percent State/Regional; and 10 percent City of Littleton
  - As shown in the table below, based on these assumptions, Federal funding would total $416 million, State/Regional funding would total $102 million and the City of Littleton share would total $216 million ($113.4 million for Local Projects and $102.2 million for Regionally Significant Projects).
  - Additionally, based on the previously described annual sales tax estimates based on the four increments and the associated level of bonds that could be issued against these increments:
    - It would take between 17 and 67 years to cover the City of Littleton's share on a pay-as-you go basis.
    - Assuming bonds are issued against a new sales tax, between 19 and 77 percent of the City of Littleton's share would be funded.

- Moderate Federal Participation:
  - Transit Projects: 40 percent Federal; 30 percent State/Regional; and 30 percent City of Littleton
  - Active Transportation and Auto Projects: 50 percent Federal; 25 percent State/Regional; and 25 percent City of Littleton.

- Based on these assumptions, Federal funding would total $284 million, State/Regional funding would total $169 million and the City of Littleton share would total $282 million ($113.4 million for Local Projects and $168.5 million for Regionally Significant Projects).
- Additionally, based on the previously described annual sales tax estimates based on the four increments and the associated level of bonds that could be issued against these increments:
  - It would take between 22 and 90 years to cover the City of Littleton's share on a pay-as-you go basis.
  - Assuming bonds are issued against a new sales tax, between 14 and 58 percent of the City of Littleton's share would be funded.

Table 29. Conceptual Financial Strategies

Scenario 1 - Maximum Federal Participation	Costs	Federal	State/Regional	City of Littleton
Local Projects	$113.4			$113.14
Regional Projects	$620.5	$416.2	$102.2	$102.2
Total	**$733.9**	**$416.2**	**$102.2**	**$215.6**
Potential New Sales Tax (cash basis)	**0.25%**	**0.50%**	**0.75%**	**1%**
Annual Estimates	$2.80	$5.60	$8.50	$11.30
Number of years to cover City's share of costs on a pay-go basis	*77.0*	*38.5*	*25.4*	*19.1*
Potential New Sales Tax (issue bonds)				
Conceptual Amount of Bonds Issued	$36	$72	$108	$145
% share of City's Funding Needs	*17%*	*33%*	*50%*	*67%*
Scenario 2 - Moderate Federal Participation	**Costs**	**Federal**	**State/Regional**	**City of Littleton**
Local Projects	$113.4			$113.4
Regional Projects	$620.5	$283.5	**$168.5**	**$168.5**
Total	**$733.9**	**$283.5**	**$168.5**	**$281.9**
Potential New Sales Tax (cash basis)	**0.25%**	**0.50%**	**0.75%**	**1%**
Annual Estimates	$2.80	$5.60	$8.50	$11.30
Number of years to cover City's share of costs on a pay-go basis	*100.7*	*50.3*	*33.2*	*24.9*
Potential New Sales Tax (issue bonds)				
Conceptual Amount of Bonds Issued	$36	$72	$108	$145
% share of City's Funding Needs	*13%*	*26%*	*38%*	*51%*

The next section provides an initial list of federal, State and other local revenue sources that could be targeted in partnership with CDOT, RTD, and DRCOG to address the non-City of Littleton funding needs beyond use of a conceptual sales tax increase.

POTENTIAL FUNDING SOURCES

The following sections provide summary descriptions of potential federal, state, and other local sources that could be targeted in partnership with RTD, CDOT, and DRCOG to implement the Regionally Significant Projects. Additional details on these funding programs and other sources considered for this analysis are provided in the Funding Guidebook, which is submitted nder a separate cover.

POTENTIAL FEDERAL PROGRAMS

This section provides descriptions of potential federal funding sources that could support implementation of Regionally Significant Projects within the Auto, Transit, and Active Transportation projects. The sources reflect both discretionary (competitive) and formula programs.

The federal funding sources described below reflect existing grant programs. The current federal transportation authorization legislation for these programs (Fixing America's Surface Transportation Act, or the FAST Act) is scheduled to expire in September 2020. Based on prior legislative history, it is likely that most, if not all, of these programs will continue. However, it is also important to note that there are ongoing discussions in Washington, D.C. regarding the return of Congressional earmarks. Cities and transportation agencies across the country have started the process of marketing major capital investment projects to their federal delegations with the goal of getting these projects named and funded as part of future transportation legislation, assuming earmarks return. When Congressional earmarks were part of federal transportation legislation in the past, the average project grant awards were significantly higher than grant awards provided through the programs described below.

Discretionary/Competitive Grants

As the preferred program of projects defined in the TMP moves through the planning, environmental, and design process, there may be opportunities to leverage federal funds for entire projects or specific cost elements of projects through competitive grant opportunities offered by the Federal Transit Administration (FTA), Federal Highway Administration (FHWA), and United States Department of Transportation (USDOT). A brief overview of competitive grant programs used to support the planning, engineering, and/or construction of Auto CapaCity, Auto Operations and Safety, Transit, and Active Transportation projects is provided below.

Finally, as indicated in the descriptions, there are a limited number of competitive federal grant programs and due to the volume of applications received, grant awards are typically less than $15 million for individual projects.

USDOT BUILD Grant Program (formerly known as the TIGER Grant Program)

Description: The Better Utilizing Investments to Leverage Development (BUILD) program, formerly known as the Transportation Investment Generating Economic Recovery (TIGER) program, is one of USDOT's largest multimodal discretionary grant programs and supports innovative projects that would be otherwise difficult to fund through traditional federal programs. USDOT seeks projects that will catalyze long-lasting, positive changes in economic development, safety, quality of life, environmental sustainability, and state of good repair. Prior rounds of BUILD/TIGER have prioritized projects seeking to improve access to reliable, safe, and affordable transportation to enhance connectivity and provide ladders of opportunity for communities in urban, suburban, and rural areas.

The BUILD/TIGER program is extremely competitive with 7,300 applications submitted to USDOT requesting $143 billion in BUILD/TIGER funds over the program's eight rounds for which summaries have been released. USDOT has awarded a total of $5.1 billion to 421 projects, which is less than six percent of all applicants. Table 30 illustrates overall supply and demand for the program since it was first authorized under the American Recovery and Reinvestment Act of 2009

(ARRA). While there have been annual appropriations for BUILD/TIGER every FY since 2009, including the most recent BUILD notice of funding opportunity (NOFO) released in April 2019, the program is not specifically authorized in federal legislation.

Table 30. BUILD/TIGER Program Overall Supply and Demand

Fiscal Year (FY)	Program Size	Applicants	Projects Funded	Percent of Projects Funded
2009	$1,500 million	~1,400	51	3.6 percent
2010	$600 million	~1,700	75	4.4 percent
2011	$510 million	848	46	5.4 percent
2012	$500 million	703	47	6.7 percent
2013	$474 million	585	52	8.9 percent
2014	$600 million	797	72	9.0 percent
2015	$500 million	627	39	6.2 percent
2016	$500 million	585	40	6.8 percent

Source: USDOT

Note: 2017 and 2018 BUILD awards summaries have not been released by USDOT.

Eligible Project Categories: Auto, Transit, and Active Transportation

Revenue Potential: Despite the program's $25 million statutory maximum grant amount, the typical BUILD/TIGER grant awarded to projects in urban areas is $10 to $15 million. USDOT rarely awards close to its maximum of $25 million in BUILD/TIGER funding to any one project. Between 2012 and 2016, only 20 out of 250 TIGER awards were $20 million or larger. Notably, nearly two-thirds of the 40 grant recipients in FY 2016 were repeat applicants.

Most Recent Application Cycle: July 15, 2019

Example Projects: Table 31 provides a summary of projects from around the country that are similar to what is being considered in the TMP. The purpose of the table is to highlight successful project examples and the share of costs the federal grant covered.

Table 31. Comparable Projects

Applicant	Project Summary	Grant Award/ Share of Total Costs	Project Type
Miami-Dade County	Expand and improve two existing park-and-ride facilities along the South Dade Bus Rapid Transit (BRT) line. The project includes additional sidewalks, improved pedestrian access, bicycle parking facilities, a kiss-and-ride, additional parking for individuals with disabilities, and electric vehicle parking with charging stations.	$9.5 M (50%)	Transit
Maquoketa, IA	The project will make several roadway improvements including new and resurfaced street pavement; replacement curbs, gutters, pedestrian curb ramps, and sidewalks for compliance with the Americans with Disabilities Act (ADA); repair and replacement of the storm sewer, sanitary sewer, and water main; installation of a new broadband fiber-optic network; and traffic signal upgrades.	$3.8 M (40%)	Roadway
Calloway County, KY	The project will widen an approximately 5.7-mile section of US 641 South from a two-lane divided highway to a four-lane divided highway between the Kentucky/Tennessee state line at Hazel north to the Middle Fork of the Clarks River.	$23 M (41%)	Roadway
Hickory, NC	The project will develop an approximately 1.7-mile bicycle and pedestrian trail and a bridge over US 321, and construct a 1.2-mile complete streetscape loop in downtown Hickory that will add designated space for bicycles and pedestrians and concurrently incorporate underground fiber cable systems.	$17 M (77%)	Active Transportation
Butler County, PA	The project will realign and widen to 4 lanes the approximately 1.5-mile Balls Bend and the approximately 0.75-mile Haines School-Commonwealth sections of Route 228, including adding turn lanes, medians, connecting access roads, and pedestrian/bicycle facilities. This project is part of a larger to widen approximately 26 miles of Route 228 in Butler County.	$20 M (47%)	Roadway

Source: BUILD 2018 Fact Sheets

USDOT INFRA Grant Program (formerly known as the FASTLANE Grant Program)

Description: The Infrastructure for Rebuilding America (INFRA) grant program, formerly known as the Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies (FASTLANE) grant program, provides dedicated, discretionary funding for projects that address critical issues facing our nation's highway and bridges. Eligible costs include reconstruction, rehabilitation, acquisition of property, environmental mitigation, construction contingencies, equipment acquisition, and operational improvements directly related to system performance.

Eligible Project Categories: Auto only—however the focus of the grant program is to improve freight and goods movement.

Revenue Potential: In FY 2018, USDOT awarded over $1.5 billion in INFRA awards to 26 projects, or an average award of $59.1 million. Each year, 90 percent of available INFRA funds are awarded to large projects, or those with a minimum grant size of $25 million. The remaining 10 percent of available funds are reserved for small projects, which have a minimum grant size of $5 million.

Most Recent Application Cycle: The FY 2019 INFRA NOFO was released on December 21, 2018. The application deadline was March 4, 2019, and FY 2019 awards were announced on July 25, 2019.

FHWA Advanced Transportation and Congestion Management Technologies Deployment

Description: The FAST Act established the Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) Program to make competitive grants for the development of model deployment sites for large-scale installation and operation of advanced transportation technologies to improve safety, efficiency, system performance, and infrastructure return on investment.

ATCMTD grants can cover up to 50 percent of the total project cost. Recipients can use funds to deploy advanced transportation and congestion management technologies, including:

- advanced traveler information systems;
- advanced transportation management technologies;
- infrastructure maintenance, monitoring, and condition assessment;
- advanced public transportation systems;
- transportation system performance data collection, analysis, and dissemination systems;
- advanced safety systems, including vehicle-to-vehicle and vehicle-to-infrastructure communications;
- technologies associated with autonomous vehicles, and other collision avoidance technologies, including systems using cellular technology;
- integration of intelligent transportation systems with the Smart Grid and other energy distribution and charging systems;
- electronic pricing and payment systems; and
- advanced mobility and access technologies, such as dynamic ridesharing and information systems to support human services for elderly and disabled individuals.

Eligible Project Categories: Roadway—capital costs only

Revenue Potential: In the most recent application cycle, 51 applicants requested more than $265 million. Ten grants were awarded ranging from $2.4 million to $12 million for a total of $53.2 million, or an average award of $5.3 million. CDOT secured a $2.4 million grant for Wolf Creek Pass Advanced Technology Deployment.

Most Recent Application Cycle: The FY 2018 NOFO was published on April 18, 2018, grant applications were due on June 18, 2018, and awards were announced on April 1, 2019.

FTA Section 5309 Capital Investment Grant Program (New Starts/Small Starts)

Description: This FTA discretionary grant program funds transit capital investments, including heavy rail, commuter rail, light rail, streetcars, and bus rapid transit. Federal transit law requires transit agencies seeking Capital Investment Grants (CIG) funding to complete a series of steps over several years. For New Starts projects, the law requires completion of

two phases (Project Development and Engineering) in advance of receipt of a construction grant agreement. For Small Starts projects, the law requires completion of one phase (Project Development only) in advance of receipt of a construction grant agreement. The law also requires projects to be rated by FTA at various points in the process according to statutory criteria evaluating project justification and local financial commitment.

Eligible Project Categories: Transit

Revenue Potential: The FAST Act authorized $2.3 billion in CIG funding annually through 2020. New Starts projects require a total project cost of greater than $300 million and CIG funding of at least $100 million. Small Starts projects have total project costs of less than $300 million and less than $100 million in CIG funds. Maximum CIG share of total project cost is 60 percent for New Starts and 80 percent for Small Starts.

Recently, RTD successfully pursued $92 million in CIG funds for the $224 million Southeast Rail Extension to Lone Tree. Local funding was provided through a combination of RTD sales tax revenue and local contributions including donated right-of-way and cash contributions. Previously, RTD obtained CIG funds for earlier lines of the FasTracks Program, with the non-federal share provided by the RTD sales tax.

Most Recent Application Cycle: Ongoing submittal and review process

Federal Formula Programs

The following provides an overview of FTA and FHWA formula grant programs that could be pursued separately or in combination with the previously described competitive grant programs. While there is no limitation on the number of federal funding programs that can be included in a project's financial strategy, the maximum federal funding participation that can be used on a project is 80 percent of the total capital costs.

If there is interest to pursue funding from any of these programs, there will need to be coordination with RTD, DRCOG, or CDOT. Use of these funds is typically identified several years in advance and is documented in the region's transportation planning and programming documents, including the Regional Transportation Plan (RTP) and the Transportation Improvement Program (TIP). More specifically, the current TIP programs federal funds through DRCOG over the 2020 to 2023 period. If FTA or FHWA formula programs are to be targeted for projects included in the TMP, the funds would have to be programmed after the current TIP period (2024 or later), or the City would have to work with DRCOG to reprogram and transfer funds from projects in the current TIP.

Programs Administered by RTD

- **FTA Section 5307 Urbanized Area Formula Program**

  Description: The Urbanized Area Formula Funding program (49 U.S.C. 5307) makes federal resources available to urbanized areas for transit capital and operating assistance and for transportation-related planning.

  Eligible activities for Section 5307 funds include planning, engineering, design, and evaluation of transit projects and other technical transportation-related studies; crime prevention and security equipment; vehicle acquisition and replacement; construction of maintenance and ***passenger facilities***; and ***capital investments in new and existing fixed guideway systems*** including rolling stock, overhaul and rebuilding of vehicles, track, signals, communications, and computer hardware and software.

  Eligible Project Categories: Transit

  Revenue Potential: FY 2019 FTA Apportionment to the Denver Region: $58.4 million

- **FTA Section 5337 State of Good Repair Formula Grants**

Description: The State of Good Repair Program provides funding to transit agencies through a statutory formula for maintenance, replacement, and rehabilitation projects of high-intensity fixed guideway and bus systems to help transit agencies maintain assets in a state of good repair. Eligible activities include implementing transit asset management plans and replacing or rehabilitating rolling stock; track; line equipment and structures; signals and communications; power equipment and substations; ***passenger stations and terminals***; security equipment and systems; maintenance facilities and equipment; and operational support equipment, including computer hardware and software.

Eligible Project Categories: Transit

Revenue Potential: FY 2019 FTA Apportionment to the Denver Region: $16.3 million

Programs Administered by DRCOG through the TIP Process

Description: The TIP programs the federally-funded transportation improvements and management actions to be completed by CDOT, RTD, local governments, and other project sponsors over a four-year period within the DRCOG region. As required by federal and State law, the TIP must be fiscally constrained to funds expected to be available. All projects selected to receive federal and State surface transportation funds, and all regionally significant projects regardless of funding type, must be identified in the TIP.

DRCOG is responsible for developing and approving the TIP. DRCOG directly selects projects with federal and State funding, and reviews CDOT and RTD-submitted projects for consistency with regional plans. ***This discussion focuses on the DRCOG-selected projects***, which draw from the following funding sources:

- **Surface Transportation Block Grant Program (STBG)**: provides funding for projects that preserve and improve the conditions and performance on any federal-aid highway, bridge, and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects. Potential TMP elements that could be eligible for STBG funds include:
    - Construction, reconstruction, rehabilitation, resurfacing, restoration, preservation, or operational improvements for highways;
    - Capital costs for transit projects;
    - Corridor parking facilities;
    - Improvements at intersections with high crash rates or levels of congestion; and
    - Infrastructure-based ITS capital improvements.
- **Transportation Alternatives (TA):** provides funding for non-motorized elements of high capaCity transit projects. Potential eligible expenses within the TMP could include planning, design, and construction of facilities for pedestrians and bicyclists.
- **Congestion Mitigation and Air Quality (CMAQ):** Program funds are available for transportation projects likely to contribute to the attainment or maintenance of a national ambient air quality standard, with a high level of effectiveness in reducing air pollution and congestion. More specifically, to be eligible for CMAQ funding, a transportation project must generate an emissions reduction, and it must be located in or benefit a nonattainment or maintenance area. Potential TMP elements that could be eligible for CMAQ funds are summarized below. Further, as noted in the list, CMAQ can be used to cover a portion of the increased operating costs associated with the introduction of expanded transit service.
    - Planning and engineering activities;

- New or rehabilitation of existing transit facilities (e.g., lines, stations, terminals, transfer facilities) if associated with new or enhanced public transit, passenger rail, or other similar services that will increase transit service capaCity;
- Advanced signal and communications systems for transit;
- Fuel, whether conventional or alternative fuel, if part of a project providing operating assistance for new or expanded transit service under the CMAQ program; and
- Operating assistance to introduce new transit service or expand existing transit service.

- **State Multimodal Transportation Options Fund (MMOF):** SB 18-001 includes a provision that establishes a Multimodal Options Fund. The Multimodal Options Fund has $96.75 million in dedicated revenue. Of that $96.75 million, $2.5 million is dedicated to the Rail Commission. The remaining $94.25 million is spilt between CDOT (15 percent, or $14.13 million) and local governments (85 percent, or $80.12 million). The legislation directs the CDOT Transportation Commission to establish a distribution formula for the local portion. The distribution formula must be based on population and ridership. The legislation also states that recipients shall provide a match equal to the amount of the award. However, the CDOT Transportation Commission, per legislation, may create a formula for reducing or exempting the match requirement for local governments or agencies due to their size or any other special circumstance. As of May 2019, the allocation methodology was still being developed by CDOT.

Selection Process: DRCOG selects projects in three phases:

1. **Set-Asides:** “Off-the-top” regional programs totaling $49.4 million over the four-year TIP period. Funding is provided through Calls for Projects and includes:
   a. Community Mobility Planning & Implementation: $4.8 million and reflects a combination of the current STAMP/UC Set-Aside and small infrastructure projects from the current TDM Set-Aside;
   b. TDM Services: $13.4 million and rebranded to include the TMA partnerships, non-infrastructure TDM projects, and Way to Go;
   c. Regional Transportation Operations & Technology: $20 million, of which 25 percent is directed to staff DRCOG Traffic Signal Program with the remaining available for project solicitation;
   d. Air Quality Improvements: $7.2 million; and
   e. Human Service Transportation: $4.0 million and is a new set-aside to improve service and mobility options for vulnerable populations.
2. **Regional Share:** $32 million available for transformative projects that will provide benefits to the entire region. This represents 20 percent of available funds after accounting for the Set-Asides. Applications are submitted through subregions, and DRCOG evaluates and selects the projects. Table 32 shows the projects that were selected as part of the current TIP and the ranked waitlisted projects to provide examples of the types of projects that scored well in the DRCOG evaluation process as well as the per project grant award amounts. Finally, it should be noted that the City of Littleton is a funding partner on the US 85 PEL Study listed in Table 33.

Table 32. TIP Regional Share Funding Recommendation

	Project Sponsor	Project Name	Regional Share Funding Request	Total DRCOG Weighted Score H=3, M=2, L=1	Tier	Project Activity	Regional Share Funding Level	Project Highlights
Boulder	Boulder County	SH-119 BRT Enhancements	$8.2	2.5	1	Construction	**$8.2**	1) Center busway in Longmont on Coffman St between 1st and 9th, 2) transit bypass lanes on SH119 at SH52, and 3) Bus Access Transit (BAT) lanes in Boulder on 28th St between Iris and Valmont.
Denver	Denver	16th St Mall Rehabilitation	$20.0	2.5	1	Construction	**$9.1**	Reconstruct with new granite paver system, install bulb- outs, landscaping, realign transitway and sidewalks.
Jefferson	Jefferson County	Peaks to Plains Trail - SH-6 Tunnel 1 to Huntsman Gulch	$4.0	2.5	1	Construction	**$4.0**	Build a 3-mile 10-foot ADA path along SH-6, including pedestrian bridges, parking lots, and creek access points.
Arapahoe	Arapahoe County	High Plains Trail/Cherry Creek Trail Connector	$2.0	2.4	1	Construction	**$2.0**	New trail connecting existing High Plains and Cherry Creek Trails, including a grade separation over Parker Road.
RTD	RTD	Mobility as a Service: Implementing an Open-Ticketing Platform	$1.8	2.4	1	Construction	**$1.8**	1) Upgrade back-end administration of fare payment system to account-based, and 2) install new fare validators on all RTD revenue vehicles.
RTD	RTD	RTD Transportation Transformation Comprehensive Plan	$1.4	2.3	1	Study	**$1.4**	Study will provide a vision for base transit system and maximize FasTracks investments.
Arapahoe	Arapahoe County	US-85 PEL Study	$1.5	2.2	1	Study	**$1.5**	Planning and Environmental Linkages study on US-85, between C-470 and Alameda Ave/I-25
Broomfield	Broomfield	SH-7 Preliminary and Environmental Engineering	$4.0	2.2	1	Pre-construction	**$4.0**	Develop preliminary and environmental engineering, and identify ROW and utility needs on SH-7 from Folsom St in Boulder to US-85 in Brighton.

Table 33. TIP Regional Share Funding Waiting List

	Project Sponsor	Project Name	Regional Share Funding Request	Total DRCOG Weighted Score H=3, M=2, L=1	Tier	Project Activity	Waiting List Ranking
Denver	Denver	Broadway Station and I-25 Safety and Access Improvements	$20.0	2.3	1	Construction	**1**
Adams	Commerce City	I-270 Corridor EA and Vasquez Blvd Construction	$6.0	2.2	1	Construction	**2**
Jefferson	Wheat Ridge	Ward Rd and BNSF Grade Separation	$1.0	2.0	1	Pre-construction	**3**
Boulder	Boulder County	US-287 BRT Feasibility and Corridor Safety Study	$0.3	1.9	1	Study	**4**
Douglas	Lone Tree	I-25/Lincoln Interchange Traffic and Mobility Improvements	$1.0	1.9	1	Pre-construction	**5**
Arapahoe	Englewood	US-285 Congestion Management and Operations Study	$0.9	1.8	1	Study	**6**
Denver	Denver	I-25 Valley Highway Phase 2.0 (I-25 and Alameda)	$15.0	2.0	2	Construction	**7**
Jefferson	Wheat Ridge	Wadsworth Blvd Widening: 48th Ave to I-70	$3.3	2.0	2	Construction	**8**
Adams	Commerce City	US-85/120th Ave Interchange: Phase 1	$8.8	1.9	2	Pre-construction	**9**
Broomfield	Broomfield	US-36 Bikeway Realignment and Safety Improvements	$1.2	1.9	2	Construction	**10**
Adams	Bennett	I-70/SH79 Interchange Operational Improvements	$0.8	1.7	2	Construction	**11**
		Total Requested	***$ 58***				
CDOT	CDOT	Central 70 (Part 2 of DRCOG's previous commitment)					

3. **Subregional Share:** The subregional model is new as of the 2020-2023 TIP cycle with approximately $160 million available among the subregions. It divides the region into 8 subregions according to county boundaries. The subregional funding pool is distributed according to a formula weighing population, employment, and VMT within each county. All DRCOG-member local governments who are partially or entirely within a given county boundary must be invited to participate in the subregional forum.

   Scoring criteria for both regional and subregional shares are based on the following categories (although subregional forums may choose to alter the criteria or weighting for the subregional share):

   1. Regional Significance (40 percent)
   2. TIP Focus Area (30 percent)
   3. Consistency with Metro Vision Objectives (20 percent)
   4. Leveraging of funds (10 percent)

For the February 2019 Subregional Call for Projects, the City submitted applications for the following projects: Bowles Avenue and Federal Boulevard Intersection Improvements, Broadway Corridor Plan, and Mineral Avenue and Santa Fe Drive Intersection Improvements. Of the three projects submitted, only a portion of the Mineral Avenue and Santa Fe Drive Intersection Improvements was funded.

POTENTIAL STATE PROGRAMS

CDOT receives revenue from five sources: state revenues, federal revenues, grants, miscellaneous sources (including the sale of property, permits, and fines), and enterprise revenues. The three largest sources of revenue for CDOT (FY 2019-2020 Estimate) are:

1. General fund transfers approved by the State Legislature ($678 million)
2. The Highway User Tax Fund (HUTF), which is made up of a combination of federal and State motor fuel taxes, vehicle registration fees, and other sources ($586 million)
3. FHWA revenue—the Highway Trust Fund ($573 million)

CDOT distributes its funds through a variety of programs, and most of its funding programs are only eligible on state-owned highways. Within the City of Littleton, this includes US 85 and Belleview Avenue where intersection or corridor projects could be done in conjunction with CDOT and therefore these projects could access state highway funds.

- **Highway Safety Improvement Program**

  Description: The primary goal of the Highway Safety Improvement Program (HSIP) is to achieve a significant reduction in fatalities and serious injuries on all publicly maintained roads. This includes public roads not owned by the State and roads on tribal lands. To comply with this program, CDOT is required to:

  - Develop a strategic highway safety plan (SHSP) that identifies and analyzes highway safety problems and opportunities;
  - Create projects to reduce the identified safety problems; and
  - Evaluate and update the SHSP on a regular basis.

  The City of Littleton currently has one project that was awarded funding under HSIP.

  Eligible Project Categories: Auto

  Revenue Potential: $43.1 million (FY 2018-19)

- **Traffic Signal and Ramp Metering Program**
  Description: The Traffic Signal and Ramp Metering (TSRM) Program was developed as a result of the 2013 Mobility Operations Reorganization Report. The objective of this program is to develop statewide policies, procedures, and guidelines on design, maintenance, life-cycle asset management, integration, and operation of traffic signal and ramp meters; manage various statewide funding programs and pools; and facilitate informed decision making on project prioritization. The TSRM Program is focused on implementing new and innovative technology, including CV/AV applications, deploying and integrating statewide ITS systems, incorporating automated performance measures, and extending technical resources to CDOT Regions in the areas of traffic signal and ramp metering. The TSRM Program also leads and/or participates in the development and implementation of arterial and freeway management strategies throughout the State. This includes integrating these systems and using them in conjunction with other intelligent transportation system devices to more efficiently manage our transportation system. This program works collaboratively with CDOT Regions, FHWA, metropolitan planning organizations, local agencies, and other stakeholders to develop and implement policies, standards, and operational procedures for traffic signals and ramp meters.

Statewide Traffic Signal Pool (SGN). CDOT's Traffic Signal Pool Program delivers funding to each Engineering Region on an annual basis. These funds are designated specifically for signal construction or signal system improvements. The Regions rely on these funds to address, on a priority basis, safety, mobility, and operational needs at locations with existing signals or where signals are warranted but not yet constructed. In a typical application, these funds are directed to activities such as new traffic signal or ramp meter construction, equipment or system upgrades, signal expansion due to intersection widening, signal interconnect, and operational improvements including minor hardware or software upgrades to facilitate safety and improve corridor traffic operations.

Statewide Traffic Signal Asset Management (SGA). CDOT owns approximately 1,850 signals statewide. CDOT is responsible for the eventual replacement of these signals at the end of its useful life. The SGA pool delivers much needed capital replacement funding to each Engineering Region on an annual basis to replace the traffic signal infrastructure in poor or severe condition. CDOT's Signal Program is leading the effort in collaborating with the Regions by establishing a process to identify, select and prioritize the replacement of statewide traffic signal infrastructure. The Signal program has established capital replacement guidelines, including performance measures and targets, focused on high-level core criteria that provide a basis for Regions to quickly evaluate, and determine a list of traffic signal capital replacement projects.

Transportation Improvement Program (TIP) - Regional Funding Pool Administration. This program pool was established by DRCOG in the TIP to be funded through the federal CMAQ program. CDOT's Signal Program, in conjunction with FHWA, DRCOG, and local agencies, administers two pools under the TIP program - the Traffic Signal System Improvement Program (TSSIP) pool and the Intelligent Transportation Systems (ITS) pool. The TSSIP program delivers a capital improvement program, which provides equipment and installs communications links to improve system components, and a traffic signal timing improvement program, which provides new traffic signal timing and coordination plans to demonstrate the benefits of the capital improvements. The ITS program awards funds to ITS projects that implement the adopted Denver Regional Intelligent Transportation Systems Strategic Plan and achieve the goals and objectives of the Regional Concept of Transportation Operations.

Current Signal Program Initiatives

- Statewide central traffic signal control system upgrade
- Statewide traffic signal controller upgrade
- Ramp Metering system upgrade
- Implementation of Automated Traffic Signal Performance Measures (ATSPMs)

- Piloting and mainstreaming new and innovative technologies (CV/DSRC, Adaptive, etc.)
- Enhancing condition-based asset management guidelines for signal asset
- Administration of DRCOG TSSIP and TIP funding pools

Eligible Project Categories: Auto

Revenue Potential: $17.8 million (FY 2018-19), $16.1 million (FY 2019-20)

- **FASTER Safety**
  Description: In 2009 the General Assembly created new funding sources to aid CDOT and local governments in funding road safety projects. Per Section 43-4-803 (21), C.R.S. (2018), a "Road Safety Project" means construction, reconstruction, or maintenance projects that:
  - The Transportation Commission determines are needed to enhance the safety of a state highway.
  - A county determines are needed to enhance the safety of a county road.
  - A municipality determines needed to enhance the safety of a City street.

  FASTER funds flow through the Colorado Highway User Trust Fund (HUTF) and are distributed to CDOT, counties, and municipalities.

  In 2014, The Transportation Commission approved new administration of the FASTER Safety program. CDOT FASTER road safety funding is now allocated to two statewide programs administered by HQ: FASTER Safety Asset Management and FASTER Safety Mitigation. HQ coordinates with the Regions to select projects for Region delivery.

  The City of Littleton currently has one project that was awarded FASTER funding.

  Eligible Project Categories: Auto

  Revenue Potential: $67.4 million (FY 2018-19), $68.5 million (FY 2019-20)

- **Regional Priority Program**
  Description: The objective of the Regional Priority Program (RPP) is to supplement the formula-driven funding allocations to the five CDOT engineering regions with flexible funding for use at the discretion of each Regional Transportation Director in consultation with local elected officials and other stakeholders in each region. This is accomplished through the transportation planning process. RPP funds are distributed to the CDOT Regions according to a formula based on 50 percent population, 35 percent state highway system lane miles, and 15 percent state highway system truck VMT.

  Eligible Project Categories: Auto

  Revenue Potential: $48.7 million (FY 2018-19), $48.4 million (FY 2019-20)

- **Transportation Alternatives Program**
  Description: CDOT uses a call for projects approach to allocated federal Transportation Alternatives Program (TAP) funds. These federal funds are allocated under TAP to transportation improvement projects that expand travel choice, strengthen the local economy, improve quality of life, and protect the environment. Many TAP projects enhance non-motorized forms of transportation like biking and walking. The TAP provides funding for bicycle, pedestrian, historic, scenic, and environmental mitigation transportation projects.

  Eligible activities include but are not limited to:
  - Construction, planning, and design of facilities for pedestrians and bicyclists
  - Construction of turnouts, overlooks and viewing areas, and preservation of historic transportation facilities
  - Some environmental mitigation activities, including vegetation management, and archeological and storm water mitigation related to highway projects
  - The recreational trails program

  Eligible Project Categories: Active Transportation

Revenue Potential: CDOT Region 1, which encompasses the City, is projected to allocate $1.8 million per year through FY2020.

- **Surface Transportation Program—Metro**
  Description: The Surface Transportation Program (STP) is a federally mandated program. STP provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge, and tunnel projects on any public road; pedestrian and bicycle infrastructure; and transit capital projects, including interCity bus terminals. STP-Metro is a subprogram of STP for urbanized areas with populations greater than 200,000. Project selection for STP-Metro funds is conducted by federally designated regional Transportation Management Areas (TMAs) comprised of local governments. In Colorado, DRCOG, the Pikes Peak Area Council of Governments (PPACG), and the North Front Range Metropolitan Planning Organization (NFRMPO) select projects, and the member governments that receive funding contribute matching funds. Project finance is administered by CDOT.

  Eligible Project Categories: Auto, Transit, and Active Transportation

  Revenue Potential: $54.0 million (FY 2018-19), $55.4 million (FY 2019-20)

- **Congestion Mitigation & Air Quality**
  Description: CMAQ is a federally mandated program, the objective of which is to improve air quality in nonattainment and maintenance areas for ozone, carbon monoxide, and particulate matter. These include the areas of the NFRMPO, DRCOG, PPACG, portions of the Upper Front Range Transportation Planning Region (UFR TPR), Aspen, Cañon City, Pagosa Springs, Steamboat Springs, and Telluride. Funds may be used for transportation projects designed to contribute to the attainment or maintenance of national ambient air quality standards (NAAQS), with a high level of effectiveness in reducing air pollution.

  Eligible activities include:

  - Establishment or operation of a traffic monitoring, management, and control facility, including advanced truck stop electrification systems, if it contributes to attainment of an air quality standard
  - Projects that improve traffic flow, including projects to improve signalization, construct HOV lanes, improve intersections, add turning lanes, improve transportation systems management and operations that mitigate congestion and improve air quality, and implement ITS and other CMAQ eligible projects, including projects to improve incident and emergency response or improve mobility, such as real-time traffic, transit, and multimodal traveler information
  - Purchase of integrated, interoperable emergency communications equipment
  - Projects that shift traffic demand to nonpeak hours or other transportation modes, increase vehicle occupancy rates, or otherwise reduce demand
  - Complete diesel retrofits of fleet vehicles
  - Development of alternative fueling infrastructure and assistance in the conversation of public and private fleets to alternative fuel vehicles such as compressed natural gas (CNG), propane, or electric vehicles
  - Expanded authority to use funds for transit operations

  Eligible Project Categories: Auto, Transit, and Active Transportation

  Revenue Potential: $50.3 million (FY 2018-19), $50.2 million (FY 2019-20)

POTENTIAL LOCAL DISTRICTS

In addition to increasing the sales tax rate that was described earlier, other locally controlled revenue programs that could be considered include:

- Increase Mill Levy for Transportation: Temporarily increase the local mill levy for a specific transportation improvement. This approach would require voter approval. An example of this approach is Larimer County, which

temporarily increased the Road & Bridge Fund Mill Levy share of the total current county-wide mill levy to implement the I-25 Improvement Project.

- Regional Transportation Authority (RTA): Implementation of a multi-jurisdiction sales tax dedicated for transportation infrastructure improvements. RTAs need to establish boundaries for the proposed authority and have all participating government entities agree on the structure and tax amount. A vote is required to establish the authority and also to approve the sales tax. The RTA approach was implemented in El Paso County in 2004 to provide funding for roadway maintenance, roadway capital projects, and transit enhancements.
- Local Improvement Districts (LID): A LID allows property owners within a defined geographic area to construct and finance public streets, storm drainage, water system, or sanitary sewer improvements over a period of time so the whole cost of the improvement does not have to be paid at once. Following a referendum among the property owners within the district, the cost of the public improvements is paid by the property owners through their property taxes.
- Metropolitan District: These districts are units of local government that provide public improvements and services to its property owners and residents through property tax revenue. Voter approval is required to implement the district. A metropolitan district provides two or more types of improvements and services which could include: parks and recreation; sanitation sewer and storm water improvements; traffic and safety controls; street improvements; water system improvements; public transportation; television relay and translation systems; fiber optic communications systems; mosquito control; and fire protection.

PROJECT ALIGNMENT WITH TMP GOALS & OBJECTIVES

Each project's overall value was determined through the aggregation of benefits, measured based upon an evaluation criteria that reflects how well a project is expected to achieve the previously-identified goals and objectives. Only the goals and objectives that translated into effective evaluation criteria for capital projects were included (25 out of 31). The remaining 6 objectives are focused on the quality of transportation projects. Those objectives should be considered through some of the City's next steps, such as design standards, and other efforts to ensure that transportation infrastructure meets the City's goals and objective. Table 34 illustrates the evaluation criteria used to score each project, consistent with the City's goals and objectives:

Table 34. Evaluation Criteria

No.	Topic	Evaluation Criteria
1	Quality of Life	Provide people with a sense of personal safety regardless of transportation mode
2	Quality of Life	Provide transportation infrastructure that meets local business needs
3	Community	Provide transportation facilities that are well integrated with land use and character
4	Community	Minimize transportation-related air quality degradation
5	Community	Minimize transportation-related water quality degradation
6	Community	Minimize transportation-related noise impacts
7	Mobility	Provide a reliable transportation system
8	Mobility	Achieve a balanced mode share

Table 34. Evaluation Criteria

No.	Topic	Evaluation Criteria
9	Mobility	Provide high-quality transportation systems people can afford to use
10	Active	Provide a well-connected, direct bicycling network
11	Active	Provide a safe biking environment
12	Active	Provide a well-connected pedestrian network
13	Active	Provide a safe walking environment
14	Active	Provide healthy transportation choices
15	Auto	Provide a well-connected automotive network
16	Auto	Provide for safe automobile travel
17	Auto	Provide a resilient and responsive traffic operations system
18	Auto	Provide an efficient automotive network
19	Auto	Provide a roadway network that allows for excellent emergency response
20	Transit	Connect people effectively to the transit system
21	Transit	Provide an efficient transit system
22	Transit	Provide safe & comfortable transit stops and stations
23	Freight	Provide a reliable freight network
24	Freight	Provide a well-connected freight network
25	Freight	Provide a safe freight network

The scores for the projects are strictly meant to be a guide for decision-makers moving forward. City staff and the Transportation Mobility Board will use the scores as they undertake the effort to prioritize projects and offer recommendations to City Council as they develop the Capital Improvement Program on an annual basis.

Score. The scoring for each evaluation criteria ranged from 0 to 5 points. A score of 5 represents the best possible score and most alignment with a given objective while a score of zero equates to a project having no positive impact on the objective.

Weight. Each criteria score was then multiplied by a criteria-specific weight. The weights applied to the criteria were developed with two goals. First, the weights balance scoring between topics in order to compensate for the fact that some topics relate to more objectives than others. For example, the “Quality of Life” topic is only associated with two scoreable objectives, whereas “Community” is associated with four. The second function of the weighting system is to reflect the understanding that certain objectives may be considered of greater value based on community input or may affect more

travelers. For example, in general projects that improve auto capaCity or operations/safety are given the highest weight, based on the prevalence of auto travel in Littleton. Table 35 shows the maximum possible score for each topic area based on the weighting criteria.

Results. The weighted scores were then summed to produce the "goal & objective alignment score." Table 36 presents the projects ranked from highest value to lowest based on this evaluation criteria scoring method. The far right column illustrates the project value.

Reconfiguring the Santa Fe Drive/Bowles Avenue and Santa Fe Drive/Mineral Avenue intersections to grade-separated interchanges were the top two projects with scores of 429. This was followed by the South Platte River Parkway extension and Access Preservation Area and Bus Rapid Transit along the Broadway corridor.

Table 35. Maximum Possible Score

Project Categories	Maximum Possible Score
Quality of Life	60
Community	80
Mobility	75
Active (Bike & Pedestrian)	150
Auto	250
Transit	135
Freight	60
Total	810

Table 36. Project Ranking

ID A=Auto BP=Bike/ Ped T=Transit	Project Type	Corridor	Intersection or Segment	Description	Cost (Millions of 2019 Dollars)	Goal & Objective Alignment Score
A23	Auto CapaCity	Santa Fe Dr	Bowles Ave	Reconfigure into grade-separated interchange	150.0	429
A24	Auto CapaCity	Santa Fe Dr	Mineral Ave	Reconfigure into grade-separated interchange	75.0	429
A5	Auto CapaCity	Access Preservation Area	Corridor Wide (Excluding ROW)	Maintain and enhance mobility between Santa Fe and South Platte River	8.0	399
A44	Auto CapaCity	South Platte River Pkwy	Corridor Wide (Excluding ROW)	South Platte River Parkway extension	6.0	399
A45	Auto CapaCity	South Platte River Pkwy	Corridor Wide (Excluding ROW)	Connect new South Platte River Parkway extension to Santa Fe Drive	1.5	399
T1	Transit	Broadway	Corridor Wide	BRT	64.0	353
BP86	Active Transportation	City-wide	15.1-mi	Missing sidewalks	2.9	323
BP87	Active Transportation	City-wide	32.5-mi	Narrow sidewalks	3.9	299
A43	Auto CapaCity	Sante Fe Dr	Corridor-Wide	Widening	50.0	289
A2	Auto Operations and Safety	Sante Fe Dr	Bowles Ave	Alternative intersection configuration	15.0	284
A3	Auto Operations and Safety	Sante Fe Dr	Mineral Ave	Alternative intersection configuration, quadrant roadway, or continuous flow intersection	15.0	284
BP31	Active Transportation	Mary Carter Greenway	Bowles Ave	Bridge widening	1.0	268
BP67	Active Transportation	Mary Carter Greenway	Mineral Ave	Bridge widening	1.0	268
BP21	Active Transportation	Broadway	High Line Canal Trail south of	Shared use path	0.2	263

Table 36. Project Ranking

ID A=Auto BP=Bike/ Ped T=Transit	Project Type	Corridor	Intersection or Segment	Description	Cost (Millions of 2019 Dollars)	Goal & Objective Alignment Score
			Arapahoe Rd to Ridge Road			
BP22	Active Transportation	Broadway	Bannock St to Caley Ave	Shared use path	0.1	263
BP23	Active Transportation	Belleview Ave	Irving St to City Limits	Shared use path	1.5	263
BP24	Active Transportation	Mineral Ave	Broadway to E Dry Creek Rd	Shared use path	0.5	263
BP25	Active Transportation	Broadway	Jamison Ave to City Limits	Shared use path	0.5	263
BP80	Active Transportation	Rangeview Dr	Windermere St to Prince St	Shared use path	0.3	263
BP82	Active Transportation	Mineral Ave	Between Santa Fe Dr & Jackass Hill Rd	Shared use path	0.2	263
BP44	Active Transportation	Broadway	High Line Canal Trail (S of Arapahoe Rd)	Grade-separated	3.0	256
BP45	Active Transportation	Mineral Ave	Peninsula Dr/ High Line Canal Trail	Grade-separated	3.0	256
BP46	Active Transportation	Rio Grande St	Slaughterhouse Gulch Trail	Grade-separated	5.0	256
BP47	Active Transportation	Santa Fe Dr	Slaughterhouse Gulch Trail	Grade-separated	6.0	256
BP48	Active Transportation	Santa Fe Dr	Dad Clark Gulch	Grade-separated	6.0	256
BP74	Active Transportation	Broadway	Lee Gulch	Grade-separated	5.0	256
BP85	Active Transportation	Little's Creek Flume Trail Connection	RR Tracks	Trail connection across flume	1.0	256

Table 36. Project Ranking

ID A=Auto BP=Bike/ Ped T=Transit	Project Type	Corridor	Intersection or Segment	Description	Cost (Millions of 2019 Dollars)	Goal & Objective Alignment Score
T5	Transit	Sante Fe Dr	Corridor Wide	Relieve burden on parking via full light rail extension (cost shown)	166.0	255
A39	Auto Operations and Safety	Broadway	Corridor-wide	V2I and ITS	2.0	249
A40	Auto Operations and Safety	Sante Fe Dr	Corridor-Wide	V2I and ITS	1.0	243
BP9	Active Transportation	Belleview Ave	City Limits/ Prospect Rd to Irving St	Protected bike lane	0.3	231
BP10	Active Transportation	Windermere St	City Limits/ Layton Ave to Littleton Blvd	Protected bike lane	0.2	231
BP11	Active Transportation	Windermere St	Littleton Blvd to Ridge Road	Protected bike lane	0.1	231
BP12	Active Transportation	Ridge Rd	Prince St to Broadway	Protected bike lane	0.3	231
BP13	Active Transportation	Alamo Ave	Prince St to Court Pl	Protected bike lane	1.0	231
BP14	Active Transportation	Main St	Prince St to Court Pl	Protected bike lane	>0.1	231
BP15	Active Transportation	Church Ave	Santa Fe Dr to Prince St	Protected bike lane	>0.1	231
BP16	Active Transportation	Federal Blvd	Belleview Ave to Bowles Ave	Protected bike lane	0.3	231
BP17	Active Transportation	Lowell Blvd	Belleview Ave to Bowles Ave	Protected bike lane	0.2	231
BP18	Active Transportation	Prince St	Centennial Dr to Mineral Ave	Protected bike lane	0.7	231
BP19	Active Transportation	Southpark Ln	Mineral Ave to County Line Rd	Protected bike lane	0.2	231
BP20	Active Transportation	Centennial Dr/ Prentice	Federal Blvd to Prince St	Protected bike lane	0.2	231

Table 36. Project Ranking

ID A=Auto BP=Bike/ Ped T=Transit	Project Type	Corridor	Intersection or Segment	Description	Cost (Millions of 2019 Dollars)	Goal & Objective Alignment Score
		Ave/ Progress Ave				
BP73	Active Transportation	Mineral Ave	Jackass Hill Rd to Broadway	Protected bike lane	0.4	231
T3	Transit	Littleton Blvd	Corridor Wide	Circulator Shuttle	TBD	226
T8	Transit	Downtown	Station	Station improvements (rider information, wayfinding, parking lot reconfiguration)	0.1	219
T9	Transit	Mineral Ave/Sante Fe Dr	Station	Station improvements (rider information, wayfinding, parking lot reconfiguration)	0.1	219
T17	Transit	Mineral Ave/Sante Fe Dr	Station	Parking garage (1500 spaces)	37.5	219
A41	Auto CapaCity	County Line Rd	Broadway to University Blvd	Widening	20.0	213
A42	Auto CapaCity	County Line Rd	Santa Fe Dr to Broadway	Widening	20.0	213
A46	Auto CapaCity	Santa Fe Dr	Dad Clark Gulch	Traffic signal	0.3	210
BP7	Active Transportation	Windermere St	Ridge Rd to Rangeview Dr	Buffered bike lane and traffic calming	0.2	205
BP8	Active Transportation	Windermere St/Jamison Ave	Mineral Ave to Broadway	Buffered bike lane and traffic calming	0.3	205
A37	Auto Operations and Safety	Windermere St	Corridor-wide	Traffic calming	2.0	200
A4	Auto Operations and Safety	Ridge Rd	Corridor-wide	Curb and gutter, geometry, intersections	5.0	176
A38	Auto Operations and Safety	Prince St	Corridor-wide	Turn lanes, curb and gutter	10.0	176
A35	Auto Operations and Safety	Sante Fe Dr	Aspen Grove Way	Signal timing and phasing, advanced	0.1	174

Table 36. Project Ranking

ID A=Auto BP=Bike/ Ped T=Transit	Project Type	Corridor	Intersection or Segment	Description	Cost (Millions of 2019 Dollars)	Goal & Objective Alignment Score
				detection and geometry		
A36	Auto Operations and Safety	Sante Fe Dr	Bowles Ave	Signal timing and phasing, advanced detection and geometry	0.1	174
A47	Auto CapaCity	Mineral Ave	Santa Fe to Jackass Hill Rd	Widen to six lanes and reconstruct sidewalks under RR crossings	2.0	174
A28	Auto Operations and Safety	Prince St	Centennial Dr	Roundabout	1.5	168
A34	Auto Operations and Safety	Sante Fe Dr	Prince St	Signal timing and phasing, advanced detection and geometry, NB Left	0.1	168
BP3	Active Transportation	Berry Ave	Blue Sage Dr to Federal Blvd	Bike lane	0.1	159
BP4	Active Transportation	Powers Ave	Delaware St to Broadway	Bike lane	>0.1	159
BP5	Active Transportation	Elati St	Shepperd Ave to High Line Canal	Bike lane	0.3	159
BP6	Active Transportation	Delaware St	Lehow Ave to Powers Ave	Bike lane	0.1	159
BP76	Active Transportation	Bannock St	Powers Ave to Broadway	Bike lane	0.1	159
BP77	Active Transportation	Shepperd Ave	Bannock St to Elati St	Bike lane	>0.1	159
BP78	Active Transportation	Sterne Pkwy	Apache St to Broadway	Bike lane	>0.1	159
BP79	Active Transportation	Tule Lake Dr	Sheridan Blvd/ City Limits to Federal Blvd	Bike lane	0.3	159
A25	Auto Operations and Safety	Littleton Blvd	Main St/ Alamo Ave/ Court Pl/ Bemis St	Roundabout	2.0	156

Table 36. Project Ranking

ID A=Auto BP=Bike/ Ped T=Transit	Project Type	Corridor	Intersection or Segment	Description	Cost (Millions of 2019 Dollars)	Goal & Objective Alignment Score
A26	Auto Operations and Safety	Prentice Ave	Delaware St	Roundabout	0.3	150
A27	Auto Operations and Safety	Prentice Ave	Huron St	Roundabout	0.3	150
A29	Auto Operations and Safety	Ridge Rd	Apache St	Roundabout	1.0	150
A30	Auto Operations and Safety	Ridge Rd	Elati St	Roundabout	1.0	150
A31	Auto Operations and Safety	Ridge Rd	Gallup St	Roundabout	1.0	150
A32	Auto Operations and Safety	Ridge Rd	Prince St	Roundabout	1.0	150
A33	Auto Operations and Safety	Ridge Rd	Windermere St	Roundabout	1.0	150
A1	Auto Operations and Safety	Belleview Ave	Prince St to Lowell Blvd	Access control, median	1.5	144
BP56	Active Transportation	Federal Blvd	Bowles Ave/ Trail Crossing	Raised crossing in channelized right turn lane	0.1	142
BP57	Active Transportation	Prince St	Little's Creek Trail	RRFB/ raised pedestrian crossing	0.2	142
BP58	Active Transportation	Berry Ave	Federal Blvd	Pedestrian signal	0.2	142
BP59	Active Transportation	Bega Park Trail	Alamo Ave	RRFB/ raised pedestrian crossing	0.2	142
BP64	Active Transportation	Bega Park Trail	Main St	RRFB/ raised pedestrian crossing	0.2	142
BP84	Active Transportation	Mineral Ave	Polo Ridge Dr	Pedestrian signal or other improvement	0.1	142
T2	Transit	Broadway	Corridor Wide	Transit speed and reliability improvements	0.4	138

Table 36. Project Ranking

ID A=Auto BP=Bike/ Ped T=Transit	Project Type	Corridor	Intersection or Segment	Description	Cost (Millions of 2019 Dollars)	Goal & Objective Alignment Score
T4	Transit	Littleton Blvd	Corridor Wide	Transit speed and reliability improvements	0.2	138
T6	Transit	Bowles Ave	Corridor	Transit speed and reliability improvements	0.1	138
T7	Transit	Downtown	District	Transit speed and reliability improvements - transit signal priority, queue jumps, or other operational improvements	0.1	138
BP75	Active Transportation	Elati St	Highline Canal	Improve connection	0.1	134
BP83	Active Transportation	Mineral Ave	Wolff St to Polo Ridge Dr	Trail crossing improvements	0.3	134
BP1	Active Transportation	Caley Ave	Prince St to Broadway	Advisory bike lane or bike lane	0.2	129
BP2	Active Transportation	Powers Ave	Court Pl to Delaware St	Advisory bike lane or bike lane	0.1	129
BP81	Active Transportation	Geddes Ave	Windermere St to Elati St	Advisory bike lane or bike lane	0.1	129
A6	Auto Operations and Safety	S Platte Canyon Rd	Mineral Dr	Full movement intersection	0.2	128
T10	Transit	Broadway	Littleton Blvd	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	0.1	127
T11	Transit	Broadway	Arapahoe Rd	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	0.1	127
T12	Transit	Broadway	Mineral Ave	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	0.1	127

Table 36. Project Ranking

ID A=Auto BP=Bike/ Ped T=Transit	Project Type	Corridor	Intersection or Segment	Description	Cost (Millions of 2019 Dollars)	Goal & Objective Alignment Score
T13	Transit	Downtown	Arapahoe Community College	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	0.1	127
T14	Transit	Littleton Blvd	S Windermere St	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	0.1	127
T15	Transit	Littleton Blvd	S Datura St	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	0.1	127
T16	Transit	Littleton Blvd	S Bannock St	Bus stop/mobility hub improvements (amenities, wayfinding, stop connectivity)	0.1	127
BP26	Active Transportation	Broadway	Powers Ave	Bicycle intersection improvements	0.1	124
BP27	Active Transportation	Santa Fe Dr	Prince St	Bicycle intersection improvements	0.5	124
BP28	Active Transportation	Prince St	Alamo Ave	Bicycle intersection improvements	0.1	124
BP29	Active Transportation	Santa Fe Dr	Belleview Ave	Bicycle intersection improvements	0.3	124
BP30	Active Transportation	Lowell Blvd	Berry Ave	Bicycle intersection improvements	0.1	124
BP32	Active Transportation	Middlefield Rd	Bowles Ave	Bicycle intersection improvements	0.1	124
BP33	Active Transportation	Prince St	Caley Ave	Bicycle intersection improvements	0.2	124
BP34	Active Transportation	Bannock St	Littleton Blvd	Bicycle intersection improvements	0.1	124
BP35	Active Transportation	Windermere St	Littleton Blvd	Bicycle intersection improvements	0.1	124

Table 36. Project Ranking

ID A=Auto BP=Bike/ Ped T=Transit	Project Type	Corridor	Intersection or Segment	Description	Cost (Millions of 2019 Dollars)	Goal & Objective Alignment Score
BP36	Active Transportation	Prince St	Main St	Bicycle intersection improvements	0.1	124
BP37	Active Transportation	Jackass Hill Rd/ Long Ave	Mineral Ave	Bicycle intersection improvements	0.1	124
BP38	Active Transportation	Santa Fe Dr	Mineral Ave	Bicycle intersection improvements	1.0	124
BP39	Active Transportation	Apache St/ High Line Canal Trail	Ridge Rd	Bicycle intersection improvements	0.2	124
BP40	Active Transportation	Elati St	Ridge Rd	Bicycle intersection improvements	0.2	124
BP41	Active Transportation	Gallup St	Ridge Rd	Bicycle intersection improvements	0.2	124
BP42	Active Transportation	Prince St	Ridge Rd	Bicycle intersection improvements	0.2	124
BP43	Active Transportation	Windermere St	Ridge Rd	Bicycle intersection improvements	0.2	124
BP51	Active Transportation	Federal Blvd	Belleview Ave	Protected bicycle intersection	0.8	124
BP52	Active Transportation	Lowell Blvd	Belleview Ave	Protected bicycle intersection	0.8	124
BP53	Active Transportation	Windermere St	Belleview Ave	Protected bicycle intersection	0.8	124
BP54	Active Transportation	Southpark Ln	Mineral Ave	Protected bicycle intersection	0.8	124
BP55	Active Transportation	Windermere St	Powers Ave	Protected bicycle intersection	0.8	124
A22	Auto Operations and Safety	Mineral Ave	Jackass Hill Rd	Intersection operation and safety improvements; pedestrian and bicycle focus	1.0	120

Table 36. Project Ranking

ID A=Auto BP=Bike/ Ped T=Transit	Project Type	Corridor	Intersection or Segment	Description	Cost (Millions of 2019 Dollars)	Goal & Objective Alignment Score
BP68	Active Transportation	Broadway	Caley Ave/ High Line Canal Trail	Signal phasing changes	>0.1	115
BP69	Active Transportation	Platte Canyon Rd	Mineral Ave/ Ken Caryl Rd	Signal phasing changes	>0.1	115
BP70	Active Transportation	Broadway	Ridge Rd/ High Line Canal Trail	Signal phasing changes	>0.1	115
A7	Auto Operations and Safety	Bowles Ave	Federal Blvd	Intersection operation and safety improvements	0.5	112
A8	Auto Operations and Safety	Belleview Ave	Federal Blvd	Intersection operation and safety improvements	1.0	112
A9	Auto Operations and Safety	Belleview Ave	Prince St	Intersection operation and safety improvements	0.5	112
A10	Auto Operations and Safety	Belleview Ave	Santa Fe Dr Interchange	Intersection operation and safety improvements	1.0	112
A11	Auto Operations and Safety	Bowles Ave	Federal Blvd	Intersection operation and safety improvements	4.3	112
A12	Auto Operations and Safety	Bowles Ave	Platte Canyon Rd/ Lowell Blvd	Intersection operation and safety improvements	1.0	112
A13	Auto Operations and Safety	Broadway	Arapahoe Rd	Intersection operation and safety improvements	1.0	112
A14	Auto Operations and Safety	Broadway	Dry Creek Rd	Intersection operation and safety improvements	0.5	112
A16	Auto Operations and Safety	Broadway	Jamison Ave	Intersection operation and safety improvements	0.5	112
A17	Auto Operations and Safety	Broadway	Littleton Blvd	Intersection operation and safety improvements	1.5	112

Table 36. Project Ranking

ID A=Auto BP=Bike/ Ped T=Transit	Project Type	Corridor	Intersection or Segment	Description	Cost (Millions of 2019 Dollars)	Goal & Objective Alignment Score
A18	Auto Operations and Safety	Broadway	Mineral Ave	Intersection operation and safety improvements	1.0	112
A21	Auto Operations and Safety	Prince St	Church Ave	Intersection operation and safety improvements	0.5	112
A20	Auto Operations and Safety	Mineral Ave	Platte Canyon Rd	Intersection operation and safety improvements	0.8	106
A19	Auto Operations and Safety	Lowell Blvd	Berry Ave	Intersection operation and safety improvements	1.0	100

ADDITIONAL PLANNING

As outlined in the modal chapters previously, in addition to capital investments, the City should conduct the following plans in the near future:

1. Additional planning for major corridors identified through this process as being key to achieving the City's goals for transportation. These corridors have been identified as those that should be improved for a variety of modes, and a study for each should be conducted to determine how best to address the needs of all users in these key areas of the City, and additional public and stakeholder outreach is required to make sure that the projects proposed are consistent with the local residents' and businesses' needs. They include:
    a. Santa Fe Drive—the US 85 PEL is expected to kick off in 2019 or 2020, in coordination with CDOT and other regional partners. Littleton should take a leadership role in that study.
    b. Littleton Boulevard—Littleton Boulevard represents a prime opportunity to re-envision how people move through a historic part of the City. A multimodal corridor study should be completed that identifies opportunities for enhancing the pedestrian and transit user experience along this corridor.
    c. Broadway—partnering with Centennial, Englewood, Douglas County, Arapahoe County, and RTD
    d. Prince Street
    e. Windermere Street
    f. Ridge Road
    g. Bowles Avenue—partnering with Jefferson County
    h. Belleview Avenue—building on past planning including the recently completed framework study
2. Additional planning for the intersections identified as having safety and operational issues. These should be evaluated in detail to identify cost-effective and implementable solutions.

3. Downtown Mobility Plan to determine how the City can address the parking and circulation issues in and around downtown.
4. Create a bicycle wayfinding program that includes region-wide and City-specific system maps posted in key locations, as well as comprehensive, easy-to-understand signing.
5. Consider opportunities for stop consolidation (in partnership with RTD) to improve transit speeds and maximize investments in amenities.
6. Consider circulator shuttle service east from downtown along Littleton Boulevard corridor. Route would connect downtown with Littleton High School along a future mixed-use corridor, serving vulnerable populations north of the roadway and population centers throughout. Vehicles could be City-owned and operated, managed by RTD, or provided through partnerships with private companies. Autonomous vehicle technology has been applied in similar settings in several cities across the U.S.[19]

[19] https://www.nlc.org/sites/default/files/2018-10/AV%20MAG%20Web.pdf

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