Appendix A

State of Bicycling in Colorado Springs Report

State of Bicycling in
Colorado Springs

February 2017

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Introduction

> *Colorado Springs will continue to promote bicycle transportation because we have a large number of residents and visitors who ride bicycles for both recreational and transportation purposes. We believe the city's attraction to cyclists will be a growing part of our tourism economy going forward and providing multi-modal transportation options will make our city more attractive to a vibrant workforce.* – Mayor John Suthers

Colorado Springs has an impressive number of elements of an ideal bicycling environment: year-round bicycling weather, striking mountain views, a network of urban and soft-surface trails, extensive singletrack options, a large number of bicycling-related organizations and businesses including USA Cycling, and a supportive city government. When the League of American Bicyclists (LAB) designated Colorado Springs as a Silver Bicycle Friendly Community in 2012, they noted the strong commitment to bicycling.

Even with these strengths, the second-largest city in Colorado sees a very small percentage of people using bicycles for transportation. While there are robust bicycle programs and organizations in the city, they are primarily focused on children and those who already bike instead of the broader population. Most of the city streets are oriented towards automobiles and many streets have high speed limits. Community members engaged in this project have said that they desire safe, connected, and fun bicycling. A number of community organizations have passionately expressed an interest in enhancing the city's bicycling culture and environment. And importantly, the City has committed to becoming a Gold-Level Bicycle Friendly Community, which would mean improving bicycle engineering, education, encouragement programs, enforcement, and internal evaluation and ultimately, increasing bicycle ridership.

To address these realities and desires, Colorado Springs is currently building on its strengths, previous planning work, and community momentum to develop the 2017 Bike Master Plan (Plan).

The Bike Master Plan envisions a healthy and vibrant Colorado Springs where bicycling is one of many transportation options for a large portion of the population, and where a well-connected and well-maintained network of urban trails, singletrack, and on-street infrastructure offers a bicycling experience for present and future generations that is safe, convenient, and fun for getting around, getting in shape, or getting away.

Planning for the Future

The vision for the Bike Master Plan includes making bicycling a viable transportation option for a broad segment of the population, and serving existing and future generations. While robust data on existing bicycle volumes or mode share is not currently available, we can presume from U.S. Census data that utilitarian bicycling activity in the city is low (see Bicycle Ridership and Safety section). This is not unique to Colorado Springs—it is a reality across the U.S.

Low ridership is related to many factors, but a large one is rider comfort and safety. Bicycle planning professionals accept that there is a large percentage of the American population that is interested in but does not currently bicycle because they feel unsafe. A number of studies have shown that a bicyclist's perception of their personal safety riding on a street is greatly influenced by their proximity to and interaction with motorized traffic.

Studies have shown that the majority of people in the U.S.—approximately 60 percent—have little tolerance for interacting with motor vehicle traffic unless volumes and speeds are very low. This group of riders is referred to as "Interested but Concerned," reflecting their interest in biking or biking more, as well as concerns about safety and comfort when interacting with motor vehicle traffic. Planning and designing for the Interested but Concerned rider, which is an intent of this Plan, results in a safe and comfortable bicycle network for everyone. Planning for this segment of the population is Colorado Springs's best chance at increasing bicycle ridership. For that reason, this bicycle planning approach will be applied to the Bike Master Plan.

lower stress tolerance:
- Children
- Families
- Older Adults

"Interested but Concerned" riders

higher stress tolerance:
- Confident Riders
- Competitive Riders
- Adults

"Strong and Fearless" riders

Report Organization

One of the first steps of the Bike Master Plan is to establish a baseline understanding of the current state of bicycling in Colorado Springs, which will directly inform recommendations for the Plan. This report includes information, data, and analysis about the following:

- *Bicycle Culture*: The organizations and programs that educate and encourage Colorado Springs residents to bicycle safely and advocate for bicycling in the city;
- *Related Plans and Policies*: The planning and policy framework that supports development of bicycling infrastructure as a priority for the city;
- *Bicycle Ridership and Safety*: Current levels of bicycling in the City and prevalent safety concerns; and
- *Bicycle Network*: The existing infrastructure for bicycling in Colorado Springs, including trails and on-street facilities.

Bicycle Culture

The enthusiasm for bicycling in Colorado Springs is evident in the number of organizations and programs that encourage bicycling in the city and provide educational opportunities for all residents. While historically the primary focus for bike-related programming has been on bicycling for recreation, it is increasingly seen as an important mode of transportation and a worthwhile activity for all Colorado Springs residents, particularly those in underserved communities. The strength of the existing bike culture lays a strong foundation for future expansion of bicycling as a mode of transportation in Colorado Springs. In this section of the report, key organizations and activities related to bicycling in Colorado Springs are summarized.

Organizations that Promote and Advocate for Bicycling

There are a number of bicycling-related organizations in Colorado Springs. The discussion that follows includes a sample of the ones that are most relevant to the Bike Master Plan.

Active Transportation Advisory Committee

The Active Transportation Advisory Committee (ATAC) meets once per month and advises the City on bicycling walking and transit issues in Colorado Springs. More specifically, its purpose is to:[1]

- Act as an advisory committee to the Citizens' Transportation Advisory Board (CTAB),
- Review any and all active transportation issues that are brought before CTAB and make recommendations to CTAB on the resolution of those issues,

[1] https://coloradosprings.gov/sites/default/files/public_works/Transportation/atac/atac_resolution_final.pdf

- Provide input to CTAB on prioritizing bicycle, pedestrian, and other active transportation projects, and
- Provide advice when requested by CTAB on active transportation matters regarding the City's Intermodal Transportation Plan.

Kids on Bikes

The *Kids on Bikes* organization provides a wide range of bicycle encouragement programs geared toward under-served children and families in Colorado Springs. Founded and headquartered in Colorado Springs, *Kids on Bikes* is dedicated to empowering children to lead healthy and active lives through bicycling. *Kids on Bikes* has partnered with city government and has recently opened a community bicycling center, called the Pedal Station, as a place to engage families through educational classes and events as well as a repair clinic and work station.[2] Some of the other key activities organized by *Kids on Bikes* are discussed in the Programs and Events section of this report. They are focused on encouragement programs and do not advocate for particular positions or projects.

Bike Colorado Springs

Bike Colorado Springs (BCS), the city's first bicycle transportation advocacy organization founded in 2015, promotes bicycling as a way to develop a more vibrant community. The organization takes an inclusive approach to bicycling and advocates for a connected network of bicycle facilities. BCS collaborates closely with other advocacy groups to generate interest and support for bicycling in the city. For example, in November 2016 BCS launched the first event of a quarterly series to celebrate bicycling and bring together advocates in an informal setting.

Colorado Springs Cycling Club

Colorado Springs Cycling Club (CSCC) promotes bicycling for all ages and abilities. The club organizes bike rides catering to a range of skill levels and purposes, including fitness rides and social rides suitable for families. While these rides are CSCC's core activity, the club also seeks to educate its members and others on the rules of the road and serve as an advocate for bicycling in the region. Several of its members are League Cycling Instructors (LCIs) and there are plans to increase the number of classes taught through the club's Educational Team. CSCC collaborates with the other prominent advocacy organizations in the region to create a stronger voice for bicycling.[3]

Southern Colorado Velo

Southern Colorado Velo is another bicycling club based in Colorado Springs that promotes bicycling for recreation and fun. Although the organization is focused on cycling as sport, it supports the broader goal of increasing bicycling in Colorado Springs for all purposes.

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[2] http://kidsonbikes.net/pedal-station/
[3] http://www.bikesprings.org/v_newsletters/article_68514775.htm

UpaDowna

UpaDowna promotes bicycling through its weekly downtown PedalParty.[4] These family-friendly cruiser rides are open to all ages and abilities and can serve as a low-stress introduction to bicycling for people who are interested, but need some encouragement and support. Loaner bicycles are available for people who do not have their own.

Bike Clinic Too

Bike Clinic Too provides refurbished bikes for homeless people and others in need in Colorado Springs. Bikes are donated to the organization and the Clinic's volunteers make any needed fixes before giving away the bike. Ongoing repair is also provided by Bike Clinic Too volunteers.

Bob Telmosse Foundation

Every year, the Bob Telmosse Foundation organizes a Bike Drive to donate new or used bikes to children during the holiday season in Colorado Springs. In 2016, over 1,000 bikes were given away.

Programs and Events

The non-engineering elements of a bicycle friendly community are typically broken down into four "E's": encouragement, education, enforcement, and evaluation programs and activities. The League of American Bicyclists (LAB) defines the non-engineering E's as follows:

- Encouragement: Creates a strong bike culture that welcomes and celebrates bicycling.
- Education: Gives people of all ages and ability levels the skills and confidence to ride.
- Enforcement: Ensures safe roads for all users.
- Evaluation and Planning: Plans for bicycling as a safe and viable transportation option.

These types of programs are run by both the City and the many key community groups previously discussed.

Education and Encouragement

Education and encouragement are essential to creating and sustaining a bike culture. Education efforts are often targeted toward school children as they are eager to learn and early instruction allows them to develop biking as a healthy, lifelong habit. Education is also needed for adults who may be interested in developing more advanced skills or who stopped riding for a period of time and wish to refresh their skills. In addition to bicyclists, motorists can benefit from education about bicycle laws and how to safely interact with bicyclists.

Encouragement activities build on education efforts and often include an educational component, but are more focused on generating enthusiasm and excitement for bicycling. Encouragement-related

[4] http://www.upadowna.org/programs/the-pedal-party/

events often include a social element, such as a community bike ride, and are particularly effective at reaching new bicyclists, or those who have not ridden in years or even decades.

Bicycle Skills Education

There are a wide range of opportunities in Colorado Springs for youth and adults to learn how to ride a bike or to improve their bicycling skills. For children, learn-to-ride classes, bike rodeos, youth bike clubs, bicycle-oriented summer camps, and after-school programming are provided. These events are offered by a variety of agencies and groups. For example, the Schriever Air Force Base Airmen have helped Ellicott Elementary School with their annual bike rodeo for fourth graders each year since 2007.[5] Additionally, the *Kids on Bikes* organization offers bicycle safety classes for elementary school aged children, teaching them to safely cross busy streets and of the importance of helmets, among other topics.

For beginning or experienced adult bicycle riders, in-depth skills training classes based on curriculum developed by the League of American Bicyclists' are taught. There are currently 11 League Cycling Instructors (LCIs) who have undergone the specialized training in bicycle education needed to teach these classes. The classes teach participants how to safely ride in a variety of circumstances, with a particular focus on interacting with traffic. Basic bicycle maintenance skills are also taught.

Mountain Metro Transit, the primary public transit agency in Colorado Springs, has developed a video to teach bicyclists how to load and unload their bike on public transit buses.[6] Bicyclists can practice mounting their bike on a bus bike rack at various community events.

Safe Routes to School and Other Youth Bicycling Programs

The City of Colorado Springs and schools within the city have actively participated in the Safe Routes to School (SRTS) program since its inception. Most of the SRTS projects implemented over the past 10 years have focused on infrastructure improvements. However, in 2015, Colorado Springs School District 11 received $58,000 to implement non-infrastructure SRTS programs at Steele and Columbia Elementary Schools. To date, SRTS efforts have focused on elementary schools and to some extent, high schools, but not on middle schools.

In addition to efforts from the City and schools, *Kids on Bikes* has developed several programs and events to encourage bicycling among Colorado Springs youth, including:[7]

- *Bike Libraries*: Bike centers with bikes, tools and parts set up in conjunction with community centers and elementary schools throughout Colorado Springs that can be used as a bike shop, rental program, repair station, etc., depending on the needs at each location.
- *Popsicle Rides*: Weekly family rides on local trails to promote healthy family fun.

[5] https://csmng.com/2013/05/22/schriever-airmen-lend-helping-hand-in-ellicott-bike-rodeo/
[6] https://coloradosprings.gov/mountain-metro/page/bike-n-bus-program
[7] http://kidsonbikes.net/wp-content/uploads/Annual-Report.2015.pdf

- *Let's Pedal*: A 10 week earn-a-bike program that focuses on teaching bike safety and maintenance skills to students in low-income neighborhoods who are in need of a bike.
- *Great Bicycle Carnival*: Annual event that advocates and encourages families to bike.
- *Mountain Bike Camps*: Summer camps for kids aged six through twelve to practice mountain biking skills.
- *Youth Education*: *Kids on Bikes* partners with local groups to teach bike safety through hands on bike rodeos and classroom presentations.
- *Family Cycling Seminars*: Educating families on safe riding habits with topics ranging from active family transportation to cargo bikes and safely hauling kids.

Bike Month

Colorado Springs celebrates Bike Month in June, along with other cities in Colorado. As part of the celebration, Bike to Work Day events are hosted by the City and supported by businesses, community organizations, and advocacy groups. In 2016, 12 breakfast stations were established at YMCAs and city parks to support commuters along their routes. Over 800 participants were recorded at these locations. Several local businesses also offered incentives to bicyclists on Bike to Work Day and a Mayor's Ride was held to increase interest and participation.[8]

In addition to Bike to Work Day events, a variety of bike promotion activities occur throughout June, including:

- Family bike rides
- Recreational rides and bike races
- Planned bike trail maintenance days (organized by Medicine Wheel Trail Advocates)

Colorado Springs Bicycle Summit

In June 2016, the first Colorado Springs Bicycle Summit was held. The Summit was a collaborative effort involving many organizations and individuals, who articulated the following goals for the event:[9]

- To expand education on what is currently happening and what is coming in the Springs and Southern Colorado around bikes.
- To broaden our base of bicycling advocates.
- To sow the seeds of future summits in coming years.
- To demonstrate to the powers that be the broad base of support.
- To create, contribute and capture a vision of cycling by seeing the possibilities that already exist outside of our city.

The case for pursuing Gold Status from the League of American Bicyclists' Bicycle Friendly Community program was also made at the Summit and continues to be a goal for the community.

[8] https://coloradosprings.gov/mountain-metro/article/news/riders-converge-breakfast-locations-bike-work-day
[9] http://www.bikesprings.org/v_newsletters/newsletter_4347555.htm

Bike Lockers and Bike Valet

Mountain Metro Transit offers bike lockers and a bike valet service for events in Colorado Springs. Lockers can be leased by the public at a rate of $30 per six months at three locations in the city, including at the Tejon and Woodmen Park-N-Ride locations.[10] The bike valet service provides bike racks and other setup equipment free of charge, but requires event organizers to secure and staff the bicycle parking area.[11]

Bike Map and City Website

The City of Colorado Springs has developed an online bike map which includes an inventory of on-street bicycle facilities, off-street trails, and bike routes. The map allows users to develop prints of facilities within their area of interest, but does not offer route finding.[12] Although bike racks are not shown on the map, the City has listed on its website the locations of bike racks installed recently through collaboration with the Downtown Partnership. These racks include a QR code, which enables smartphone users to access the online bike map, bike laws, and other safety information.

Through its website, the City of Colorado Springs promotes bicycle safety messages and provides information about projects and new engineering treatments, such as shared lane markings. Several videos from the LAB can be viewed, along with safety tips and links to external resources.

Adaptive Bicycling Programs

One unique aspect of Colorado Springs is its adaptive bicycling programs.

Therapeutic Recreation Program

Started in 2008, the Adaptive Cycling Program of the Therapeutic Recreation Program (TRP) has become one of the most popular adaptive sports offerings from the City's Parks systems. Regular programming runs from April through November and is designed to offer bicycling opportunities for individuals with disabilities, allowing them to enjoy the recreational aspect of bicycling. The program has allowed many riders to gain the experience and skills to become confident bicyclists and to own their own recumbent trike or hand cycle. The program is part of the Paralympic Sports Club program, having a direct Olympic sporting counterpart.

U.S. Paralympics

U.S. Paralympics hosts bicycling clinics in Colorado Springs for athletes from around the country, both in road and track racing disciplines.

Wounded Warrior Project

The Wounded Warrior Project (WWP) has a Colorado Springs office that owns a fleet of bicycles for veterans. The TRP partners with the WWP on numerous events including public events for all types of

[10] https://coloradosprings.gov/mountain-metro/page/bike-lockers
[11] https://coloradosprings.gov/mountain-metro/page/bike-valet
[12] http://coloradosprings.maps.arcgis.com/apps/MapTools/index.html?appid=7f65384de8e54fc4a80f2a7732c686e6

bicycling abilities. Additionally, Colorado Springs is a permanent city on their annual Warrior Ride multi-day ride series.

Fort Carson Warrior Transition Battalion

The Warrior Transition Battalion (WTB) at Fort Carson has a fleet of adaptive (recumbent trike and hand cycles) along with upright bikes for soldiers stationed at the WTB. They have partnered with the TRP program throughout the years to connect military personnel with civilian events taking place off post, creating a link between the communities and providing a wider array of opportunities for their members.

Enforcement

Enforcement of traffic laws is a critical strategy for achieving a more bicycle friendly community. Bicyclists' actions on roadways are subject to the same traffic laws as other vehicles in Colorado. In general, Colorado laws pertaining to bicyclists are considered to be among the friendliest to bicyclists in the country. For instance, a bicyclist's ability to ride in the center of a travel lane to avoid hazards in the roadway is spelled out in code, as is the requirement for any vehicle to pass at least three feet from a bicyclist.

Traffic laws in Colorado Springs are enforced by the Colorado Springs Police Department (CSPD), El Paso County Sheriff's Office, and Colorado State Patrol. The majority of traffic enforcement within the city limits is handled by CSPD officers. The Traffic Safety Enforcement division of the CSPD was recently disbanded. The CSPD works with the bicycling community as well as City engineering and planning staff to identify and address enforcement-related concerns related to bicycling. Law enforcement agencies contribute to education efforts and assist with coordination of bicycle events and rides.

Residents can request focused enforcement from the CSPD to respond to traffic safety concerns such as speeding. Additionally, mobile speed trailers are available for use on neighborhood streets on a rotating, first come-first serve basis.[13]

Through coordination with CSPD as part of this project, the following was learned:

- Though some CSPD officers perform their jobs on a bicycle, they do not receive training regarding how to enforce bicycle traffic laws.
- Anecdotal evidence suggests public misconceptions about bicycle-related traffic laws and an underreporting of bicycle crashes.
- The majority of the biking in the City is downtown and the downtown enforcement team is primarily on foot, meaning that they can engage some bicyclists in conversation.
- Resource constraints mean that officers are most focused on vehicular traffic and emergency response.

[13] https://coloradosprings.gov/public-works/page/traffic-calming-alternatives

Bicycle Culture Needs

While there are a number of bicycle-related encouragement, education, and enforcement programs and activities in Colorado Springs, there are two specific areas of need that relate to this Bike Master Plan:

- Education for middle school students. Education or encouragement programs that focus on middle school students, who cannot yet drive, would help to create the next generation of bicyclists and citizens who understand the needs of various users of the street.
- Programs for the Interested but Concerned. Similarly, more education or enforcement programs that target adults who are not confident biking on streets (the Interested but Concerned) could go a long way toward making bicycling accessible to all. These could take the form of Open Streets events or safe biking classes, among other options. While some of these events are already happening, there may be a need to better coordinate/organize them for the average city resident.

Related Plans and Bicycle Policies

The state, region, and City have adopted numerous plans and policies that have helped create and support the bicycling environment in Colorado Springs. This section discusses the most relevant existing plans and policies that will inform the 2017 Plan. Other plans—such as those from El Paso County or geographically smaller-scale City plans, such as the West Side Avenue Action Plan—will be considered when developing Plan recommendations.

State and Regional Plans

Statewide Bicycle and Pedestrian Plan

The Colorado Department of Transportation's (CDOT's) 2012 *Statewide Bicycle and Pedestrian Plan* outlines an approach to deciding which bicycle and pedestrian projects to fund. The plan focuses on facilities and programs under CDOT's jurisdiction, and therefore, does not make specific recommendations within Colorado Springs. CDOT is currently conducting Phase II of the statewide bicycle and pedestrian planning process. This phase has many objectives including the development of system-level performance measures and integrating bicycle and pedestrian modes into the Statewide Transportation Plan.

Moving Forward 2040 Regional Transportation Plan

The Pikes Peak Area Council of Governments (PPACG), which includes the City of Colorado Springs, updated its regional transportation plan in 2015. The *Moving Forward 2040 Regional Transportation Plan*[14] includes a strategy for how to use anticipated public transportation funds over the next 20 years.

[14] *Moving Forward 2040 Regional Transportation Plan*. Pikes Peak Area Council of Governments (PPACG). 2015. http://www.ppacg.org/library/transportation/2040-moving-forward-update.

Through extensive analysis, planning, and engagement with regional stakeholders, PPACG developed a fiscally-constrained list of transportation projects based on need and the availability of funding. In general, roadway improvement projects identified in the fiscally-constrained plan include widening and striping to accommodate on-street bike lanes. However, the fiscally-constrained project list also allocates over four million dollars to create new or enhanced on-street bicycle facilities to enhance connectivity between on- and off-street bicycle facilities and to enhance projects within the region. These projects stem from the City's bicycle and trail master plans and other related plans or policies.

PPACG Regional Nonmotorized Plan

The *PPACG Regional Nonmotorized Plan*[15] was completed in 2015 and contains a thorough assessment of on-street bicycling conditions in the region. It is incorporated into the *Moving Forward 2040 Regional Transportation Plan* as Appendix F. The inventory conducted for the plan revealed a fragmented network of bike lanes with differing design standards, no protected on-street bike lanes, few bicycle treatments at intersections, and a lack of connections between the on-street and off-street networks.

The *Regional Nonmotorized Plan* identified about 70 regional improvement corridors and evaluated these corridors based on mobility, network connectivity, livability and deliverability to identify priority corridors that would create a complete network for the region. The effort identified six priority corridors that fall completely within the City of Colorado Springs and two that include Colorado Springs and adjacent areas; this is out of 11 total priority corridors. These corridors and associated recommendations for Colorado Springs are listed in Table 1.

[15] *PPACG Regional Nonmotorized Plan*. Pikes Peak Area Council of Governments (PPACG). 2015. http://www.ppacg.org/library/transportation/2040-moving-forward-update/appendixes/57-appendix-f-regional-nonmotorized-plan/file.

Table 1. PPACG Regional Nonmotorized Plan Corridors within Colorado Springs

Corridor Name	Description	Improvements Recommended within Colorado Springs
Route 18: Manitou Springs to Downtown Colorado Springs via Old Colorado City	The route uses the Fountain Creek alignment and the Creek Walk alignment and falls within the jurisdictions of the City of Colorado Springs, the City of Manitou Springs, and El Paso County.	**12' Multiuse Trail:** • Connection between the Cimarron / Sierra Madre intersection to the Pikes Peak Greenway. • From the Pikes Peak Greenway at the Cimarron / I-25 interchange, following the creek, to the Colorado / Columbia intersection. • Enhanced Crossings: Midland Trail crossing under Colorado Ave. at the Columbia intersection, 21st Street, 8th Street, and crossing to the existing Midland Trail.
Route 12: Town of Falcon to the Pikes Peak Greenway via Rock Island Trail	Follows the Rock Island Trail alignment. This route falls within the jurisdictions of El Paso County and the City of Colorado Springs.	**12' Multiuse Trail:** • Segment between the Rock Island Trail, between Constitution Avenue and the Sand Creek Trail. • End of the Rock Island Trail to the Pikes Peak Greenway. • Enhanced Crossings: Constitution at the Rock Island Trail, Peterson Road, and Piros; Rock Island Trail crossings at Powers, Murray, Chelton, Circle, and Union.
Route 23: Peterson AFB to Downtown Colorado Springs	Runs from downtown Colorado Springs (at the Pikes Peak Greenway / Cimarron intersection) to Peterson AFB (at the Stewart / Goodfellow intersection). The route uses Airport, Prospect Lake Drive and Costilla.	**12' Multiuse Trail:** • Connection between Cimarron Street / Sierra Madre Street intersection and the Pikes Peak Greenway. • Enhanced Crossings: Costilla Street intersections with Cascade, Tejon, Nevada, Weber, Watsatch, Hancock, Eastlake Blvd./ Union Blvd.; Airport Road intersections with Eastlake, Printers Parkway, Circle, Chelton, Academy, Murray, Lydia Grove, Powers. **Bike Lanes:** • On Airport Road and Stewart Avenue as needed. • Along Prospect Lake Drive, Sierra Madre.
Route 29: Air Force Academy to US Highway 85 / 87 via Academy Boulevard	Runs from the US Air Force Academy (Park Drive / South Gate intersection) to the Academy / Hancock intersection, following Academy Boulevard.	**12 'Multiuse Trail:** • Along entire Academy Boulevard corridor. • Enhanced Crossings: All intersections along corridor.
Route 41: Fort Carson to Downtown Colorado Springs	Runs from Fort Carson to downtown Colorado Springs and follows State Highway 115.	**12' Multiuse Trail** • Along SH 115 from Gate 1 to Cheyenne Blvd. • Enhanced Crossings: SH 115 intersections with Nelson, O'Connell, Academy, Star Range, Cheyenne Mountain, Lake, Cheyenne Road; Cascade Avenue intersections with Cheyenne Road, Ramona; Tejon Street intersections with Brookside, Motor Way, I-25, Las Vegas, Mill, Cimarron, Costilla **Bike Lanes:** • SH 115 / Cheyenne Road intersection to Costilla / Tejon intersection • SH 115 / Cheyenne Blvd., intersection to SH 115 / Cheyenne Road intersection
Route 43: Evans Avenue / Cheyenne Boulevard intersection to Pikes Peak Greenway	Runs from Evans / Cheyenne Blvd., intersection to the Pikes Peak Greenway. The route follows Cheyenne Blvd. and Tejon St.	• Enhanced Crossings: Cheyenne Blvd. intersections with Cresta, 8th Street, and Cascade; Tejon Street intersections with Brookside and Motor Way
Route 44: Front Range Trail	A statewide north to south trail paralleling I-25 through El Paso County[1]	• Better connections with the on-street system • Underpass at Mesa and Polk
Route 71: Garden of the Gods Road to Union Boulevard	Runs from Garden of the Gods Road and 30th Street to Academy and N. Carefree Circle and falls within the jurisdiction of the City of Colorado Springs.	**12'Multiuse Trail:** • From Garden of the Gods / Mark Dabling intersection to Austin Bluffs / Brenner intersection. • Enhanced Crossings: Garden of the Gods intersections along corridor; Austin Bluffs intersections with Mallow, Staton, UCCS, Meadow. **Bike Lanes:** • American Drive from Austin Bluffs to Van Teylingen • Van Teylingen from American to North Carefree • North Carefree from Van Teylingen to Academy

City of Colorado Springs Plans

Comprehensive Plan

The *Colorado Springs Comprehensive Plan*[16] was developed in 2001 and includes bicycle mobility and parking in several of its policies and strategies for achieving a balanced transportation system. An update to the Comprehensive Plan is currently in progress and is expected to be complete in spring 2018. The themes and priorities for the new Comprehensive Plan (*Plan COS*) have not yet been identified, but early input suggests that creating a more connected, multimodal transportation system and improving infrastructure are likely to be important emphases of the plan.

Infill Comprehensive Plan Supplement

The intent of the 2016 *Infill Comprehensive Plan Supplement*[17] is to support and augment the 2001 *Comprehensive Plan* and to also recommend new actions to promote infill and redevelopment throughout the mature areas of the city. Although this document is not directly applicable to the development of the 2017 BMP, it does reinforce the City's commitment to a multimodal transportation system, including a complete streets approach and a general focus on non-motorized transportation and trail connectivity. One of the recommendations includes modifying "the Engineering Criteria Manual to be more conducive to infill-related density and multimodal access and deemphasize congestion concerns."

Park System Master Plan

The *Park System Master Plan* was completed in 2014 by the Parks, Recreational & Cultural Services Department. Among the top ten issues for the plan to address were trail system gaps, something that a Bike Master Plan could help address through on-street connections. The plan found that less than 50 miles of urban trails would need to be added in order to complete the four key connecting routes in the trail network. These planned trails will be considered in the 2017 Plan.

Experience Downtown Colorado Springs Master Plan

The recently completed *Experience Downtown Colorado Springs Master Plan* establishes a bold vision and plan for the future of the downtown. Several of the goals and action steps identified in the plan identify better bicycling conditions as a high priority.

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[16] *Comprehensive Plan*. City of Colorado Springs (Colorado). 2001. https://coloradosprings.gov/communications/page/2001-comprehensive-plan.

[17] *Infill Comprehensive Plan Supplement*. City of Colorado Springs (Colorado). 2016. https://coloradosprings.gov/sites/default/files/infill_supplement-31mar2016.pdf.

Key findings of the plan related to bicycling include:

- All downtown streets must have safe and comfortable access for biking.
- The Legacy Loop should be completed and connected to downtown through urban and neighborhood greenways.
- Wide streets in the downtown present a unique opportunity for Colorado Springs to reallocate roadway space to non-vehicular uses.
- Streets should be designed for slower speeds and a variety of uses.
- Implementation of Phase 1 of the Colorado Springs bike share system, focused on the downtown area, would provide a transportation benefit while also improving the attractiveness of the downtown for tourists and workers.
- A systematic approach to bike parking is needed to provide easy, safe, and predictable access.

The plan outlines a downtown streets typology with the following street categories:

- Signature streets, pedestrian priority streets, and downtown alleys;
- Urban and neighborhood greenways;
- Residential garden streets and special purpose streets;
- Major transportation streets; and
- Other downtown streets.

While each of these groups of streets would be expected to accommodate bicyclists through varying means, particular emphasis is placed on urban and neighborhood greenways, which are seen as essential for providing safe and comfortable bicycle access within and through the downtown. These greenways are described as including "sensible reductions in the width and number of car and parking lanes," bike lanes, and/or "designated bicycling and pedestrian facilities." Figure 4.5 of the Plan includes a proposed urban and neighborhood greenways network for the downtown.

Colorado Springs Bike Share Business and Implementation Plan

In 2015, a study was undertaken to develop a business and implementation plan for a bike share system in Colorado Springs. The study determined that the best opportunities for implementing such a system are in the downtown and immediately surrounding areas. Lack of a safe and comfortable bicycle network was noted as an impediment to the success of a potential bike sharing system, especially in low-income areas. The *Experience Downtown Master Plan* reiterates the importance of bike sharing for the success of the downtown. The business community in Colorado Springs is planning for a 2018 launch of the bike share system.

City of Colorado Springs Policies

Complete Streets Ordinance

In December 2005, the Colorado Springs City Council adopted Ordinance No. 05-196 to incorporate recommendations related to complete streets and roundabouts into the 2001 Intermodal Transportation Plan. The Ordinance specifically refers to and incorporates by reference a staff report provided to the City Plan Commission. That report describes how complete streets and roundabouts fulfill several policies and strategies of the City's Comprehensive Plan, as well as goals and objectives of the ITP. With regard to complete streets, the following amendment was adopted into the Roadway section of the ITP, based on staff recommendations:

"Construct complete streets designed to accommodate all users. In all new roadway projects or major reconstruction projects, accommodate travel by pedestrians, bicyclists, and transit users, except where pedestrians and bicyclists are prohibited by law from using a given facility or where construction of bikeways or walkways would be unsafe or impractical. Such facilities for pedestrian and bicycle use shall be designed to the best currently available standards and guidelines."

Maintenance Practices

The City of Colorado Springs maintains on- and off-street bicycle facilities. Its Public Works Division is responsible for maintenance of on-street facilities, while the Parks Department maintains trails. On-street facilities are swept at the same time as other travel lanes. However, snow and ice removal occurs after other travel lanes are cleared. Sweeping and other trail maintenance activities are conducted on an as-needed basis. The Parks, Recreation, and Cultural Services Department has a checklist that outlines basic maintenance protocols for soft-surface and paved trails, including sweeping and snow removal. It does not include a schedule or prioritization of maintenance activities for transportation or other purposes.

Bicycle Design Guidance

The City of Colorado Springs has several documents which provide guidance on the design of bicycle accommodations. Chief among these is the Engineering Criteria Manual,[18] which is composed of seven sections. Section III, the Traffic Criteria Manual,[19] addresses bicycle accommodations on City streets. The design of bicycle accommodations and other roadway elements are outlined in the Manual and key excerpts are summarized in Table 2.

[18] City of Colorado Springs Engineering Criteria Manual. City of Colorado Springs (Colorado). 2010. https://coloradosprings.gov/sites/default/files/images/subdivision_policy_manual.pdf.
[19] Ibid.

Table 2. Design Criteria by Functional Classification (adapted from City of Colorado Springs Traffic Criteria Manual)[20]

	Principal Arterial Type 2 (6-lane)	Principal Arterial Type 1 (4-lane)	Minor Arterial	Collector	Residential (Local)	Minor Residential (Local)	Public Alley	Industrial
Posted speeds (mph)	45	45	40	30	25	25	15	30
Design ADT	25,000-60,000	10,000-25,000	5,000-25,000	1,500-5,000	300-1,500	50-300	50-300	< 10,000
Roadway Width (pavement mat)	2-40' pavement mat	2-28' pavement mat	69'	28' (no parking) 38' (parking)	30'	24' (< 21 lots) 28' (> 20 lots)	16' residential 22' commercial	51'
No. of Lanes	6	4	4	2	2	2	2	3
Lane Widths	11'	11'	11'	14' w/ shared bike	9'	N/A	N/A	14' w/ shared bike w/ 12' center left turn
Shoulder Width	4'	4'	4'	N/A	N/A	N/A	N/A	N/A
Median	Raised 28'	Raised 17'	Raised 17'	N/A	N/A	N/A	N/A	N/A
Sidewalk (placement)	Detached 6'	Detached 6'	Detached 6'	Detached 5'	Attached 6' vert. curb/ Detached 5' others	Attached 6' vert. curb/ Detached 5' others	N/A	Detached 5'
Bicycle Accommodation	***6' multi-use shoulder***	***6' multi-use shoulder***	***5' multi-use shoulder***	***On street w/ shared lane***	***On street w/ shared lane***	***On street w/ shared lane***	---	***On street w/ shared lane***
Tree Lawn Width	7'	7'	7'	7'	7'-6"	7'	N/A	7'
Parking	No	No	No	Allowed	Two sides	One side only	No	Two sides

As Colorado Springs seeks to develop a safe and connected network of bicycle facilities, it is critical to have roadway design criteria that support this goal. A key consideration is that bicyclists are highly sensitive to factors such as traffic speed and volume and thus it is much more difficult and expensive to design and construct comfortable bicycle facilities on higher speed, higher traffic roads. Providing low-stress bicycle facilities is key to creating a safe and comfortable environment that results in more people bicycling. Figure 1, from the *2014 Fort Collins Bicycle Master Plan,* shows how speed and traffic volumes inform the selection of appropriate bicycle facility types.

The recommended bicycle accommodations were developed in 2010, before many recent advancements in bicycle facility design. Applying the existing criteria, without other street features, will not result in low-stress facilities for bicyclists, as discussed further in the Quality of Facilities section of this report.

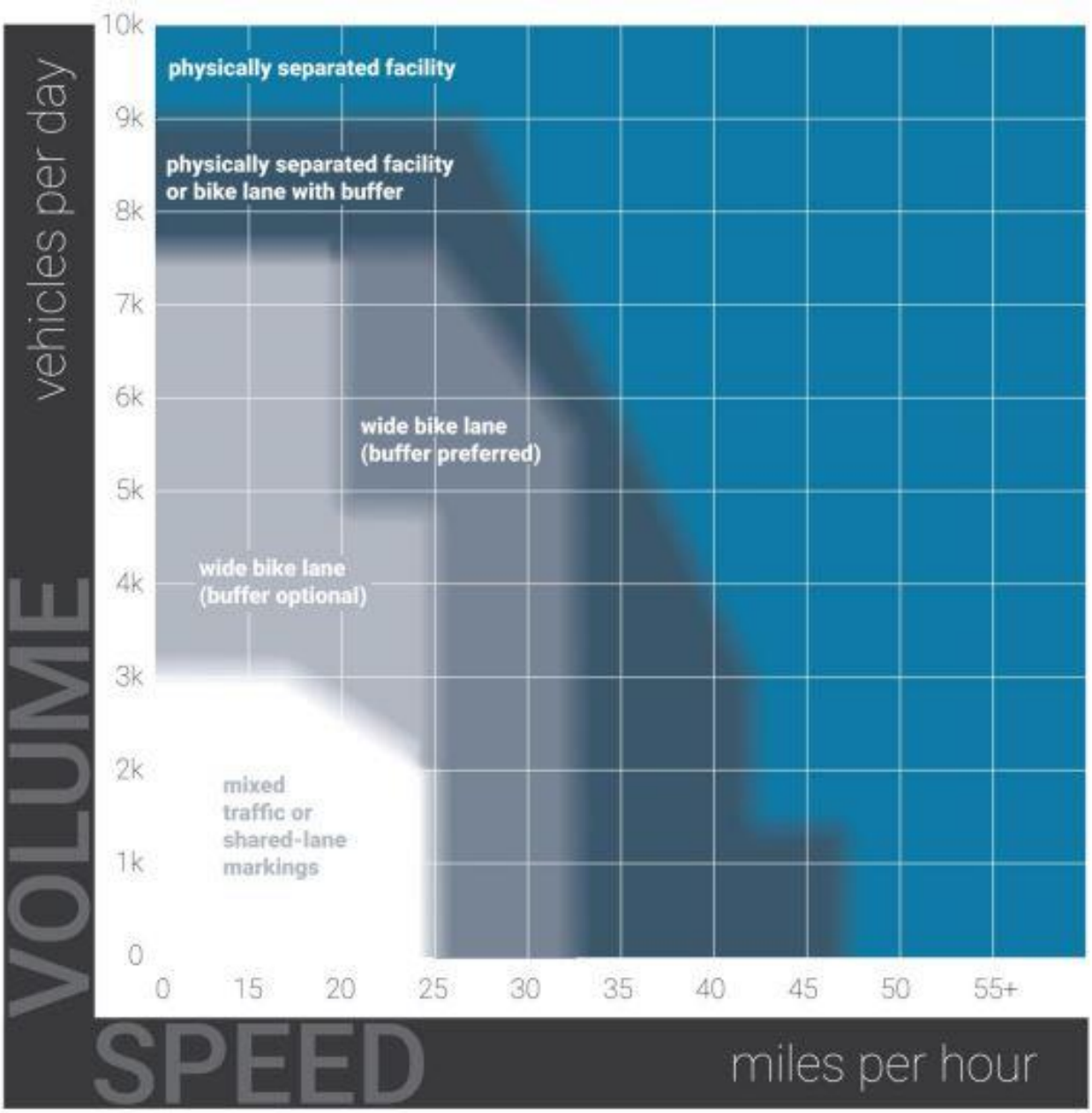
[20] *Ibid.*

Beyond the choice of bicycle accommodation, some other areas of concern in Colorado Springs current design criteria include:

- *Lack of context*: Although it is difficult to adequately capture all of the possible combinations of land use and roadway type, it is important to recognize that roadway designs, including bicycle facilities, should be sensitive to and influenced by the surrounding land use. The Institute of Transportation Engineers' 2010 report *Designing Walkable Urban Thoroughfares: A Context-Sensitive Approach* is a useful reference for this topic.[21]
- *High speed roadways*: As cities across the country are embracing Vision Zero and addressing traffic safety with an eye toward eliminating deaths and serious injuries for all modes, reduction of speeds has emerged as one of the highest priorities. In addition to the obvious dangers posed by high traffic speeds, such roads create significant crossing barriers that contribute to a fragmented network. In light of this and the goal of creating low-stress bicycle networks, design criteria that promote high speed streets should be reconsidered. Additionally, street retrofits need to consider speed and/or include speed limit reduction.
- *Excess capacity*: Roadways with excess capacity encourage speeding, create wider crossings for all modes of travel, and take up space that could otherwise be used for other purposes. The average daily traffic (ADT) and associated traffic volume ranges in Table 2 suggest there is a potential for some roads to be built with significant excess capacity. For instance, a four-lane minor arterial with 5,000-10,000 vehicles per day would likely have significant excess capacity. The Federal Highway Administration (FHWA) advises that roadways with ADTs of 20,000 or less may be good candidates for street reconfigurations and should be evaluated for feasibility.[22] Therefore, there may be opportunities to reconfigure some Colorado Springs streets and add bicycle facilities, especially those streets with less than 20,000 ADT.

[21] https://www.ite.org/css/RP-036A-E.pdf
[22] Road Diet Informational Guide (Federal Highway Administration [FHWA], 2014

Figure 1. Fort Collins 'Designing for the *Interested but Concerned'* Facility Selection Chart[23]



[23] http://www.fcgov.com/bicycling/pdf/appendix_c_recommended_design_guidelines.pdf

Bicycle Parking

The Downtown Colorado Springs Form-Based Code requires that an adequate number of bike racks are provided for employees, customers, and residents of new buildings constructed downtown. The Code recommends that these racks be located within 100 feet of the building entrance and that be easy to locate and use. Detailed guidance for the quantity or design of the racks is not offered in the Code, but is available through external resources such as the Association of Pedestrian and Bicyclists' publications, *Essentials of Bike Parking: Selecting and Installing Bike Parking that Works* and *Bicycle Parking Guidelines, 2nd Edition*.

The Form-Based Code encourages installation of more secure and protected bicycle storage, such as bike lockers or other protected bicycle storage areas, by providing developers with a 'density bonus', for installing these facilities. This allows developers to build at a higher density than would otherwise be allowed by zoning law. Up to three points are available through the bicycle storage bonus, which is comparable to other categories, such as historic preservation and public art, and translates to an extra floor of building space.

Although the City lacks a comprehensive bicycle parking ordinance, a draft ordinance was developed in May 2016, covering bicycle parking requirements for new developments and changes of use. It includes quantitative requirements for installation of bike racks based on the number of dwelling units and also covers bicycle parking design standards. This draft should be further developed as staff time allows and incorporated into City code.

Bicycle Ridership and Safety

Documenting current bicycling patterns and trends is an important step in the development of recommendations for improving conditions for bicycling. Such information also allows for benchmarking progress over time. In this section of the report, the existing conditions for bicycling in Colorado Springs are described, including potential use of bicycling facilities, current ridership, and safety.

Potential Bicycle Demand

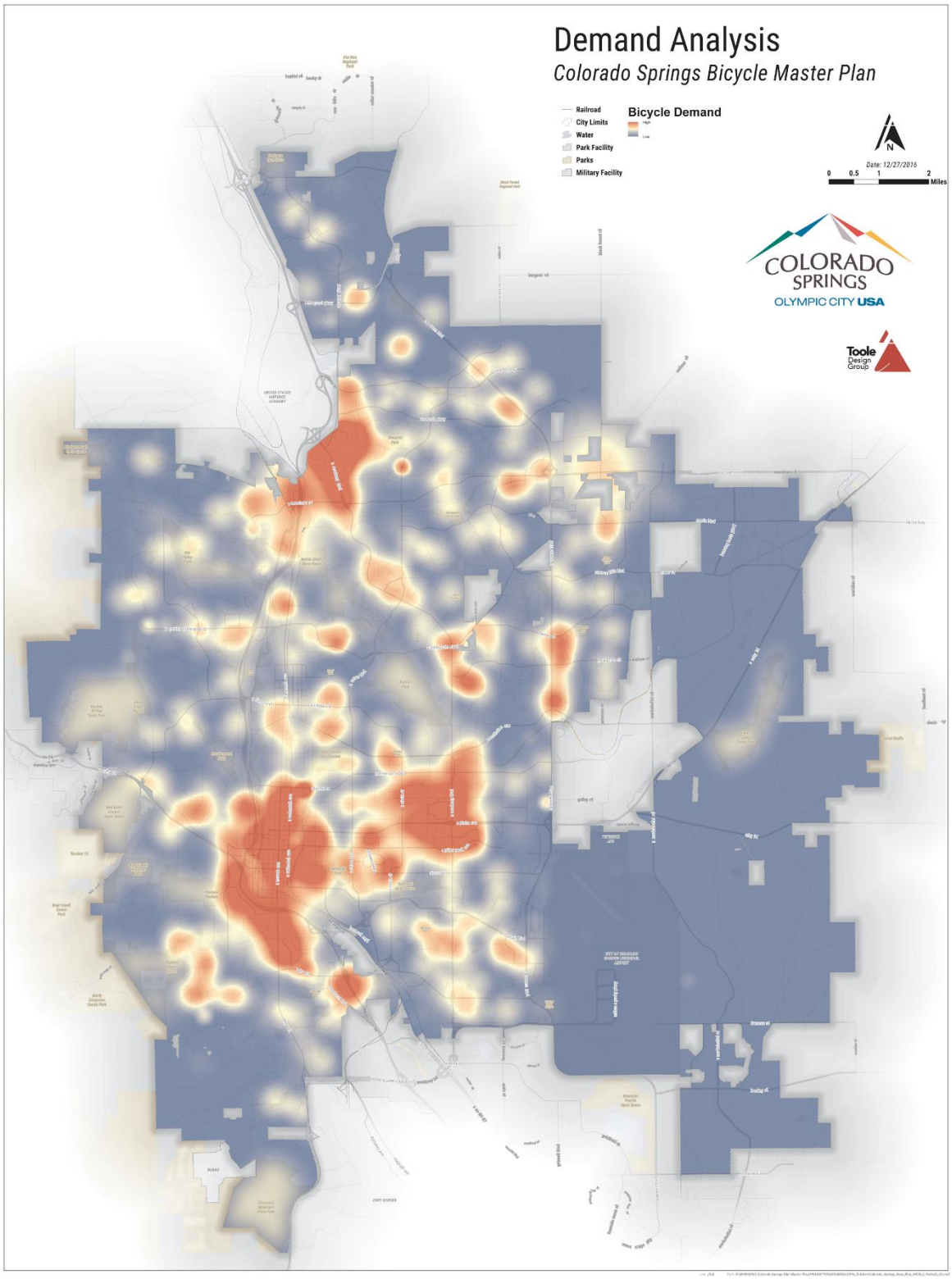
To understand where the greatest opportunities exist to increase bicycling in Colorado Springs, a GIS-based demand analysis was conducted. The analysis accounted for population and employment density, commercial land uses, transit hubs, K-12 schools, colleges, parks, and libraries to determine the areas with the greatest potential demand for bicycling. A 'heat map' of the analysis results is shown in Figure 2. The analysis considered both utilitarian/transportation and recreational types of bicycling.

Larger areas of the city that were identified through the analysis as having the greatest potential use for bicycling infrastructure include:

- Downtown Colorado Springs and surrounding areas
- Academy Blvd., north of Pikes Peak Avenue to Palmer Park Blvd., and surrounding areas
- Academy Blvd., north of Woodmen Rd.

Along with these areas, several shorter corridors and activity areas were found to have high demand for bicycling. Taken together, the results indicate some potential geographic focus areas for bicycle infrastructure development, but also suggest that the demand for bicycling is dispersed throughout the city and that opportunities to increase bicycling exist across a variety of contexts. The Plan recommendations will be informed by comparing potential bicycling demand with existing bicycle facilities and their connectivity. Because the analysis for potential bicycle demand is a planning tool only, the recommendations will also be informed by stakeholder and public input and further analysis.

Figure 2. Potential Demand for Bicycling in Colorado Springs



Bicycle Ridership

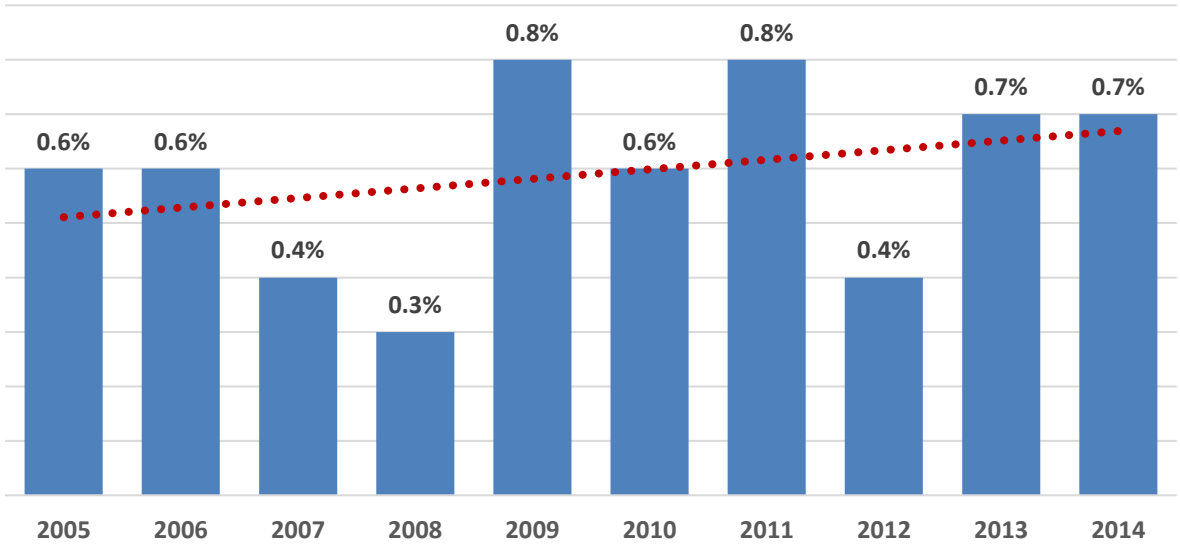
Data about levels of bicycle usage are not available to the same extent as for motor vehicles. The lack of data makes it difficult to determine trends, evaluate the impacts of infrastructure projects, and identify locations with high crash rates. Nonetheless, existing data from the U.S. Census, along with data collected for the BMP and bicycle counts conducted by the Colorado Department of Transportation (CDOT) give a sense of the overall level of system usage.

Commute Mode Share

U.S. Census data show that, as a percentage of total commute-to-work trips, bicycle use may be increasing in Colorado Springs. Commute mode share estimates from the 1990 and 2000 census reported bicycling accounted for 0.5 percent of commute to work trips. Annual estimates since 2005 vary from 0.3 to 0.8 percent, but generally show an increasing trend, as indicated in Figure 3.

It should be noted that census data pertain only to work trips and do not capture other types of trips, such as shopping or recreational trips. Additionally, individual years are subject to a relatively high margin of error. According to an analysis of data collected through the National Household Travel Survey, work trips account for only 16 percent of all bicycle trips, while recreational trips account for almost half.[24] Therefore, the total amount of bicycle trips taken in Colorado Springs is likely to be higher than suggested.

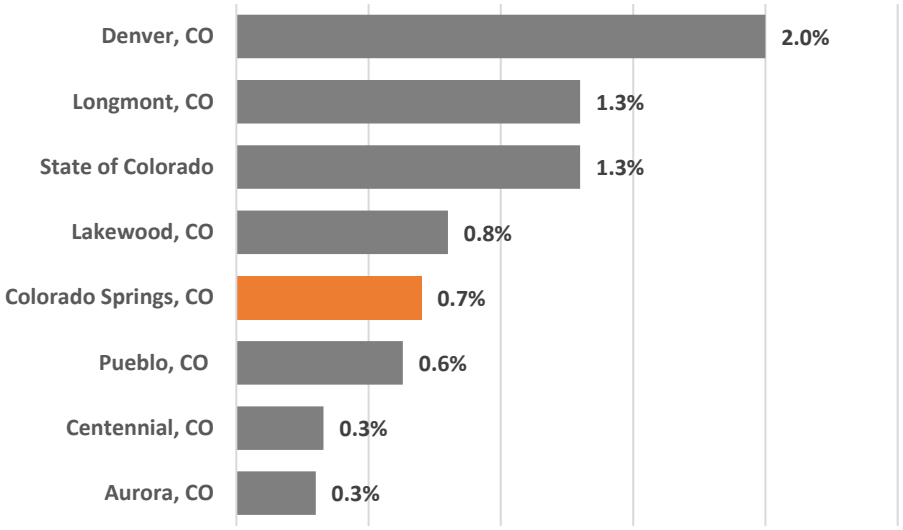
Figure 3. Colorado Springs Bicycle Commute Mode Share One-Year Estimates, 2005-2014



[24] http://www.travelbehavior.us/Nancy--ppt/Biking%20in%20the%20US%20PPT.pdf

Figure 4 shows the results of an analysis of 2014 census data conducted by the League of American Bicyclists.[25] The report indicates Colorado Springs has a lower rate of bicycle commuting than the State of Colorado as a whole (0.7 percent in Colorado Springs compared to 1.3 percent statewide). Colorado Springs' commute mode share is comparable to that of Lakewood and Pueblo. Although not shown in Figure 4, the highest rates of bicycling in Colorado occur in Boulder, CO (11.1 percent) and Fort Collins, CO (7.4 percent). These cities are among the leaders in bicycle commuting nationwide and, as college towns, have very different demographics and land use patterns than Colorado Springs. Nonetheless, they demonstrate the potential for bicycling in Colorado and specific programs and policies from those cities may serve as useful models for Colorado Springs.

Figure 4. Bicycle Commute Mode Share for Select Colorado Geographies, 2014



Bike Master Plan Survey

As part of the BMP public outreach process, a survey of Colorado Springs residents was conducted to gain a better understanding of attitudes and preferences related to bicycling. Although this survey is not representative of the Colorado Springs population, the findings nonetheless are informative. For instance, out of 813 total respondents, 409 people indicated they ride throughout the year. Similarly, almost half reported riding three or more days per week, including 11 percent who ride daily. Additional findings from the survey are discussed in the Bicycle Facilities section of this report.

Count Data

CDOT has installed two permanent, continuous counters in Colorado Springs. A counter along the Midland Trail, between Chestnut Street and South 8th Street counts both bicyclists and pedestrians through a combination of inductive loops and passive infrared technology. Another counter on Tejon

[25] http://bikeleague.org/sites/default/files/ACS_report_2014_forweb.pdf

Street, just south of I-25, counts bicyclists in the north and southbound bike lanes, using inductive loops. Both counters were installed in April 2015.

From late April through December 2015, the Midland Trail location recorded an average of 172 bicyclists per day.[26] Saturday and Sunday had the highest average daily volumes (over 200 per day), but weekday volumes were also substantial (roughly 160 per day). This pattern indicates the location serves both recreational and commuting bicyclists, but is more commonly used for recreation or other non-commute purposes.

During the same period, the Tejon Street counter recorded 125 bicyclists per day. Compared to the Midland Trail location, the site experiences a greater share of commuting traffic, but bicycle traffic outside the commute period is also substantial.

The City also conducts bicycle counts along many of the trails using automated equipment and in the past, has conducted manual counts. This data is forthcoming.

The City lacks a comprehensive count program. In a survey conducted for the *CDOT Non-motorized Monitoring Program Evaluation and Plan* (not yet published), City staff indicated equipment costs, inadequate staff time, and uncertainty over the best counting methods are barriers to establishing and implementing a count program.

Bicycle Safety

Two sets of crash data were obtained from the City of Colorado Springs to assist in the identification of safety trends and problematic locations. In the first dataset, all crashes involving at least one motor vehicle that occurred between 2011 and 2015 within city boundaries were provided in tabular data format. The second dataset included crashes involving a bicyclist and motor vehicle from 2008 through 2012 and was provided in spatial format for mapping and analysis. In this section, key trends and findings revealed from the crash data are discussed. Similar statistics from an unpublished crash analysis conducted for the City and County of Denver are included for context.

It is important to note that bicycle crashes are known to be under-reported. For example, single-bicycle crashes not involving a motor vehicle are not captured in public crash databases, but are often severe. Additionally, instances where both parties do not report the crash cannot be accounted for. The number of unreported crashes in Colorado Springs is unknown, but a study conducted by the Federal Highway Administration found that 33 to 57.5 percent of all bicycle crashes potentially go unreported.[27]

Crash Trends and Severity

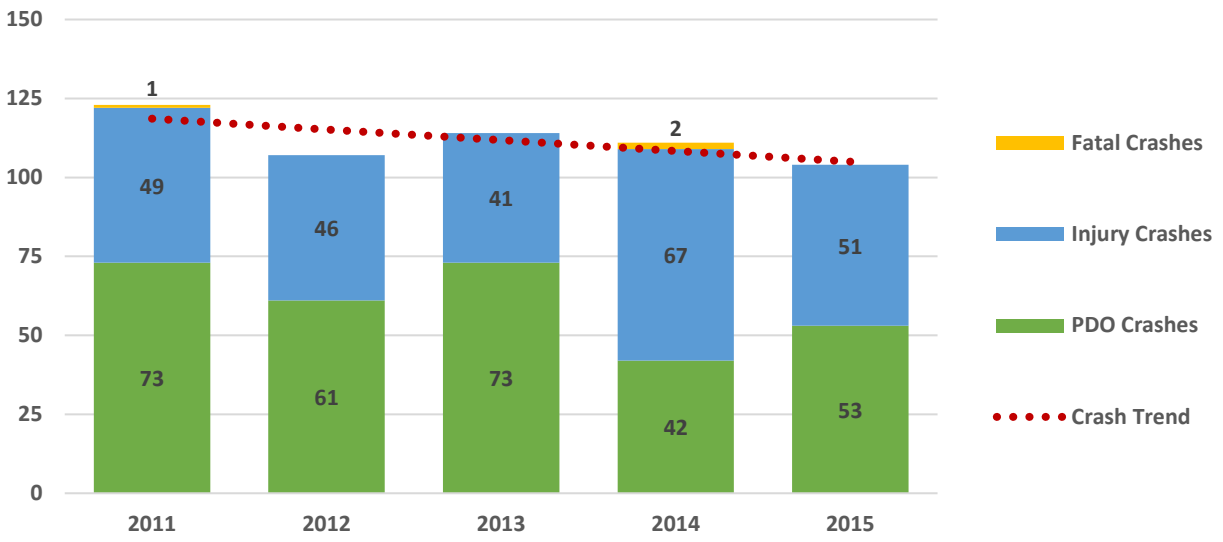
As shown in Figure 5, there were between 100 and 125 bicycle crashes in Colorado Springs each year from 2011 through 2015, or around 25 crashes per 100,000 residents. By comparison, there was an

[26] Source: CDOT.

[27] Federal Highway Administration. Injury to Pedestrians and Bicyclists: An Analysis based on Hospital Emergency Department Data. FHWARD-99-078. 1999.

average of 280 bicycle crashes in Denver from 2013 through 2015, or around 42 crashes per resident per year. Keeping in mind that Denver has a bike commute mode share roughly three times higher than Colorado Springs, it appears the risk of getting into a crash may be higher in Colorado Springs; however, more data would be needed to reliably make that determination.

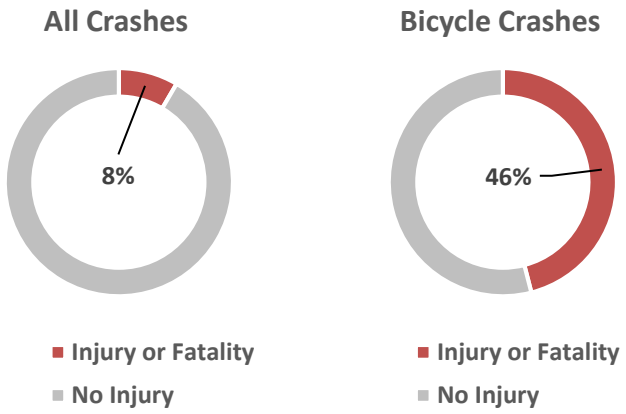
Figure 5. Colorado Springs Bicycle Crashes by Year and Severity, 2011-2015



Note: PDO means property damage only

Perhaps more important than the overall number of crashes is that when a crash does occur, the likelihood of injury is high. Bicycle crashes account for only 1.2 percent of all crashes, but 5.2 percent of injuries and 2.1 percent of fatalities. Almost half of all bike crashes involve an injury or fatality (46 percent), compared to only 8 percent of all crashes (Figure 6). The percentage of crashes resulting in injury is comparable to that in Denver.

Figure 6. Percentage of All Crashes and Bicycle Crashes Resulting in Fatality or Injury, 2011-2015



Crash Risk Factors

To address bicycle safety concerns, it is important to understand the factors that contribute to a crash or affect the outcome. Figures 7 through 9 highlight some of the important risk factors that are commonly associated with bicycle crashes in Colorado Springs: lighting conditions, behavioral contributing factors, and crash location. Highlights and considerations from this analysis include:

- **Driver failure to yield** was the most common behavioral contributing factor and was responsible for almost a quarter (23 percent) of all bicycle crashes from 2011 through 2015. The second most common factor was driver inexperience (eight percent), followed by bicyclist failure to yield and bicyclist inexperience (seven percent each). Distraction and impairment on the part of drivers or bicyclists each contributed to less than five percent of crashes.
- Over 80 percent of bike crashes from 2011 through 2015 occurred during **daylight conditions**. Without bicycle volume data, it is difficult to determine whether this is proportional to the level of bicycling during those times.
- The majority of crashes occurred at **intersections** (66 percent), while an additional 15 percent occurred at driveways and alleys. Non-intersection locations accounted for 17 percent of crashes. These findings highlight the need for particular attention at conflict points.

Figure 7. Number of Bicycle Crashes by Lighting Condition, 2011-2015

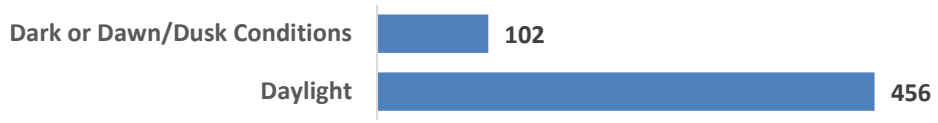


Figure 8. Number of Bicycle Crashes by Behavioral Contributing Factor or Driver Action, 2011-2015

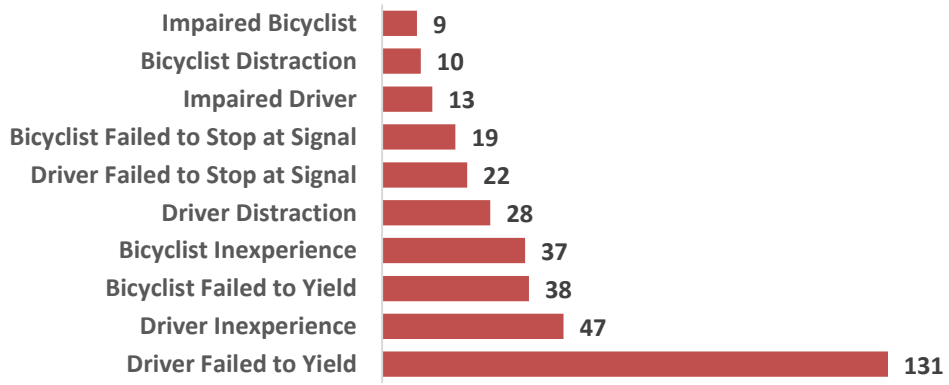
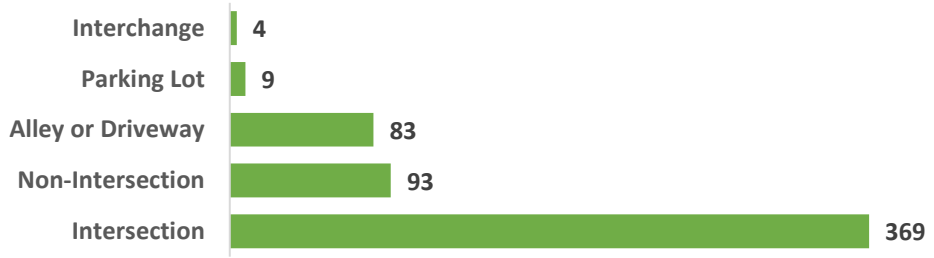


Figure 9. Number of Bicycle Crashes by Crash Location, 2011-2015



High-Crash Corridors for Bicycles

Determining the corridors with the highest number of crashes may help the city prioritize bicycle infrastructure investments in the future. To this end, a geographic analysis of available crash data was undertaken. As noted above, bike crashes from 2008 through 2012 were provided in spatial format and serve as the basis for the corridor analysis.

High-crash corridors were identified through a GIS-based process. Colorado Springs' street network was first divided into logical corridor segments of five miles or less, defined by changes in the number of lanes on a street, presence of a bike facility, or changes in land use. Next, crashes were joined to corridors, which were in turn compared on the basis of crashes-per-mile.[28] The high-crash corridors identified through this process are shown in Table 3 and Figure 10.

[28] Some streets with high crashes-per-mile calculations were not included in the high-crash corridor list because their rates were only high as a result of their short length. For instance, a segment of Arvada Street east of S Nevada Avenue, had a high crash rate. But at just over ¼ mile and with only two total crashes, this corridor was deemed too short to include. Further investigation of some other high-crash corridor crashes revealed that their geocoded placement was likely inaccurate given that tabular data indicated they were non-intersection crashes.

Table 3. High-crash Corridors for Bicycles, 2008-2012

Street	Fatal Crashes	Injury Crashes	Property Damage Only Crashes	Total Crashes	Length (mi)	Crashes per Mile
Limit Street, W Bijou St to W Cimarron St	0	3	5	8	0.47	17.03
S Nevada Avenue, I-25 to Old Broadmoor Rd	0	9	2	11	0.7	15.68
Colorado Avenue, N 7th St to S Corona St	0	6	6	12	1.22	9.81
Kiowa Street, W Bijou St to N Institute St	0	6	5	11	1.15	9.55
Colorado Avenue, N 34th St to N 7th St	0	10	11	21	2.66	7.89
Nevada Avenue, Fillmore St to I-25	0	12	19	31	4.07	7.61
Walnut Street, W Boulder St to W Cucharras St	0	2	2	4	0.53	7.48
8th Street, W Colorado Ave to W Cheyenne Rd	0	10	6	16	2.26	7.07
Tejon Street, Cache Poudre St to W Cheyenne Rd	0	7	10	17	2.6	6.55
Bijou Street, Limit St to N El Paso St	0	3	7	10	1.54	6.5
Boulder Street, Cascade Ave to Circle Dr	0	9	7	16	2.72	5.88
Winters Drive, Cascade Ave to El Paso St	0	2	1	3	0.53	5.62
Cascade Avenue, Jackson St to Fountain Blvd	0	7	10	17	3.18	5.35

Generally, the high-crash corridors are multilane streets with four or more lanes. Some of these streets have bike lanes, such as 8th Street, portions of South Tejon Street, and the eastern part of Colorado Avenue. South Nevada Avenue and the western portion of Colorado Avenue do not have bike lanes, but have high numbers and rates of crashes, likely because there are many destinations located along these corridors.

Without bicycle volume data, it is difficult to determine the relative risk of bicycling on these corridors. To a certain extent, the identified high-crash corridors may reflect higher levels of bicycling. Nonetheless, they should be further investigated for safety concerns. Collection of volume data, for these corridors and in general, would provide additional insight into the risk of bicycling in individual corridors and the potential for crash reduction through infrastructure improvements.

Figure 10. High-Crash Corridors for Bicycles in Colorado Springs

As previously noted, reported crashes are only one part of the bicycle safety story for generally two reasons: 1) many crashes go unreported, 2) crash data is often not as detailed as it needs to be to draw firm conclusions, and 3) safety concerns prevent some people from riding. It is therefore useful to supplement crash data with perceived, qualitative data collected from public outreach efforts. In 2015, the City held public workshops to discuss bicycling and at those, people expressed concerns about safety for the following corridors:

- 8th Street
- Manitou Avenue
- Cimarron Street/Highway 24 (specifically due to high automobile speeds)
- Mallard Drive
- Powers Boulevard (specifically due to high automobile speeds)
- Woodmen Road (specifically due to high automobile speeds)
- Voyager Parkway
- Rangewood Drive
- 31st Street

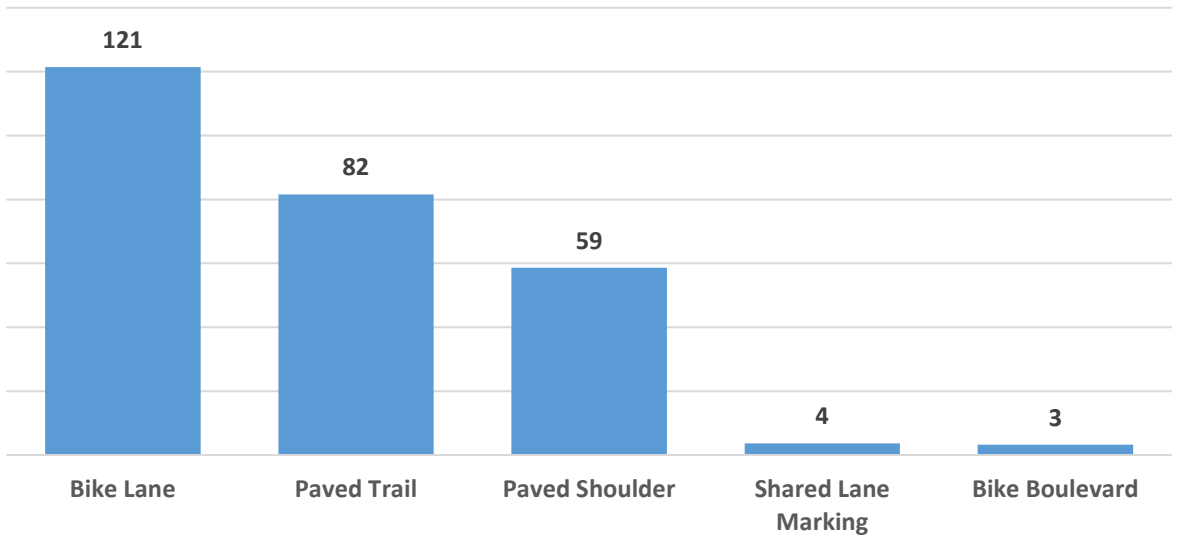
All but two of the listed corridors are streets with four or more travel lanes, and more than half have five or six lanes. While all but 8th Street are different corridors than those identified by the crash analysis, it is reasonable to conclude that bicycle traffic safety is an issue along the city's higher speed and multilane streets.

Bicycle Network

One of the key determinants of bicycle use is the quality and extent of the bicycle network. As discussed earlier in this report, Colorado Springs has a very active and engaged bicycling community, but without a network of comfortable facilities that connect and connect to origins and destinations, most people are unlikely to choose bicycling as their mode of transportation for routine trips.

Colorado Springs has made a significant investment in bicycle facilities and is known for its efforts to develop bicycle infrastructure, particularly off-street trails. Figure 11 shows the centerline mileage of paved bicycle facilities implemented as of 2015.[29] There are over 120 miles of bike lanes, 80 miles of paved trails or paths, and 40 miles of unpaved mountain bike trails in the city. Paved shoulders are also common, while shared lane markings and bike boulevards have been implemented much less widely. Figure 12 shows the existing bicycle network.

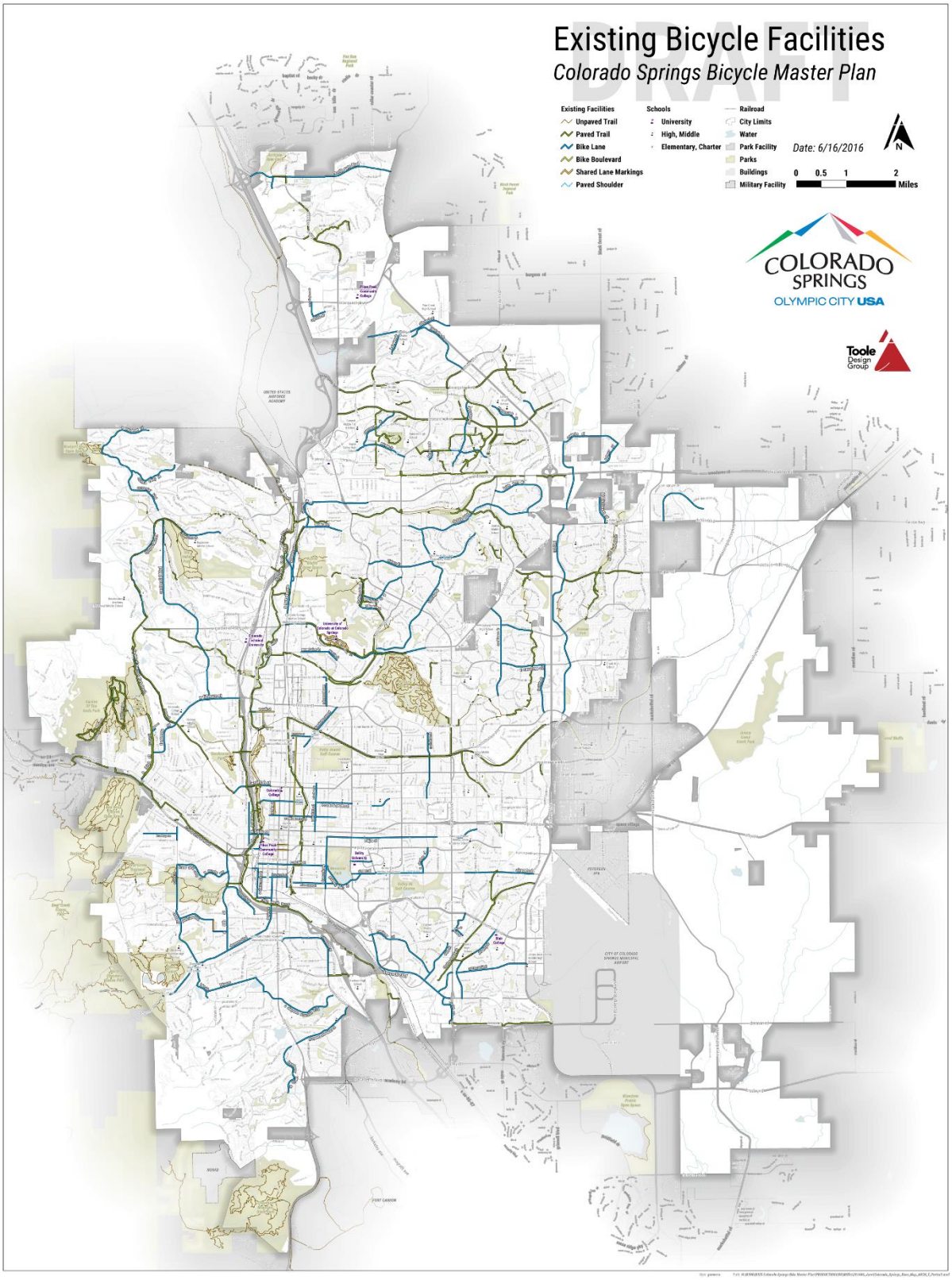
Figure 11. Paved Bicycle Facility Mileage



Note: Mileage indicates facility/street miles and not lane miles.

[29] GIS Data provided by City of Colorado Springs.

Figure 12. Colorado Springs Existing Bicycle Facilities



Paved Trail Network

Colorado Springs has several significant trails for bicycling. Paved trails are generally very comfortable and desirable for bicycling, but are difficult and expensive to implement widely. Also, they are often indirect as compared to the street network. Nonetheless, they attract new riders and serve as critical arteries, particularly when they cover long distances and avoid busy street crossings. Some of the more prominent trails in the city are described below:[30]

- *Legacy Loop* is a roughly 10-mile trail system around downtown Colorado Springs that includes the Pikes Peak Greenway, Shooks Run Trail, and Rock Island Corridor.[31] The Legacy Loop was noted as a key feature in the Experience Downtown Master Plan.
- *Pikes Peak Greenway Trail* parallels I-25 and Monument and Fountain Creeks Pikes for the length of the City of Colorado Springs and is part of the Colorado Front Range Trail system. It serves as the north-south spine for the Colorado Springs urban trails system.[32] At the north end, it connects to the Santa Fe Trail, and at the southern end it connects to the Fountain Creek Trail.
- *Rock Island Trail* is an east-west trail that forms the northern part of the Legacy Loop trail system, connecting Pikes Peak Greenway to Shooks Run Trail.
- *Shooks Run Trail* is a significant north-south trail, located east of downtown. It is part of the Legacy Loop system, connecting with Rock Island Trail on the north end and to Fountain Boulevard at the south.[33] The trail is part of the Shooks Run drainage, which is currently being studied through the *Envision Shooks Run* planning process.
- *Midland Trail* is an east-west trail that runs from America the Beautiful Park on the west side of downtown to Manitou Springs, parallel to US 24. Portions of the trail follow the street network.
- *Templeton Gap Trail* is a 4.5 mile trail north of downtown, just south of University of Colorado at Colorado Springs (UCCS). It connects Pikes Peak Greenway to Goose Gossage Sports Complex on the west end to Palmer Park on the east.

In addition to these trails, there are several shorter trails that contribute to the bicycling network. The City of Colorado Springs' Urban Trail Map is a comprehensive resource for trails in the city.[34]

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[30] Trail descriptions from Trails and Open Space Coalition (http://www.trailsandopenspaces.org/?portfolio), Walk Ride Colorado (http://www.walkridecolorado.com/by-location/colorado-springs-colorado), and other sources as noted.

[31] https://coloradosprings.gov/legacyloop

[32] http://www.trailsandopenspaces.org/?portfolio=pikes-peak-greenwaysanta-fefountain-creekfront-range-trail

[33] http://www.trailsandopenspaces.org/?portfolio=shooks-run-trail

[34] https://parks.coloradosprings.gov/sites/default/files/parks_recreation_and_cultural_services/trails/urban_trail_map.pdf

On-Street Bike Network

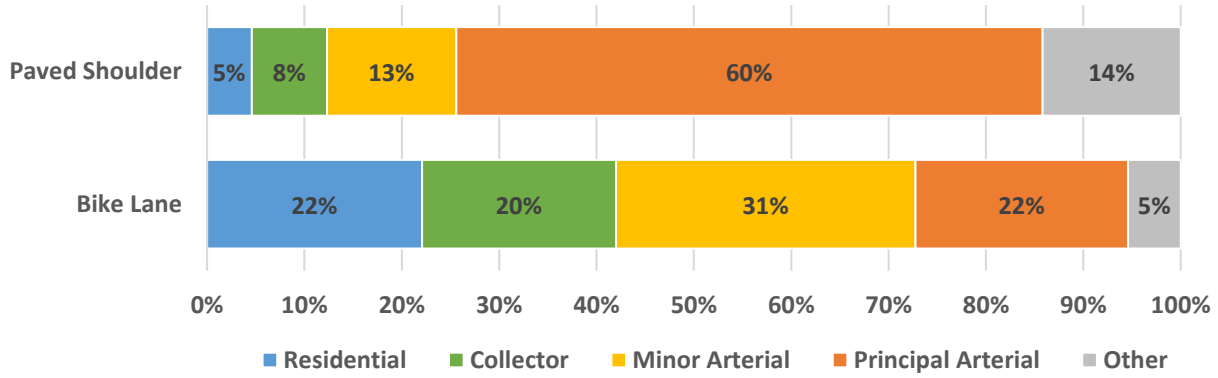
Despite the extensive trail system already developed in Colorado Springs and plans for its expansion, the greatest opportunity for developing a connected network of comfortable bicycle facilities is through on-street facilities, which is the focus of this Plan. While opportunities to develop and improve trails should continue to be pursued, financial and other constraints point to the importance of existing rights-of-way for the development of a connected, low-stress bicycling network. On-street bicycle networks also provide more direct access to destinations as compared to trails.

Careful consideration must be given to the planning and design of on-street facilities to ensure they are appropriate to the roadway and land use context. The percentage of bike lanes and paved shoulders in Colorado Springs by roadway functional class is shown in Figure 13. Functional class is a useful proxy for traffic speed in the absence of speed data.

Over half of the currently-designated bike lane network and close to three-fourths of paved shoulders are on minor or principal arterials.[35] Given that Colorado Springs' design criteria suggest posted speeds of 40 mph for minor arterials and 45 mph for principal arterials, with high traffic volumes (Table 2), it is apparent that although the bike lane and paved shoulder network covers a substantial portion of the roadway network, a large percentage of those facilities are unlikely to appeal to a broad group of bicyclists. As discussed in the Quality of Network section of this report, unseparated bike lanes on roads with speeds at or above 35 mph are uncomfortable for most people to riding bicycles. In order to provide comfortable facilities on these types of roads, significant separation from traffic is needed.

Note that there are many local, lower volumes and speed streets in the city that are likely comfortable for bicycling. While some of these are designated as bike boulevards or shared lane markings, many are not signed or designed as formal bike facilities. See the Connectivity section for more discussion of these types of streets.

Figure 13. Percentage of Paved Shoulder and Bike Lane Mileage by Functional Class



[35] For this analysis, principal arterials also includes freeways and expressways.

Connectivity

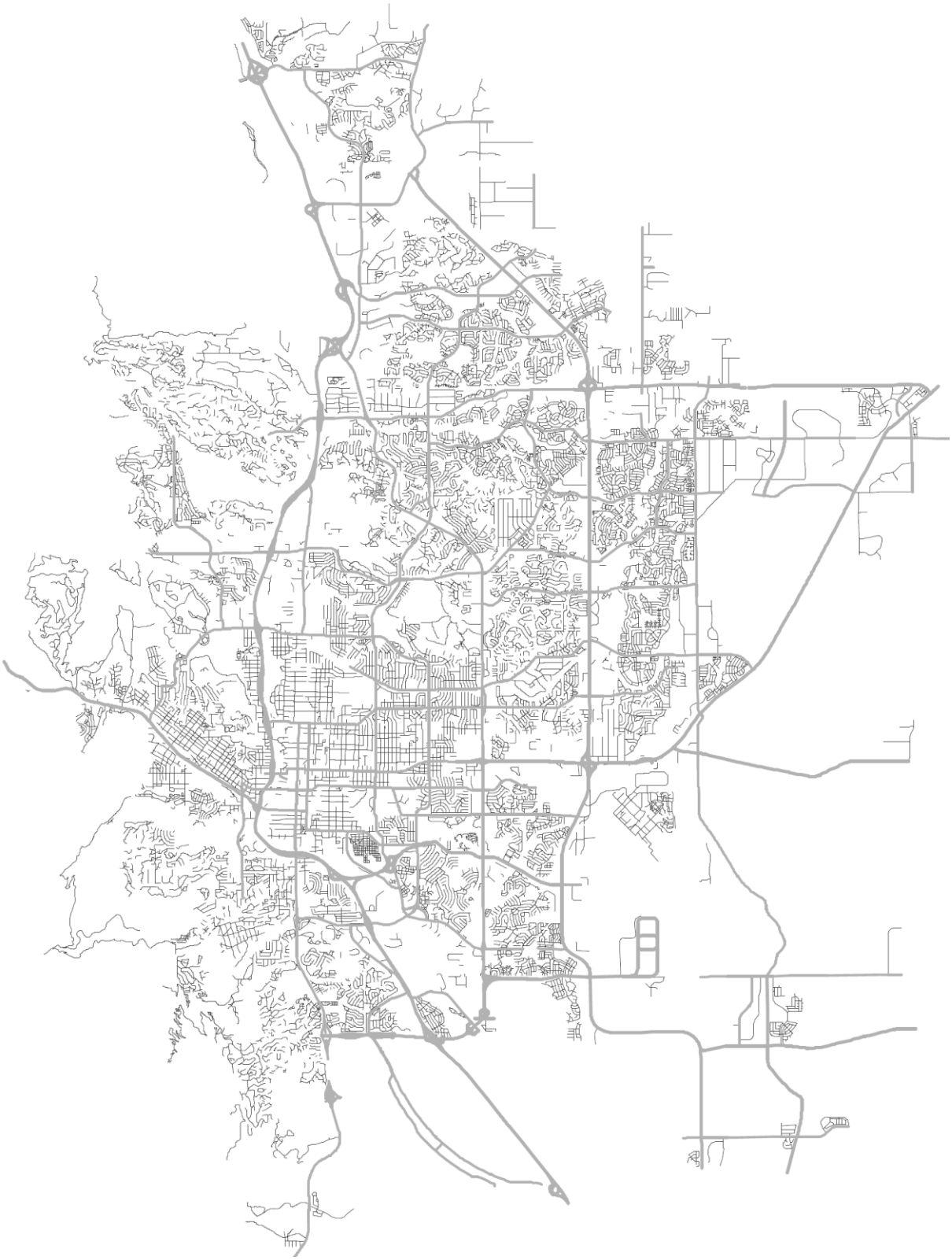
For a network of any type to be useful, it needs to connect. Figure 14 shows only existing bicycle facilities in the city, along with existing local streets, as a way to demonstrate connectivity. Beyond some of the trails, there are few long-distance facilities and there are few continuous routes that connect neighborhoods. This limited connectivity is a barrier to attracting more bicycle riders, especially those wanting to ride for transportation/utility.

One example of a large, longer-distance connectivity gap is between most parts of the city and Manitou Springs, a major destination. This is due to topography, limited street connections, and no continuous trails.

Figure 14. Bicycle Facility Connectivity: Paved Trail Network (left) and Local Street Network (right)

As noted in the On-Street Bike Network section of this report, the local street network can play an important part in a low-stress network. These streets are typically comfortable for biking and often don't require significant investment, beyond intersection improvements, to create a more formal bicycle facility. However, in most suburban-oriented communities like Colorado Springs, the connectivity of this local network is unfortunately limited (see Figure 14, right side). This is not only due to development patterns, but to the major arterials and freeways that serve as barriers. Figure 15 is a larger version showing the "island" effect of the local street network, especially beyond downtown.

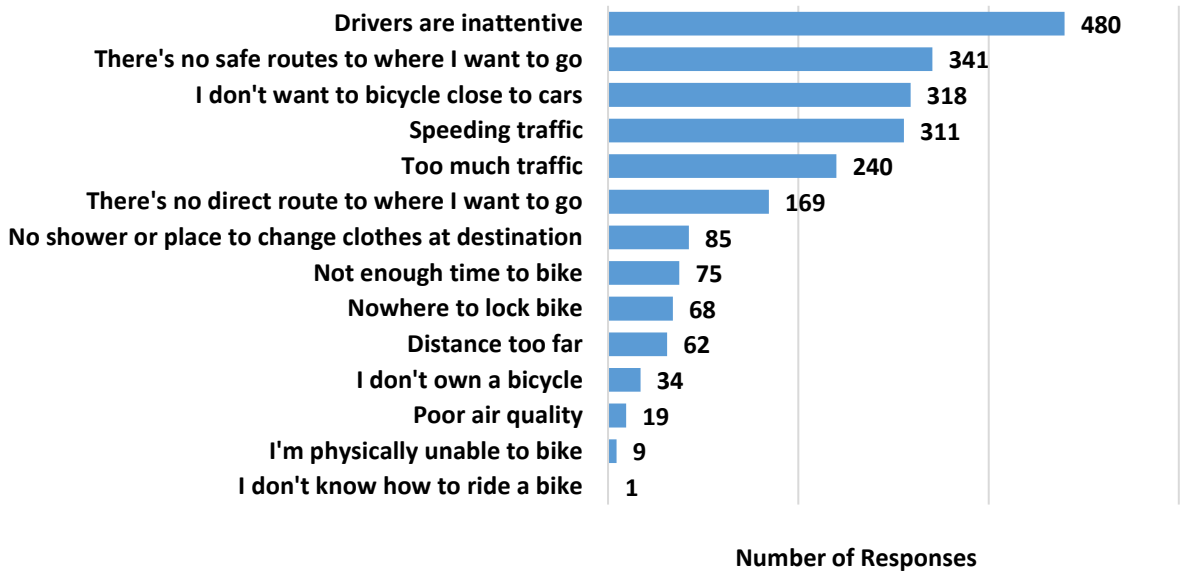
Figure 15. Local Street Network (with Freeways shown)



Attitudes and Preferences for Bicycle Facilities

As previously noted, an online survey targeting Colorado Springs residents was conducted between July and October 2016 to inform the development of the Bike Master Plan. In total, 813 people completed the survey and the results indicate that interactions with drivers, high traffic volume and speed, and lack of safe routes are among the strongest deterrents to bicycling. When asked why they do not bicycle, driver inattention, high traffic speeds and volume, and lack of safe routes to destinations were among the most common responses. The full range of responses is shown in Figure 16.

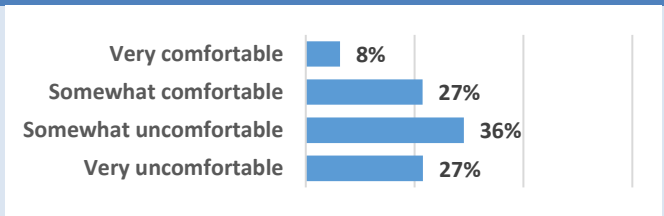
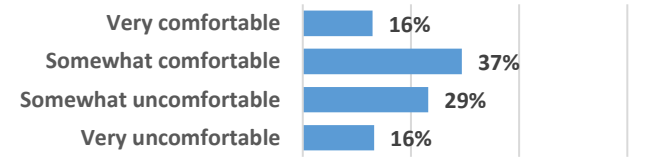
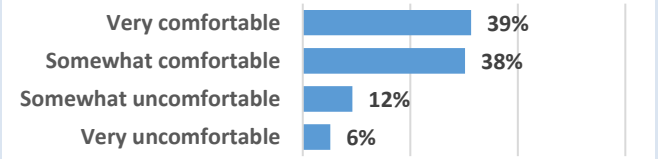
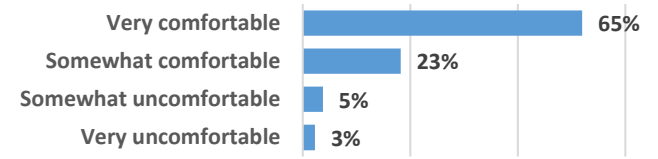
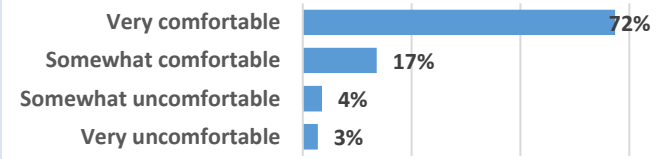
Figure 16. Summary of Responses to the Question: "Please indicate why you cannot or do not want to bicycle in Colorado Springs" [36]



Additional analysis of the survey data revealed strong preferences for the types of facilities where people would feel comfortable bicycling (Figure 17). Few respondents expressed they would feel very comfortable bicycling in shared lane markings or unseparated bike lanes (8 percent and 16 percent, respectively). By contrast, the majority would feel very comfortable in curb-protected and barrier-separated bike lanes (65 percent and 72 percent, respectively). Less than 10 percent of respondents indicated they would be uncomfortable in these types of facilities. The comfort of various bicycle facilities types is discussed in greater detail in the next section of the report.

[36] Note that respondents could choose up to three answers.

Figure 17. Summary of Responses to the Question: "How Comfortable Would You Feel Biking Here?" for Various Facility Types.

Facility Type	Image Shown	Survey Responses
Shared Lane Marking		
Unseparated Bike Lane		
Neighborhood Street		
Curb-Protected Bike Lane		
Barrier-Separated Bike Lane		

Quality of Facilities

The quality of a bicycle network is just as important as having a network at all. A connected network of high quality and low-stress bicycle facilities can increase ridership by attracting a wide range of bicyclists.

Bicyclist comfort or conversely, traffic stress, on a given street segment can be measured by conducting a Level of Traffic Stress (LTS) assessment. The low-stress bicycling concept is premised on the successful experience of the Dutch, who have focused on building a connected bicycle network that minimizes bicyclist interaction with motorized traffic. This same approach is now being used by a number of American cities.

The LTS model, developed by the Mineta Transportation Institute, roughly correlates to the experience of an Interested but Concerned rider.[37] The assessment uses data on speed limits, number of lanes, pavement width, presence of on-street parking, and presence of bike lanes to determine four levels of traffic stress (Table 4), with LTS 1 being the lowest stress (most comfortable) and LTS 4 being the highest stress (least comfortable). Interested but Concerned riders generally prefer and only ride on LTS 1 and 2 streets.

Table 4. Level of Traffic Stress Ratings

Level of Traffic Stress Rating	Description
LTS 1	Little to no traffic stress. Generally suitable for the entire population.
LTS 2	Little traffic stress. Suitable for most adults, even those with little confidence or experience interacting with motor vehicles.
LTS 3	Moderate traffic stress. Uncomfortable and unappealing for some, but suitable for more experienced bicyclists.
LTS 4	High traffic stress. Only suitable for very skilled bicyclists who are comfortable with proximity to high-speed and/or high-volume traffic.

Corridors are assessed by their weakest link and therefore, intersections are another major factor in assessing LTS. A low-stress street may be comfortable due to slow traffic speeds and the presence of a bike lane, but if that street crosses a major roadway without accommodation for bicyclists, an Interested but Concerned rider is unlikely to take that route. Intersections are assessed based upon presence of signalization, bike lane interaction with a right turn lane, and characteristics of the cross street (number of lanes, speed, presence of median).

[37] Mekuria, M, P. Furth and H. Nixon. (2012, May) "Low-Stress Bicycling and Network Connectivity." Mineta Transportation Institute.

Stress Assessment

As a way to demonstrate the varying levels of comfort of typical Colorado Springs streets, this section of the report presents an example street for each LTS category shown in Table 4. These range from LTS 1 (lowest level of stress) to LTS 4 (highest level of stress).

LTS 1: West Pikes Peak Avenue between North Spruce Street and 33rd Street

Along with well-designed trails and protected bike lanes, neighborhood (or local) streets can provide one of the lowest stress bicycling experiences. The low speed limit and traffic volumes on this segment of West Pikes Peak Avenue create a comfortable riding environment for bicyclists, even though they share the roadway with motor vehicle traffic. It is good practice to designate such streets as bike boulevards (also referred to as neighborhood greenways, neighborhood bikeways, or slow streets in other cities) and provide wayfinding to destinations and connecting routes.

Street characteristics:

- No striped parking lane
- Two travel lanes
- 25 mph
- Estimated daily volume under 3,000 vehicles per day (vpd)[38]

[38] Two traffic counts were available along this segment, from 2014 and 2011 which were 1,425 and 2,390 respectively. Streets with a 25 mph speed limit and no centerline with volumes under 3,000 vpd rate LTS 1.

LTS 2: East Bijou Street between N Union Boulevard and North Hancock Avenue

The relatively low speed limit and presence of a bike lane makes this segment of Bijou Street comfortable for most bicyclists. If parking turnover were frequent here, e.g., if this same cross section were in a commercial area, the street would be LTS 3 owing to the possibility of drivers opening car doors into the bike lane more frequently. A wider parking lane or bike lane would help lower stress in that case.

Street characteristics:

- 7’ parking lane
- 5’ bike lane
- Two travel lanes
- 30 mph

LTS 3: South Tejon Street between East Motor Way and Cheyenne Boulevard

This segment of Tejon Street is not particularly comfortable for most bicyclists even though it has a bike lane. The bike lane is adjacent to higher speed traffic with a posted speed limit of 35 mph. The higher number of travel lanes also implies higher traffic volumes and may encourage higher speeds during off-peak times.

Street characteristics:

- 5’ bike lane
- Four travel lanes
- 35 mph

LTS 4: Hancock Expressway between Delta Drive and South Academy Boulevard

This section of road is generally uncomfortable to bicyclists, except those who have a high tolerance for fast-moving traffic. Most bicyclists would feel unsafe on this segment and would likely choose to ride on the sidewalk rather than in the bike lane.

Street characteristics:

- 6’ bike lane
- Four travel lanes and center turn
- 40 mph

Intersection Example

Many low-stress streets in Colorado Springs cross major streets without accommodation for bicyclists. One example pertinent to a previously-identified low-stress street is the intersection of West Pikes Peak Avenue and 31st Street, an unsignalized intersection with two-way stop control for traffic on Pikes Peak Avenue.

At this location, bicyclists would need to cross four travel lanes on 31st Street without the possibility of waiting in a median refuge for a gap in traffic. Based on the LTS methodology for intersections, this intersection is rated as LTS 3, rendering the low-stress LTS 1 route on Pikes Peak Avenue unusable by those riders who will not tolerate that stress level.[39] Installation of a traffic signal would lower the intersection rating to LTS 2.

[39] Lowry, M., P. Furth and T. Hadden-Loh. (2015, January) "Low-Stress Neighborhood Bikeability Assessment to Prioritize Bicycle Infrastructure." Paper presented at the Annual Meeting of the Transportation Research Board.

Citywide Applicability

These examples are representative of many of the on-street bicycle facilities in Colorado Springs. This Plan will apply the low-stress approach, which pairs appropriate bicycle facilities with appropriate streets, to developing a long-term vision for a comfortable and safe bicycle network in Colorado Springs. The future network needs to be highly sensitive to street features such as automobile speed limits, traffic volumes, number of travel lanes, and intersection controls, among others.

Needs for the Bike Master Plan

To truly achieve a bicycle friendly community and increase bicycle ridership, a more institutionalized bicycle culture and a connected network of comfortable and safe bicycle facilities is needed.

Bicycle Identity

While Colorado Springs is home to an impressive number and quality of bicycle organizations, programs, and events, they are mostly focused on a relatively small subset of the population and have not yet permeated the broader city identity. The City has an opportunity to partner with others to focus additional programming on those who are interested in casual bicycling, to further galvanize the existing bicycle community, and to continue to educate the next generation of bicyclists.

Bicycle Friendly Street Design

As discussed in this report, street design and bicycle facility choice has a direct impact on safety and comfort. As demonstrated by public comments, crash analysis, and a comparison with national practices, the City's existing street design standards need to be updated in order to provide a bicycle network that will attract a broad range of riders. Low-stress principles should be applied to modified street design standards as well as a future network vision.

Wide streets are a hallmark of the city's street designs that simultaneously present a challenge and an opportunity. Whereas many cities struggle to retrofit bicycle facilities in constrained rights-of-way, the challenge for Colorado Springs is to implement facilities that are comfortable and publically-accepted given the high traffic volume and speed that are common on those wide roadways.

Intersections, the location of most bicycle crashes, need to be improved to provide a clear path for all modes of travel, reduce vehicle speeds, provide protection for bicyclists where appropriate, and to improve yielding for all modes of travel.

Strategic Investment

Building a better bicycle network in Colorado Springs will require strategic investment decisions and a high degree of public support as many of the simpler projects have already been implemented. This report has demonstrated that a base of support for bicycling already exists among some members of the public and within city government. This enthusiasm and commitment to bicycling will be critical as Colorado Springs seeks to address the challenges and obstacles to bicycling across the community. Its historic land use and transportation development pattern has resulted in a dispersed population and disconnected street grid outside the downtown core. For that reason, bicycle activity varies by geographic location. The City should decide where to focus its near-term bicycle infrastructure in order to serve the most bicyclists, improve the locations with the biggest safety issues, and create public and political momentum for future change.