COLORADO SPRINGS BIKE SHARE

Business and Implementation Plan
FINAL REPORT

Toole Design Group

COLORADO SPRINGS

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1. Introduction

Downtown Ventures, a non-profit arm of Downtown Partnership, engaged Toole Design Group (TDG) to investigate the feasibility of implementing a bike share system in Colorado Springs, Colorado. This report was made possible through the financial support from the City of Colorado Springs, Colorado College, Penrose-St. Francis Health Services, and the Downtown Development Authority, and is under the fiscal agency of Downtown Ventures.

This plan provides an overview of what a bike share system could look like in terms of users, system size, phasing, and cost, while also providing a blueprint for system implementation. The study followed the process outlined in **Figure 1** and includes stakeholder outreach and goal setting, community analysis, system development, and a financial analysis.

Figure 1 Plan Process

This report includes the following components:

Chapter 2 presents the results of a community analysis that explores the preparedness of the City for bike share. These results are used in Chapter 4 to develop a preliminary system plan and phasing strategy.

Chapter 3 outlines the system goals that were developed from meetings with stakeholders, City representatives and other agency staff, economic development and public health professionals, and other interest groups.

Chapter 4 presents the bike share demand analysis and the opportunities and challenges of implementing bike share in Colorado Springs.

Chapter 5 provides an overview of the principles of bike share planning and the system plan development. The conclusion of this exercise is the draft system phasing plan.

Chapter 6 outlines station siting guidelines to be used during project implementation.

Chapter 7 gives an overview of the social and geographic equity considerations of implementing bike share in Colorado Springs.

Chapters 8 presents an analysis of the financial needs and performance of a potential bike share program in Colorado Springs.

Finally, **Chapter 9** provides an overview of governance structures, implementation considerations, and project next steps.

2. Existing Conditions

Understanding the context into which a bike share program would be introduced is important in determining whether such a program is feasible. This includes an evaluation of factors that impact general bicycling conditions or the potential market demand for bike share such as topography, weather, transportation infrastructure and demographics.

Physical Conditions

Colorado Springs, located approximately 70 miles south of Denver, is the second largest city in Colorado with a population of almost 470,000 people. Situated in the high desert with the Rocky Mountains to the west and the Palmer Divide to the north, the city is physically large (approximately 195 square miles[1]) and hilly, especially outside of the central city. The city officially sits at an altitude of 6,035 feet, while Manitou Springs is at 6,320 feet.[2] Downtown Colorado Springs is located on the central southwest side of the City and includes a high proportion of the region's employment and governmental services. Downtown is also home to numerous cultural, entertainment, and visitor attractions.

Colorado Springs has variable weather patterns with pronounced winter and summer weather. Summer temperatures are moderate (average highs are between 79 and 84 F between June and August).[3] August is the rainiest month, averaging 3.5 inches.[4] Winter temperatures are variable in Colorado Springs so while the average snowfall exceeds three inches between October and April (March is the snowiest month), temperatures can vary greatly by week or even by day. Therefore, despite the snow and colder weather, bicycling can be a year-round activity in Colorado Springs.

Colorado Springs Snapshot

(Based on 2010 U.S. Census)

469,886 / Population (2013)

2141 / Persons per square mile

6,035 Feet / Elevation

$53,962 / Median household income

36% / Bachelor's degree or higher

[1] US Census Bureau. Colorado Springs (city), Colorado. 2010. http://quickfacts.census.gov/qfd/states/08/0816000.html
[2] Colorado Springs. High Altitude Effects & Tips. Accessed 16 Oct. 2015. http://www.visitcos.com/high-altitude-effects-tips
[3] Intellicast. Historic Average, Colorado Springs, CO. Accesses 20 Aug. 2015. http://www.intellicast.com/Local/History.aspx?location=USCO0078
[4] Ibid.

Figure 2 Downtown Colorado Springs

Demographics

Bike share ridership is influenced by density and land-use; it tends to work best in places where more people live, work, play, and take transit. Also, certain segments of the population have been shown to be early adopters of bike share in other cities. Deploying a system in areas of Colorado Springs with these characteristics will help to maximize early success.

The city as a whole represents a population density of approximately 2,141 persons per square mile, which is comparable to some other cities with successful bike share systems including Fort Worth (2,180 persons per square mile) and Salt Lake City (1,667 persons per square mile).

Commuter Behavior

Colorado Springs is a predominately auto-oriented city with single occupancy vehicle use representing approximately 79 percent of all commuting trips (**Figure 3**). Approximately 5 percent of people bicycle, walk, or take public transportation to work. The city's relatively high driving rate is related to low development densities, auto-oriented land-uses in most areas, and the provision of free or inexpensive parking.[5] Bike share could provide an opportunity to replace some motor vehicle commute trips (i.e., encourage mode shift) and also create options for non-driving commuters to make trips during the day.

[5] US Census Bureau. 2008-2012 American Community Survey 5-Year Estimates File B08101 Means of Transportation To Work By Age.

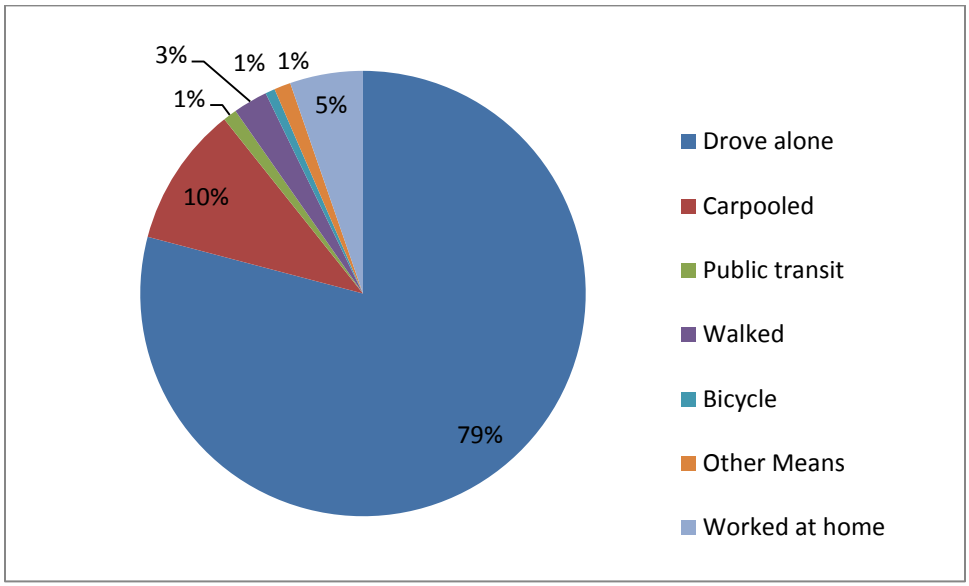

Figure 3 Journey to Work Mode Share in Colorado Springs[6]

Bicycling is a popular and effective way to get around town, however only 0.7 percent of workers 16 years and older commute to work by bicycle. Colorado Springs has been recognized by the League of American Bicyclists as a Silver Level Bicycle Friendly Community.[7] A map of bicycle facilities in Colorado Springs is included in **Figure 4.**

While there has been little academic research regarding the link between the provision of bicycle facilities and bike share ridership, there is a significant volume of research that shows a positive relationship between bicycle facilities and bicycling levels.[8,9,10,11] For example, Buehler and Pucher found that cities that made a 10 percent increase in bike facilities saw a 2 to 3 percent increase in bicycle commuting compared to cities with no change in facilities.

Visitors and Tourism

Tourists, visitors, and other casual users provide an important revenue stream representing approximately two-thirds of user-generated revenues in peer cities. This may be because tourists and visitors are less cost-sensitive and are willing to pay higher fees to keep the bicycle out longer.

The Pikes Peak region is a popular destination for tourists seeking scenery, rock formations and other unique geological features, like Pikes Peak and Garden of the Gods. Also popular are cultural, educational, and historical attractions including the Colorado Springs Fine Arts Center located south of Colorado College on Cascade Avenue and the Colorado Springs Pioneers Museum in downtown, among others. Colorado Springs is also home to one of three United States Olympic Training

[6] US Census Bureau. 2013 American Community Survey 5-Year Estimates File B08101 Means of Transportation to Work By Age.
[7] "The Bicycle Friendly Community (BFC℠) program provides a roadmap to improve conditions for bicycling and the guidance to make your distinct vision for a better, bikeable community a reality" through the League of American Bicyclists. http://bikeleague.org/community
[8] Buehler, R. & Pucher J. (2012). *Cycling to Work in 90 Large American Cities; New Evidence on the Role of Bike Paths and Lanes*.
[9] Dill, J. & Carr, T. (2003). *Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them, Commuters Will Use Them*.
[10] Hunt, J. & Abraham, J. (2007). *Influences on Bicycle Use*. Transportation, 34, 453–470.
[11] Parkin, J., Wardman, M. &Page, M. (2008). *Estimation of the Determinants of Bicycle Mode Share for the Journey to Work Using Census.*

Centers and the headquarters of the United States Olympic Committee. In addition to other large festivals and events, the city has hosted part of the USA Pro Challenge bicycle race three times, and anticipates an opportunity to host again in the future.

According to the Colorado Springs Convention and Visitors Bureau, Colorado Springs attracts 5.2 million overnight visitors each year, and tourism is the region's third largest industry.[12,13] There are over 14,400 hotel rooms in the Pikes Peak Region and the greater downtown area boasts four primary hotels with nearly 600 rooms. Other hospitality clusters are located in southwest Colorado Springs and smaller properties on the west side and in Manitou Springs.

Staying Competitive

Bike share can help Colorado Springs stay relevant and competitive with its peer cities, especially to attract new businesses and tourism. **Tables 1** and **2** provide an overview of how Colorado Springs compares to other cities in terms of their bicycle friendliness and provision of bike share. Bicycle friendliness rankings are based on the League of American Bicyclists' Bicycle Friendly Community evaluation which evaluates legislation and enforcement, policies and programs, infrastructure and funding, education and encouragement, and planning. There are five potential rankings: bronze, silver, gold, platinum, and diamond that indicate a community's bike friendliness. In 2012, the League designated Colorado Springs as Silver-level Bicycle Friendly Community.

Table 1 Business Attraction Comparison Cities

City	League of American Bicyclist Ranking	Bike Share?
Huntsville, AL	N/A	No
Minneapolis, MN	Gold	Yes
Phoenix, AZ	Bronze	Yes
Salt Lake City, UT	Silver	Yes
San Antonio, TX	Bronze	Yes

[12] Colorado Springs Convention and Visitors Bureau. "Fast Facts – Colorado Springs." Accessed Oct. 13, 2015. http://www.visitcos.com/fast-facts

[13] Colorado Springs Convention and Visitors Bureau. 2014 Annual Report. http://www.visitcos.com/sites/default/files/Annual%20Report-2014change.pdf

Table 2 Tourism Comparison Cities[14]

City	League of American Bicyclist Ranking	Bike Share?
Albuquerque, NM	Bronze	Yes
Austin, TX	Silver	Yes
Boise, ID	Silver	Yes
Denver, CO	Silver	Yes
Estes Park, CO	N/A	No
Kansas City, MO	Bronze	Yes
Oklahoma City, OK	N/A	Yes
Phoenix, AZ	Bronze	Yes
San Diego, CA	N/A	Yes
Salt Lake City, UT	Silver	Yes

[14] The Colorado Springs Convention and Visitors Bureau provided a list of the top ten cities to use for comparison.

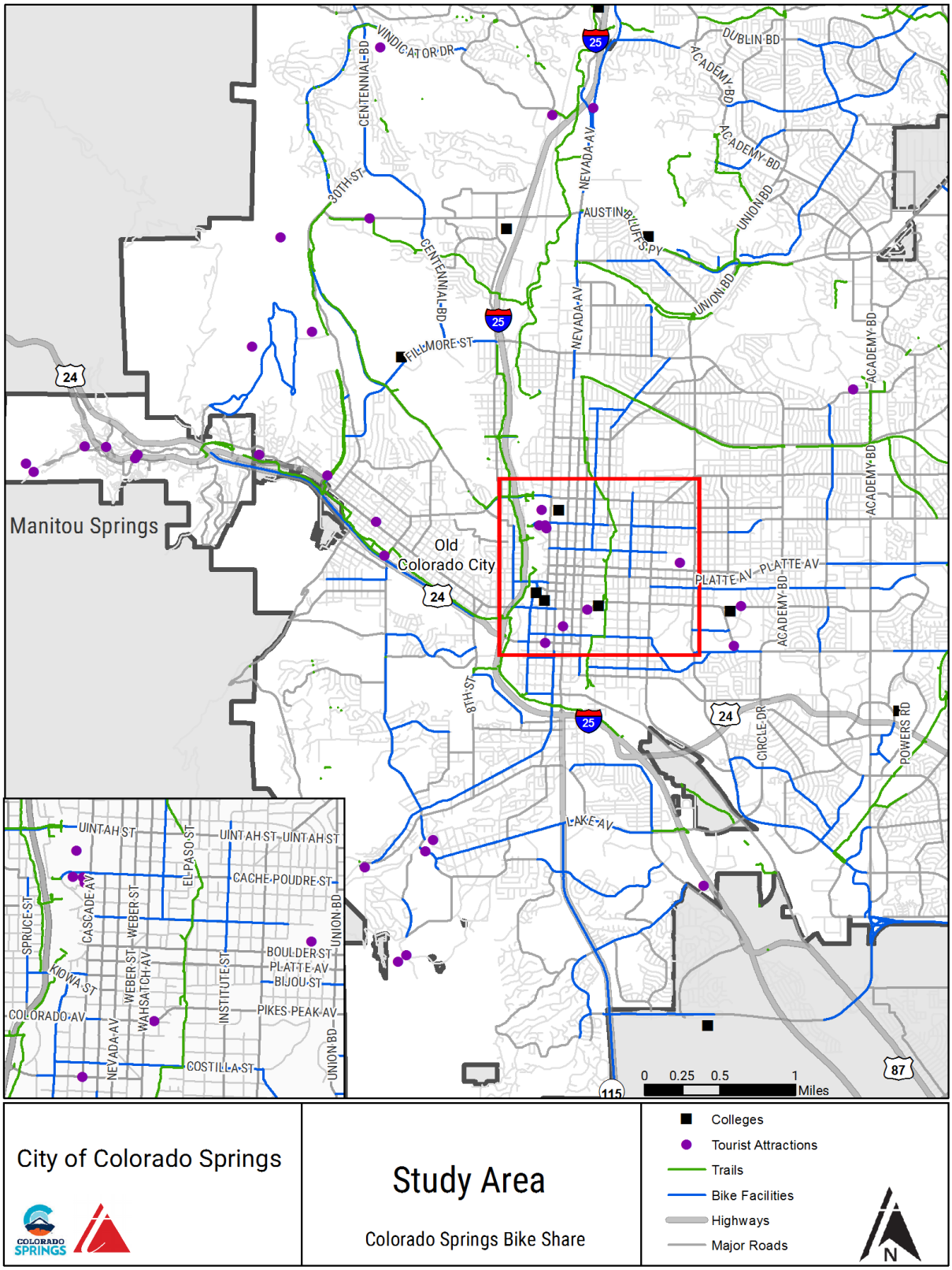

Figure 4 Study Area Map

3. Stakeholder Engagement and Goals

Involving the local community in the planning process was important to developing goals, identifying challenges and opportunities, and building understanding of a bike share program.

The project was overseen by a Bike Share Steering Committee, composed of representatives from the Colorado Springs Downtown Partnership, Colorado Springs City Council, the City, Penrose-St. Francis Health Services, Colorado College, YMCA of the Pikes Peak Region, Urban Intervention/Altitude Land Consultants, Bike Colorado Springs, HB&A, Bicycle Colorado, Walker Asset Management Realty, and Colorado Springs Independent. The Steering Committee served as advisors throughout the process and reviewed project deliverables.

The project team also engaged a series of stakeholders representing a variety of disciplines and interests. Overall, the project team gathered information from over 20 organizations during three focus groups held on July 28, 2015. These organizations included:

- Bike Colorado Springs
- Catalyst Campus
- City of Colorado Springs (including representatives from the Departments of Transportation; Parks, Recreation and Cultural Services; Planning and Development)
- Colorado Springs City Council
- Colorado College
- Colorado Springs Downtown Partnership
- Council of Neighbors and Organizations
- HB&A
- Ivywild Improvement Society
- Kaiser Permanente Southern Colorado
- Middle Shooks Run Neighborhood
- Mountain Metropolitan Transit
- Nor'wood Development Group
- Old North End Neighborhood
- Organization of Westside Neighbors
- Penrose-St. Francis Health Services
- SRAM
- Trails and Open Space Coalition
- United States Olympic Committee
- YMCA of the Pikes Peak Region

A summary of their input is provided in the section that follows.

Stakeholder Input

Stakeholders were asked to identify how bike share might be relevant to their organization and to identify any opportunities and challenges to implementing a bike share system. Their responses show a clear desire to change the perceptions of Colorado Springs, to provide a new tourist and visitor amenity, and to increase the amount and quality of bicycle infrastructure in the city. Noted challenges related to funding and the lack of a complete bicycle network, which is a particularly challenging barrier for novice riders.

Stakeholders identified the following opportunities for bike share in Colorado Springs:

- Using the system as an economic development tool – not only to attract and retain workforce talent but to attract visitors and tourists to Colorado Springs and to use the system to connect these people to their destinations.
- Providing a catalyst for greater improvements to bicycle infrastructure in the city and a dramatic change to help the City enhance its reputation as livable and bicycle-friendly.
- Improving connections across the city, especially to transit, recreational activities, and neighborhoods.
- Engaging a variety of stakeholders to support and promote the system and create local opportunities for sponsorship where possible.
- Ensuring that the system is affordable and engages lower-income communities. This could include locating stations in low-income communities, reducing barriers to access (such as the need for a credit card), and engaging targeted marketing toward low-income populations.
- Creating a sustainable business model to operate the system on an ongoing basis.

System Goals

Based on the input received from the project steering committee and other stakeholders, a bike share system in Colorado Springs should meet the following three goals:

Mobility - Offer an additional transportation option for residents, students, employees, and visitors to Colorado Springs.

Economic - Increase the attractiveness of Colorado Springs as a place to live, work, visit and do business. Support the tourism industry by offering a new amenity for visitors.

Bicycling - Increase the rate of bicycling in Colorado Springs and use bike share as a catalyst for more bicycle infrastructure improvements.

4. Bike Share Demand Analysis

The project team undertook a GIS-based heat mapping analysis to understand where bike share might be most successful in Colorado Springs and conducted a review of how some of the physical, demographic, and cultural characteristics might impact the potential demand for bike share. This analysis aggregated various data including:

- Physical conditions (topography);
- Population density;
- Employment density;
- Colleges and universities;
- Visitor attractions;
- Transit stops and hubs; and
- Bicycling infrastructure.

The methodology includes point allocations based on an area's performance in each of the above categories. Points were summed to provide a "suitability" score for each area. The weighting and methodology used for each variable are described in **Table 3** and the results of the heat mapping analysis are shown in **Figure 5.**

Table 3 Heat Mapping Scoring and Methodology

Variable	Points	Methodology
Tourist Attractions	20	Point locations based on information from TripAdvisor, including major arts, culture, sporting venues, and tourist attractions.
Population Density	19	Census blocks grouped into quartiles based on their population density. Census blocks assigned scores based on which quartile they fall, e.g. top quartile = 20/20, bottom quartile = 5/20.
Employment Density	19	Census blocks grouped into quartiles based on their employment density. Census blocks assigned scores based on which quartile they fall, e.g. top quartile = 20/20, bottom quartile = 5/20.
Topography	15	The flattest areas of the city received more points than the hilliest. Assuming that a lower street grade is more conducive for cycling, a 0-3% grade is considered good and therefore no negative weighting was applied; a 4-6% grade had a -33% weighting applied; a 6-10% grade had -66% weighting applied, and any grades over >10% had a -100% weighting applied.
On- and Off-Street Bike Routes	10	On- and off-street bike routes as provided by the City of Colorado Springs with a 0.125 mile buffer added to account for proximity.
College or Universities	8	College campuses were assigned points to the entire campus area.
Transit Hubs	5	Transit hubs, including park-and-rides and transit centers, were included.
Transit Stops	4	Transit stops grouped into quartiles based on ridership data. Stops assigned scores based on which quartile they fall, e.g. top quartile = 30/30, bottom quartile = 7.5/30. Scores graduated from the maximum score within a ¼ mile radius from the point location and decreasing out to ½ mile radius from the point location.
TOTAL	**100**	

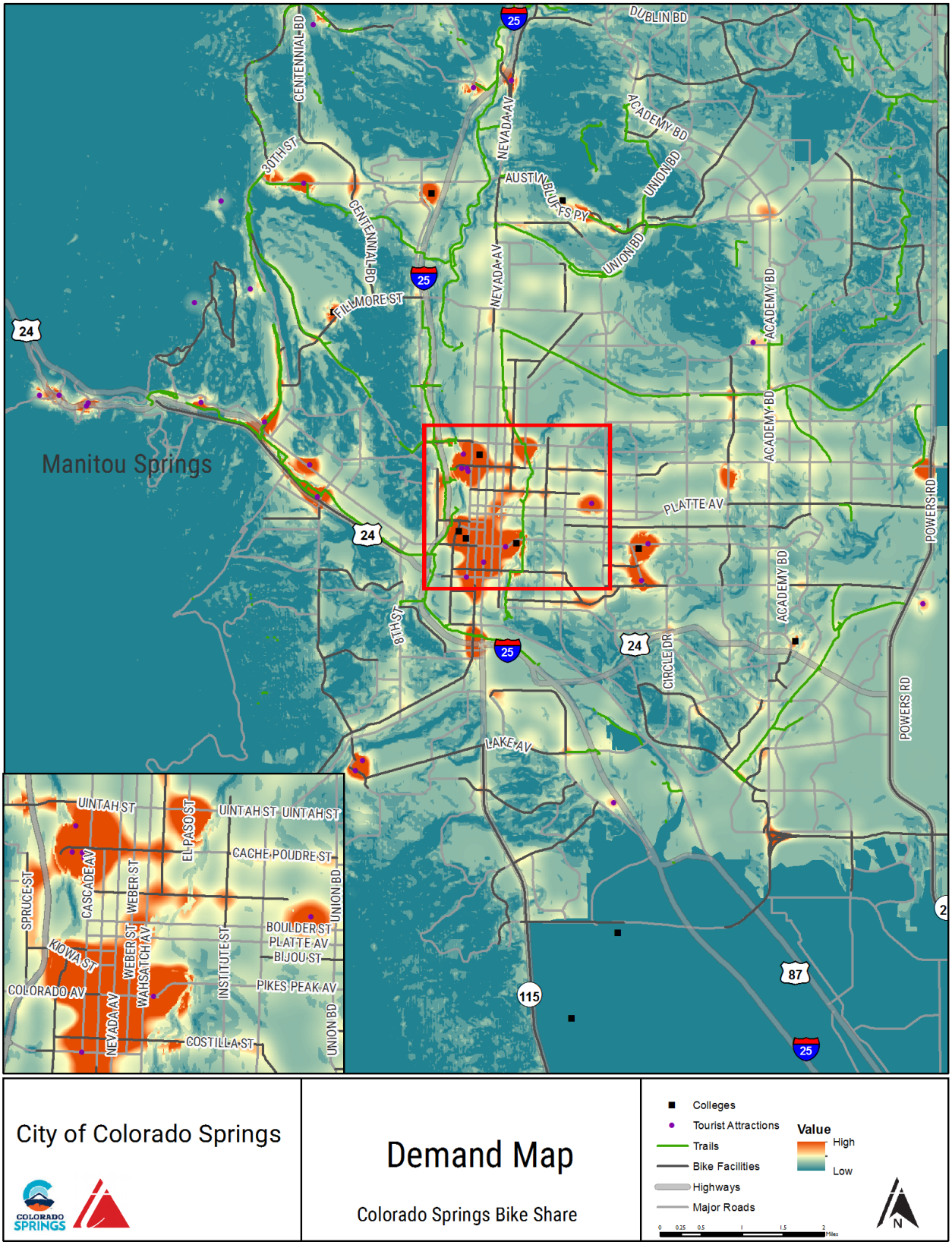

Figure 5 Colorado Springs Demand Map

Summary of Demand Analysis

Potential Bike Share Service Area

Based on the heat mapping exercise and stakeholder input, the major concentrations of activity are around Downtown Colorado Springs, Colorado College, Memorial Park including the Printers Parkway area, the United States Olympic Training Center, Old Colorado City, Manitou Springs, and isolated pockets of development into the north.

Potential Bike Share Users

The demand analysis, national best practices, and stakeholder input were used to identify potential users of bike share in Colorado Springs, including:

- Residents living in the service area using the system to access local services, destinations, restaurants, and entertainment venues.
- Commuters travelling to the service area making first and final mile connections to and from transit or those that drive into Downtown and want a way to move about throughout the day.
- Students, staff, and faculty of Colorado College or other colleges making first and final mile connections to and from transit, to access nearby commercial districts, restaurants, entertainment venues, campus, and student housing.
- Out-of-town visitors to Colorado Springs connecting from their hotels to conference facilities, visitor attractions, commercial districts, and recreational opportunities.
- Day visitors connecting recreational and visitor attractions.

Bike Share Opportunities and Challenges

Based on stakeholder input, the characteristics of the city, and the demand analysis, the primary opportunities for bike share in Colorado Springs include:

- Downtown Colorado Springs and the immediately surrounding area offer a variety of land-uses with a generally well-connected, grid-like street pattern that encourages bicycling.
- Bike share can provide access to transportation, jobs, and other services.
- Bike share can reduce household expenditure on transportation. For example, annual members of Capital Bikeshare in Washington, D.C. saved an average of $800 per year on personal transportation costs.[15]
- Bike share can attract and retain residents, students, and workforce talent. Many communities use it as a tool in their revitalization and redevelopment efforts and to promote their image as a forward thinking, bicycle-friendly community. Bike share embraces new technology, social media, and is part of the new sharing economy, which are attractive characteristics to younger demographics and professionals.

[15] 2013 Capital Bike Share Annual Member Report. Accessed Nov. 18, 2014. http://www.capitalbikeshare.com/assets

- The City has a significant tourist and visitor market and bike share offers a unique way for tourists to see the city, helping attract their spending power. Tapping into this demographic will help boost user-generated revenues. Bike share could provide a means for hotel guests to move about the city without needing an automobile.
- Bike share can serve day visitors looking to experience Colorado Springs' multiuse trails and can strengthen the city's reputation as a bike-friendly and destination for bicycling and the outdoors.
- The level of press coverage generated by a bike share system would serve to emphasize the city to visitors, businesses, and employers. For example, the launch of Charlotte B-cycle in North Carolina received exposure in 18 newspapers including the New York Times.[16]
- Bike share can positively impact businesses located near stations. A study of annual members of the Nice Ride system in Minneapolis and St. Paul, MN found that annual members made a number of commercial trips that they would otherwise not have made because of bike share. The researchers calculated that Nice Ride annual members created an additional $150,000 in economic activity at local businesses over the course of one bike share season.[17]
- Similarly, a 2013 study of five Capital Bikeshare stations suggests a positive economic impact on surrounding commercial areas.[18] A majority of riders travelling to these stations spent money within a four block area and planned to return to the neighborhood on a regular basis. Further, approximately 20 percent of riders to these stations would not have made the trip if not for bike share, suggesting that bike share generated new spending trips to these commercial areas.
- There is a large concentration of employment in downtown Colorado Springs including governmental, defense, non-profit, education, finance, and health employers.[19] Large employers could be interested in sponsorship and could provide bike share membership as a wellness benefit for employees or as part of their transportation demand management programs.
- The large student, faculty, and staff populations at Colorado College and University of Colorado- Colorado Springs are potential early adopters of the system.
- Major student housing developments could be well-used bike share locations to connect students to campus and to other community amenities.
- A bike share system can create a small number of local jobs to operate and maintain the system.

[16] From the Sponsor's Perspective (2013). Accessed Dec. 12, 2013. www.bikeshare.com
[17] Schoner, J.E., Harrison, A., and Wang, X. (2012). "Sharing to Grow: Economic Activity Associated with Nice Ride Bike Share Stations." Humphrey School of Public Affairs, University of Minnesota.
[18] Anderson, Ryan, et al. "Economic Impact and Operational Efficiency for Bikeshare Systems." 2014. http://ralphbu.files.wordpress.com/2014/01/virginia-tech-capital-bikeshare-studio-report-2013-final.pdf
[19] Colorado Springs Regional Business Alliance. Major Employers. Accessed Aug. 18, 2015. http://www.coloradospringsbusinessalliance.com/economic-development/business-climate/major-employers-20130417133725

- Bike share offers a first- and last-mile connection to and from transit and should be provided as an option at major transit centers.
- Colorado Springs has a growing bicycling culture, particularly around the University campus, and an extensive bikeway network that can be used to provide bike share users with a comfortable and safe way to move between stations. Colorado Springs' bicycle infrastructure will help encourage greater levels of bike share ridership, especially among less experienced riders and tourists.

The primary challenges of establishing a bike share system in Colorado Springs include:

- While the bike network is growing throughout the city, the lack of a unified bicycle network may impede the success of a bike share system. Therefore, improved infrastructure is critical.
- Population and employment densities are low in many parts of Colorado Springs so bike share demand may be lower in these areas. Therefore, stations should be focused around the highest density locations and top activity centers.
- The hilly topography of Colorado Springs can be a challenge for riders so the station locations and bicycle equipment should be chosen with this in mind.
- Single occupant motor vehicle travel represents a high portion of trip-making in the region so making bike share a fun, seamless, and convenient alternative will help attract new users to the system.
- There are still many streets in Colorado Springs that are less comfortable for new and inexperienced bicyclists so providing maps and other information about safe riding will be key.

5. Preliminary System Plan and Phasing

This chapter outlines the principles of bike share planning, the key characteristics of successful systems, and the process for developing a system plan. The chapter includes a summary of recommendations for service area, size, and phasing of a potential bike share system.

System Planning Principles

Bike share planning principles developed from industry best practices and peer city experiences are described below. These characteristics were used to develop system characteristics for Colorado Springs.

Density and Breadth of Coverage

A key decision relates to the balance between station density and breadth of coverage. Some cities have chosen to launch their initial system with a high density of stations in a smaller area (e.g., Chattanooga, Salt Lake City, etc.), whereas others have chosen to spread stations out at lower densities as to cover a larger area (e.g., Minneapolis-St. Paul, Madison, etc.). There are a number of aspects to consider in making this decision:

- Providing stations at high densities maximizes the visibility and utility of the system by providing users with a reasonable expectation that there will be a station within walking distance from anywhere in the system area. It also provides redundancy so that if a station is empty or full, a user can go to a nearby station and find an available bicycle or an empty dock.
- If stations are provided at high densities but the coverage area is too small, then the system may not serve a sufficient range of destinations and may not be an effective alternative to walking. For more dispersed systems or for stations at the edges of the system, it is important to make sure there is additional capacity available (i.e., more docking points) so that users are not faced with empty or full stations.

In peer cities, station densities average approximately 6.5 stations per square mile and in most cities, station densities are higher in downtown and inner-city areas and become progressively lower as the system moves away from central neighborhoods.

System Size and Layout

A system that provides too few stations will be limited in the number of destinations it serves and may therefore be less attractive to potential users. However, cities must take a measured approach due to funding and other constraints and may choose to phase their implementation.

Station spacing and contiguity is important in determining a system size and layout. Some systems are designed in small clusters of stations while others are more evenly distributed. **Figure 6** shows the system layout for each of the four peer cities, showing how they can vary from dense to sparse or from clustered to linear.

Dock-to-Bike Ratios

Peer cities have adopted dock-to-bike ratios ranging from 1.5 to over 2.0 docks per bike. The dock-to-bike ratio is important as higher ratios reduce rebalancing needs and operating costs, but increase upfront capital costs related to station equipment and installation. A ratio of 1.7 docks-per-bike has been assumed for Colorado Springs to balance these factors.[20]

Methodology

To determine the appropriate bike share system size and location, the project team used system characteristics from peer cities to develop an average station density, applied that density to the system service area (developed from the demand analysis and stakeholder feedback), and created three proposed phases for bike share roll-out.

Peer City Comparison

Most of the major North American bike share systems launched after 2010. Several programs, in cities of comparable size or with similar characteristics to Colorado Springs, have come online more recently and provide data comparisons for this feasibility study. The following four peer systems were selected based on their similarities in population size, climate, tourism, and region:

- **Boulder B-cycle, Boulder, CO –** Mid-sized city with bus-only transit network, a university presence, and a high visitor population. The system is owned and operated by a 501(c)(3) non-profit, Boulder B-cycle. For the majority of bikes and stations purchased, Boulder B-cycle receives funding from federal, state, and local government grants.[21] Additional funding comes from private donors, sponsorships, memberships, usage fees, foundation grants, and federal grants awarded to the City of Boulder to fund a 2014 capital expansion.[22,23]
- **Denver Bike Sharing, Denver, CO –** Large city with a similar climate and high tourism market. The Denver B-cycle bike share system is owned and operated by Denver Bike Sharing, a 501(c)(3) non-profit organization. The system is funded through in-kind gifts, operating grants, sponsorship, and membership and usage fees.[24]

[20] Smart bike systems have different technologies depending on the vendor with different requirements for a docking mechanism. For a smart bike system like Phoenix's that doesn't require specialized docking points, this ratio is not as relevant, as bikes can be locked up outside of a docking point. Please note that when we discuss numbers of docks below, this is referring to systems that require a specific docking point only.
[21] Boulder B-cycle 2014 Annual Report. https://boulder.bcycle.com/docs/librariesprovider35/default-document-library/b-cycle-annual-report-2014.pdf?sfvrsn=4
[22] In 2014, the City of Boulder administered a federal TCSP transportation grant to fund Boulder B-cycle's $550,000 system expansion. The City was reimbursed $440,000 from the TCSP grant and $110,000 (20 percent local match) from Boulder B-cycle. This local match was sourced from a variety of local property owners and businesses that saw stations installed on their premises during the 16-station expansion.
[23] Kaiser Permanente. "Boulder B-Cycle to Expand by 70 Percent in 2014." March 19, 2014. Accessed Oct. 19, 2015. http://share.kaiserpermanente.org/article/boulder-b-cycle-to-expand-by-70-percent-in-2014/
[24] For greater detail of Denver B-cycle's funding structure, see the Denver Bike Sharing Sharing 2014 Annual Report. https://denver.bcycle.com/docs/librariesprovider34/default-document-library/annual-reports/2014-denver-bike-sharing-annual-report.pdf?sfvrsn=2

- **GREENbike, Salt Lake City, UT –** Southwest city with a bike share system started in downtown and is currently expanding. The system is owned by a non-profit and is operated by the Downtown Alliance. GREENbike is nearly a 50-50 public-private partnership with 48 percent of its funding from private sources.[25, 26] In 2014, GREENbike's non-ridership based operational revenue came from a title sponsor (SelectHealth), a basket sponsor (SelectHealth), 17 unique station sponsors, and an annual membership card sponsor.[27]
- **San Antonio B-cycle, San Antonio, TX** – Large southwest city with a bike share system geared toward recreational riders. San Antonio Bike Share, a 501(c)(3) non-profit, was created to meet the city's request to provide a bike share program, rentals, and tours. Federal grants from the Department of Energy, Centers for Disease Control and Prevention, and the Federal Transit Administration provided funding for initial purchase of system capital such as stations, bicycles, and solar panels.[28] The system is currently owned by the City, operated by San Antonio Bike Share, and funded through government grants, sponsorships, and membership fees.

The size, membership, and ridership characteristics of these systems are summarized in **Table 4** and provide a benchmark for estimating an appropriate size and scale of a bike share system in Colorado Springs. **Figure 6** shows the system size, coverage area, and station density of each peer system at a consistent scale to show their differences more clearly.

[25] GREENbike Annual Report 2014. https://configuringgreenbike.bcycle.com/docs/librariesprovider32/default-document-library/2014-annual-report.pdf?sfvrsn=2

[26] In 2014, public funds were received through a Transportation Alternatives Program grant via the Wasatch Front Regional Council, the Utah Department of Transportation, the Utah Transit Authority, the Utah Clean Air Partnership, and the Salt Lake Redevelopment Agency. Public funds were used exclusively for capital.

[27] GREENbike Annual Report 2014. https://configuringgreenbike.bcycle.com/docs/librariesprovider32/default-document-library/2014-annual-report.pdf?sfvrsn=2

[28] San Antonio Bike Share. Accessed Oct. 19, 2015. http://www.sanantoniobikeshare.org/about_us

Table 4 Characteristics of Comparable Bike Share Systems (2014 Annual Data)

	Denver, CO[29]	Boulder, CO[30]	Salt Lake City, UT[31]	San Antonio, TX[32]
System Name	Denver Bike Sharing	Boulder B-cycle	GREENbike	San Antonio B-cycle
Start Date	April 2010	2011	2013	March 2011
Technology	Smart Dock	Smart Dock	Smart Dock	Smart Dock
SYSTEM STATISTICS				
Number of Bikes	709	250	113	450
Number of Stations	84	38	16	53
Number of Docks	709	n/a	165	830
Dock-to-Bike Ratio	1.7	n/a	2.5	1.8
Bikes per station	8.4	6.6	7.1	8.5
Service Area (sq. mi.)*	13.2	5.8	1.5	10.2
Station Density (stations per sq. mi.)**	6.4	6.6	8	5.2
Population Density (people/sq. mi.)	4,193	4,021	1,720	1,383
MEMBERSHIP				
Casual Members	69,382	9,834	17,224	26,031
Annual Members	3,980	1,455	308	1,824
RIDERSHIP				
Total Annual Trips	377,229	43,143	46,264	65,560
Annual Member Trips	242,770	n/a	32,701	n/a
Annual Casual Trips	124,475	n/a	13,563	n/a
Trips per Bike per Day	1.5	0.8	0.7	0.4

[29] Denver Bike Sharing 2014 Annual Report. https://denver.bcycle.com/docs/librariesprovider34/default-document-library/annual-reports/2014-denver-bike-sharing-annual-report.pdf?sfvrsn=2
[30] Boulder B-cycle 2014 Annual Report. https://boulder.bcycle.com/docs/librariesprovider35/default-document-library/b-cycle-annual-report-2014.pdf?sfvrsn=4
[31] GREENbike Annual Report 2014. https://configuringgreenbike.bcycle.com/docs/librariesprovider32/default-document-library/2014-annual-report.pdf?sfvrsn=2
[32] San Antonio B-cycle. https://sanantonio.bcycle.com/

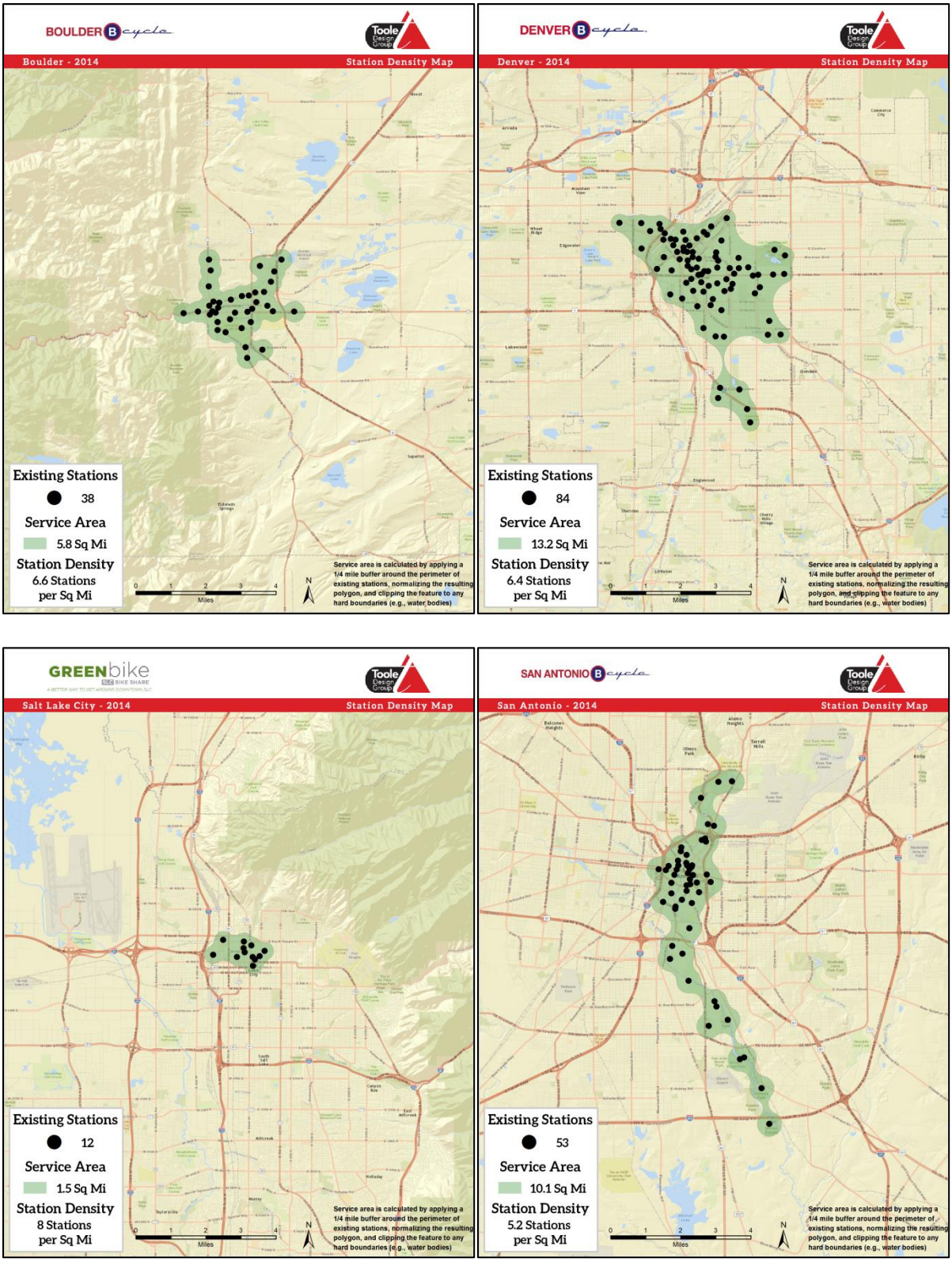

Figure 6 Comparisons of System Size, Coverage Area, and Station Density for Peer Bike Share Cities

System Phasing Plan

The area shown as "most suitable" for bike share in **Figure 5** includes an area of approximately 10 square miles encompassing Downtown, Ivywild, Colorado College, Old North End Neighborhood, Old Colorado City, Manitou Springs, Printers Parkway and eastern neighborhoods, Broadmoor, and the University of Colorado Colorado Springs (UCCS). This area would require approximately 65 stations at an average density of 6.5 stations per square mile. Given funding constraints and other factors, a phasing plan is recommended to allow for the city's core bike share development to be completed in phase one, with significant additions as phases two and three.[33]

The phasing plan is shown in **Figure 7** and summarized in **Table 5**.

Phase One – Downtown Core (26 stations)

The first phase would include 26 stations covering an area of approximately five square miles including the highest demand areas of Downtown, Colorado College, Penrose-St. Francis and the Bon Shopping Center, the United States Olympic Committee Training Center, and Memorial Hospital. The focus of this phase is to meet the demand of visitors and tourists so it would connect retail and restaurant districts with attractions and recreational areas such as the Pikes Peak Greenway Trail.

Phase Two – Old Colorado City, Manitou Springs, and Ivywild (10 stations)

The second phase would connect retail and restaurant districts with attractions and recreational areas within the City, including a westward expansion into Old Colorado City and Manitou Springs' tourist and recreational center. It also includes a southward expansion into the Ivywild neighborhood.

Phase Three – UCCS and Printers Parkway (26 stations)

The UCCS and University Village Colorado phase would cover two miles and 13 stations to serve the UCCS campus and its surrounding commercial and residential core. The Printers Parkway addition would capture the medical offices and residential neighborhoods to the east of downtown. At approximately two square miles, this portion of the expansion would include 13 stations. Combined, this expansion would complete the City's first five years of a bike share system.

Additional Phase – Broadmoor (3 stations)

The Broadmoor phase would cover approximately one half mile with three stations at and near the Broadmoor Hotel, one of Colorado Springs' top tourist attractions. Extending the core service area into this neighborhood could attract hotel visitors and tourists while also providing an amenity to the Broadmoor employees and staff members. This additional phase was not included in the financial analysis.

The phasing plan does not preclude future expansion into other areas or accelerated expansion into areas identified in later phases. Expansion should be considered after an initial operating period of six to 12 months when operation of the system is better understood and funding commitments for expansion are in place.

[33] This assumes that phase two would be completed in year three, phase three would be completed in year five, and the Broadmoor phase is completed as funding allows.

Table 5 System Phasing Plan

Phase	Description	Stations	Area (sq.mi.)	Station Density (stations/sq.mi.)
Phase One	Downtown, Colorado College, and inner-city neighborhoods	26	4	6.5
Phase Two	Old Colorado City, Manitou Springs and Red Rock Canyon Open Space, and Ivywild	10	1.5	6.7
Phase Three	UCCS Campus, University Village Colorado, Printers Parkway, and eastern neighborhoods	26	4	6.5
Additional	The Broadmoor Hotel and its surroundings	3	0.5	6.0
	TOTAL	**65**	**10**	**6.5**

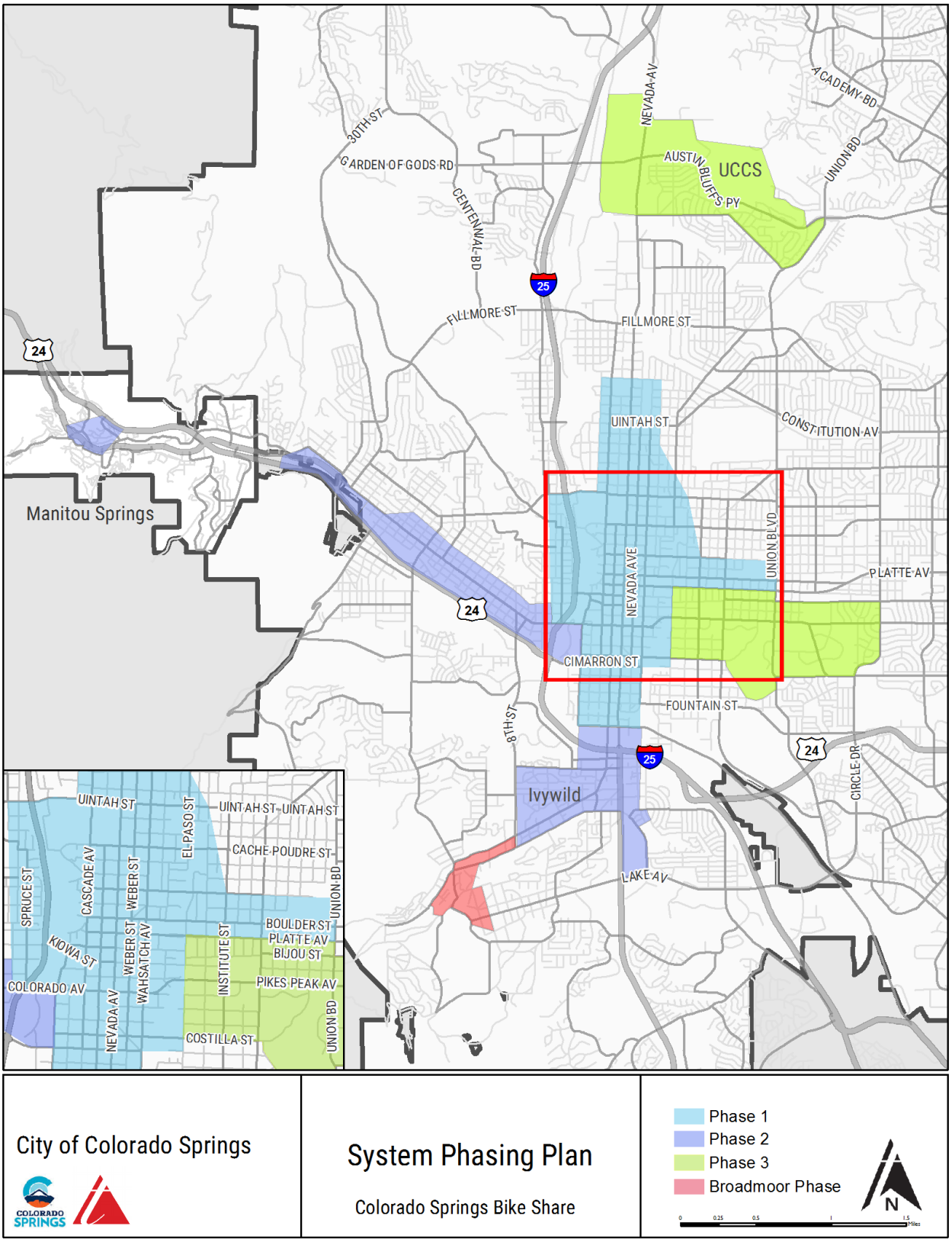

Figure 7 Proposed Phasing Plan

6. Station Siting

Stations should generally be placed in safe, convenient, and visible locations and can include installations in-street, on sidewalks, in parks and other public lands, or on private property through the use of a License Agreement with the property owner. Stations sited on public right-of-way will need to obtain a revocable permit from the City. In all instances, stations should be available at all times to the public and to the operator for the purposes of maintenance and bicycle redistribution.

Bike share stations should be placed on a hard, level, paved surface and must meet the solar exposure and cellular signal requirements specified by the equipment vendor. In cases where stations do not meet solar or connectivity requirements, hard wiring may be necessary.

The footprint of the station will depend on the proposed number of docks. Actual station dimensions will need to be confirmed once an equipment vendor is selected. However, approximate station sizes are shown in **Table 6**. For example, a 15 dock, single sided station is approximately 40 feet long and 6 feet deep.

The phasing plan does not show specific station locations. These will require additional public outreach and field work to confirm the availability of space, identify right-of-way and property ownership, meet the specific needs of the equipment vendor (such as solar exposure requirements), react to potential sponsorship agreements, and identify the interest of the adjacent property and business owners to finalize station locations.

Table 6 Approximate Station Dimensions

Characteristic	Approximate Dimension
Height	
Dock height	2’-8”
Kiosk/map panel height	7’-0”
Height to top of solar panel	11’-6”
Depth	
Base plate with dock	<3’-0”
Station with bicycle	<6’-0”
Length	
13 docks + kiosk	35’-0”
14 docks + kiosk	37’-6”
15 docks + kiosk	40’-0”
16 docks + kiosk	42’-6”
Additional docks	2’-6”

Sidewalk Site Requirements

Sidewalk sites should not interfere with existing pedestrian travel patterns and must maintain sufficient clearance to fixed objects and utilities. A revocable permit will need to be obtained if the site is located within the public right-of-way. Per the Colorado Springs City Code 3.2.213.F, requirements for station siting with the revocable permit are as follow:

1. No device or structure shall be so located or used so as to:

a. Interrupt the normal flow of vehicular or pedestrian traffic;

b. Interfere with the public's normal use of the public property upon which the structure, device or use is permitted, such as the overhang diagonally parked automobiles or the door-opening radius of parallel parked automobiles;

c. Interfere with any other device or structure lawfully existing thereon, such as parking meters, water meters, curb cuts, bus stops, etc. The device, structure or use shall not occupy more than one-fifth (1/5) of the width of any paved sidewalk. Whenever possible, devices and structures shall be installed on unpaved or unused areas of sidewalks or in connection with other devices or structures already installed which break the flow of pedestrian traffic.

2. Any device or structure shall be installed in such a manner so as to prevent it from being dislodged by any natural force such as wind or any man-made force such as an act of vandalism.

3. Devices and structures permitted shall be so constructed as to reduce so far as is feasible sharp edges or protrusions that could cause injury to persons or damage to property. Devices and structures shall be easily visible and recognizable with regard to the available light from street lighting and light emanating from adjoining property during periods of darkness.

4. Devices and structures shall be installed so as to eliminate the collection of litter under and upon the same insofar as possible, and to facility cleaning of the adjacent area of litter and snow.

A photo rendering of a potential sidewalk bike share station in Acacia Park is shown in

Figure 8**.**

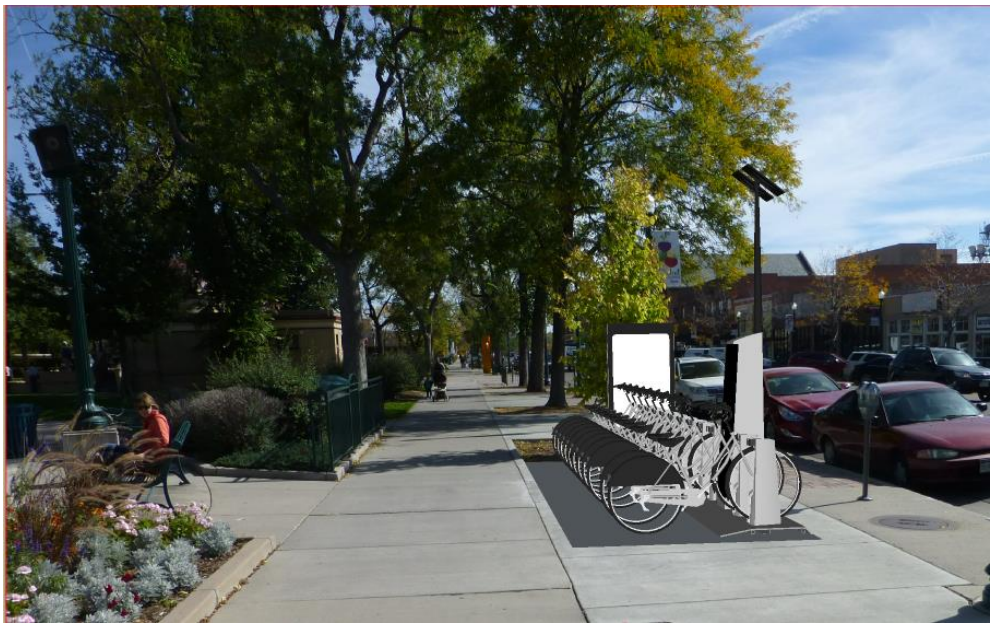

Figure 8 Example of a Potential Sidewalk Bike Share Station

On-Street Site Requirements

On-street stations are generally considered for streets with lower traffic volume and speeds. However, higher traffic volume streets can be considered where there is sufficient width for a user to pull a bike from the station without encroaching into the traffic lane, or where there is a buffer provided between the station and moving traffic (e.g., a bike lane or painted buffer).

On-street sites typically make use of converted parking spaces, though restricted parking areas may also be considered where these sites do not impact sight lines. It is preferred that on-street sites first consider conversion of non-metered parking and that any metered parking conversion be reviewed by the City's Parking Department. The process for permitting should follow the requirements set forth by the revocable permit process and the on-street bicycle corral application process.

Generally, on-street stations should first consider low traffic volume streets. However, higher traffic volume streets can be considered where there is sufficient width for a user to pull a bike from the station without encroaching into the traffic lane, or where there is a buffer provided between the station and moving traffic, e.g., a bike lane or painted buffer.

Standard safety treatments should be developed for on-street stations in consultation with the City's Traffic Engineering Department and may include street markings, flexible delineators, or other safety equipment. A photo rendering of a potential on-street bike share station on the roadway adjacent to Penrose-St. Francis Hospital in Colorado Springs is shown in **Figure 9**.

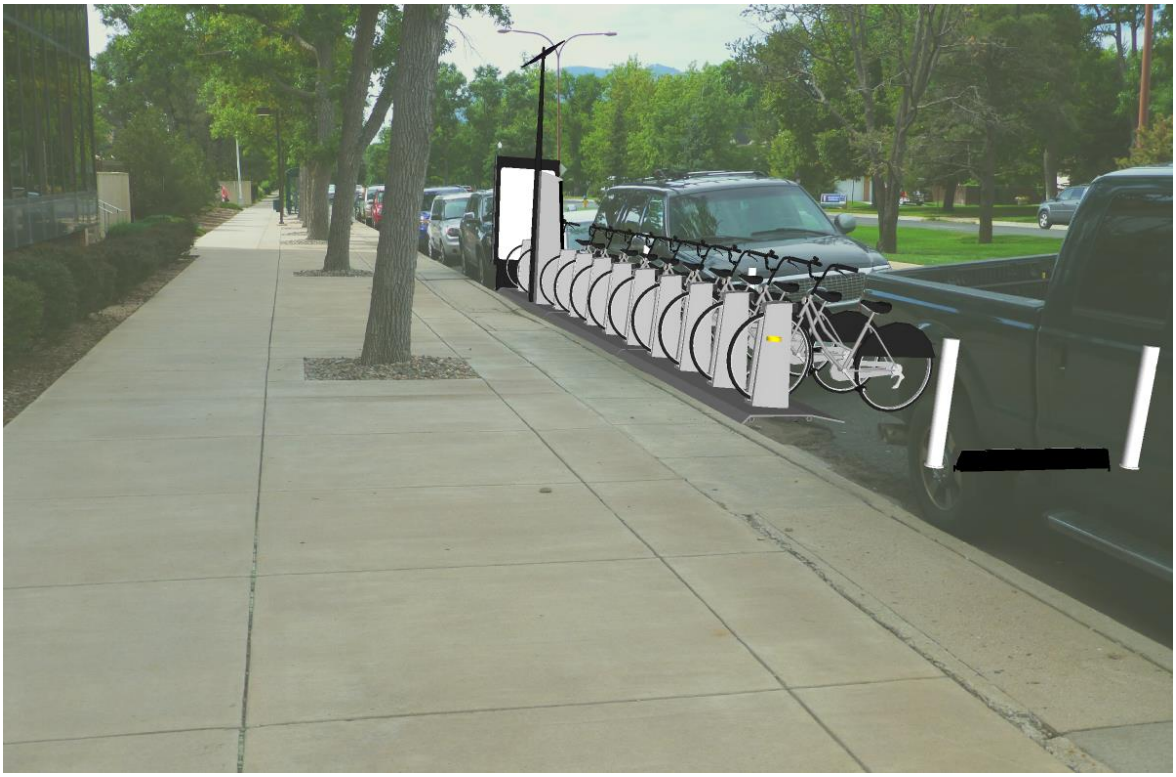

Figure 9 Example of a Potential On-Street Bike Share Station

Parks and Other Public Property

Stations may be placed on Parks Department or other City property at the discretion of the relevant agency. In general, the same guidelines as sidewalk siting apply to these sites. A photo rendering of a potential station at Bancroft Park is shown in **Figure 10**.

Figure 10 Example of a Potential Bike Share Station

Private Property

Stations may be placed on private property at the discretion of the owner. The operator must secure a License Agreement to establish the terms of use, to transfer liability, and to ensure the site is accessible to the public at all times. Generally, sidewalk siting guidelines apply to these sites, but the revocable permitting process would not be required for this type of siting. A photo rendering of a potential station at Ivywild School property is shown in **Figure 11.**

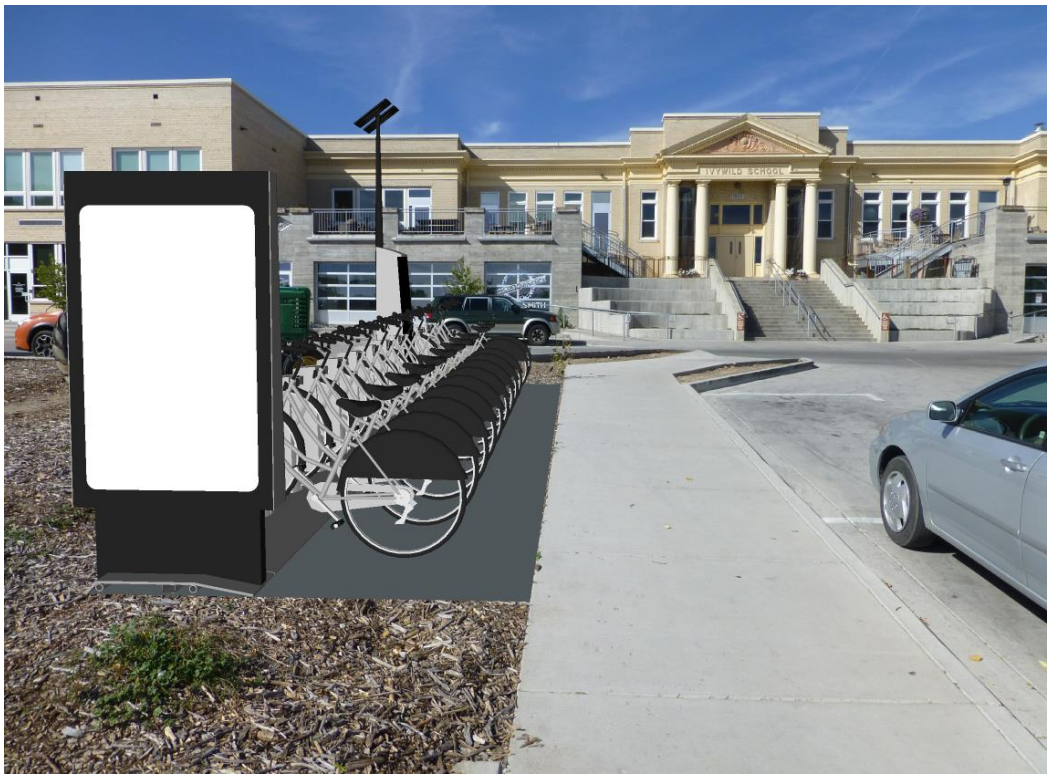

Figure 11 Example of a Potential Bike Share Station on Private Property

7. Social and Geographic Equity

In addition to serving visitors, bike share can become a viable transportation option for Colorado Springs residents. However, there are challenges in reaching all residents, particularly those in low-income and minority communities, due to station locations, a lack of bicycle infrastructure, cost, and cultural differences. To address these potential challenges and create an inclusive system, the following strategies are recommended.

Increasing Access to the System

A1. Station Locations

The system can provide good network coverage to low-income and non-white populations living within the proposed service areas.

Figure 12 shows the percentage of population with household income below the federal poverty threshold (i.e., an annual income of $23,850 for a family of four).[34] Citywide in Colorado Springs, approximately nine percent of households live below the federal poverty threshold.[35] **Figure 12** shows that several Census tracts within the proposed bike share service area include a higher percentage of people in poverty than the city average. This includes a significant part of the downtown core that comprises phase one; portions of Old Colorado City, Ivywild, and Manitou Springs in phase two; and a large portion of the Printers Parkway extension and part of the UCCS extension in phase three. Therefore, the proposed bike share area, particularly phase one, would serve low-income populations.

Related to race, the system would serve minority populations within the city (see **Figure 13**), including Census tracts that have a higher percentage of non-white populations than the city average of 20 percent. These areas include the downtown core of phase one, portions of phase two, and the UCCS campus area and Printers Parkway of phase three.[36]

A2. Commitment to Bicycle Infrastructure

Often bike share stations in low-income communities are not supported by an adequate bicycling network. Therefore, choosing station locations that maximize the existing bicycle network while supporting the development of more bicycle infrastructure will help to bridge the accessibility gap.

[34] US Department of Health and Human Services. 2014 Poverty Guidelines. Dec. 1, 2014. Accessed Oct. 19, 2015. http://aspe.hhs.gov/2014-poverty-guidelines
[35] US Census Bureau. 2009 – 2013 American Community Survey 5-Year Estimates. Accessed Oct. 16, 2015.
[36] US Census Bureau, ACS Demographic and Housing Estimates. 2009 – 2013 American Community Survey 5-Year Estimates. Accessed Oct. 16, 2015.

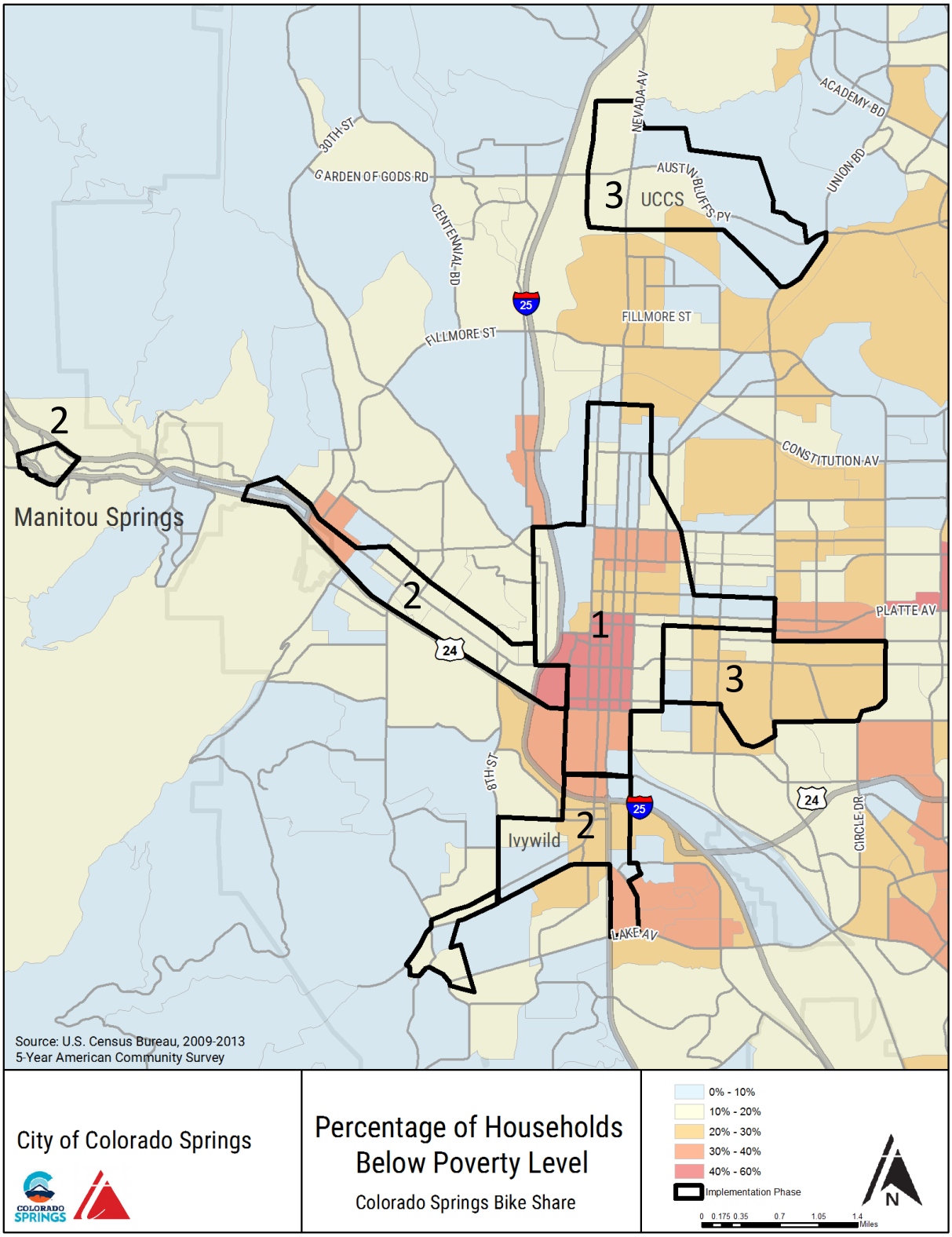

Figure 12 Percentage of Households in Poverty

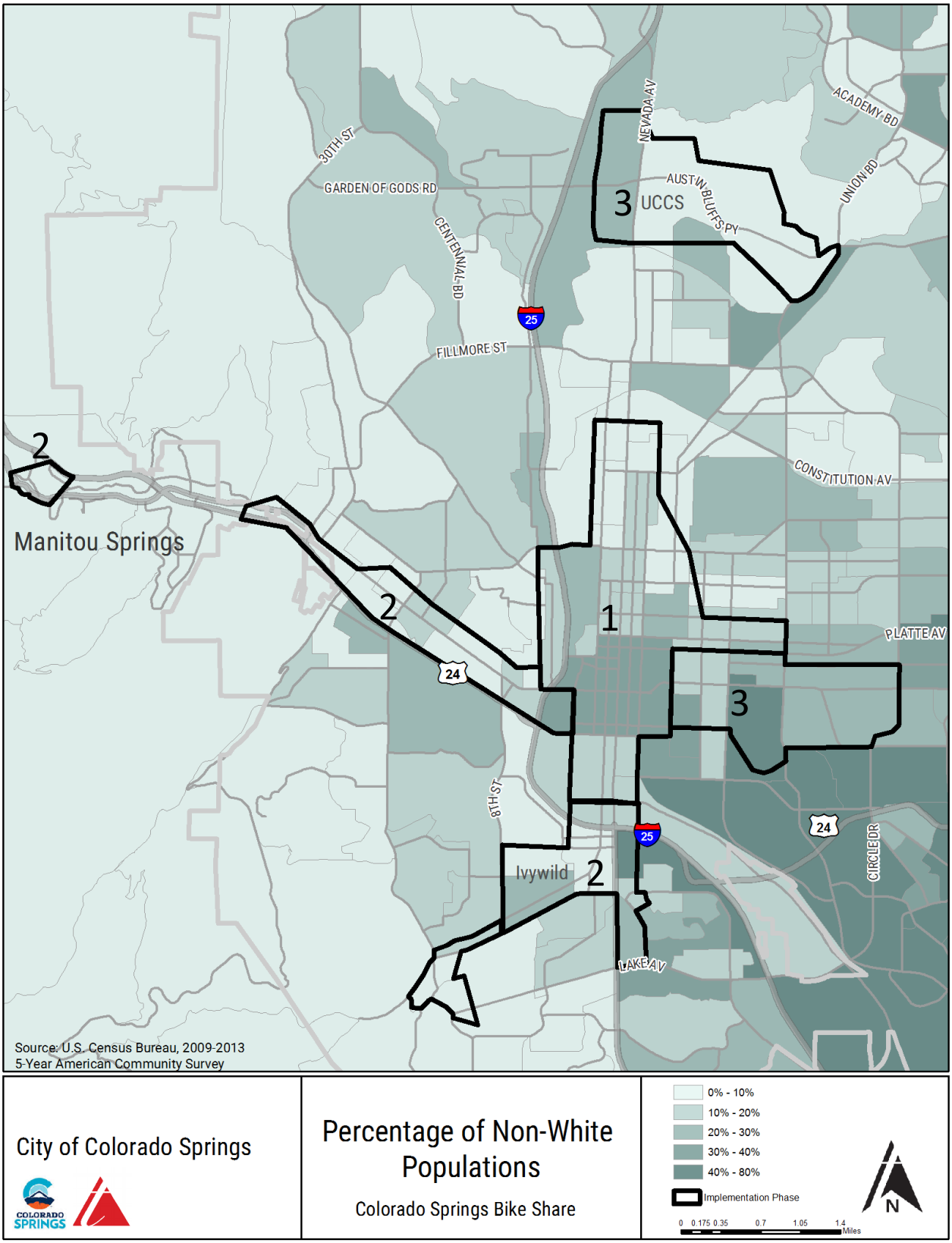

Figure 13 Percentage of Non-white Populations

Reducing Barriers to Entry

B1. Reducing Upfront Costs

Although bike share is an affordable transportation option, the current one-time annual membership fee can be a barrier for a low-income individual. This barrier can be reduced by introducing different pricing structures (e.g., monthly membership rather than annual, pay-per-ride options, etc.) and offering discounted memberships to qualifying individuals.

B2. Improving Financial Access to the System

Partner organizations can help improve access to the system by helping people without credit cards to use bike share systems. For example, in Washington, D.C the Bank on DC works with Capital Bikeshare to get unbanked people into the banking system and offers them a credit/debit card and a discounted bike share membership. In Philadelphia, Indego has partnered with PayNearMe which allow members to make monthly cash payments at 7-11 and Family Dollar stores, thereby increasing access to the system.[37]

Marketing and Outreach

C1. Local Champions

Encouraging leaders within the focus communities to adopt bike share and spread the word via targeted communications will be important to the success of the outreach strategy. Local champions may be political figures, community organizers, or committed individuals with a proven means to influence their local communities, such as the stakeholders involved in the development of this study.

C2. Dedicated Funding

Earmarking funds for targeted marketing and outreach can help involve low-income and minority communities in the bike share system.

C3. Community Organizations

A small number of important and effective partners should have early involvement in the establishment phase to maximize their impact.

C4. Employment Programs

A jobs program could be included as part of the bike share system to boost employment and opportunity. One or two strong jobs partners for the bike share program should be identified.

[37] Indego. Cash Membership using PayNearMe. 2015. Accessed Oct. 19, 2015. https://www.rideindego.com/pricing/cash-program/

8. Capital Equipment Options

The two most common bike share technologies are the "smart dock" and "smart bike" systems, with advantages and disadvantages dependent on a community's needs. A comparison of the features of the smart dock smart bike technologies is included in **Table 11**.

Smart Dock Systems

Most of the systems in the United States use smart dock or "station-based" technology that includes a computerized terminal where transactions and information are processed to release and lock the bikes at a series of connected docks. The components of smart dock bike share systems are shown in **Figure 14**.[38]

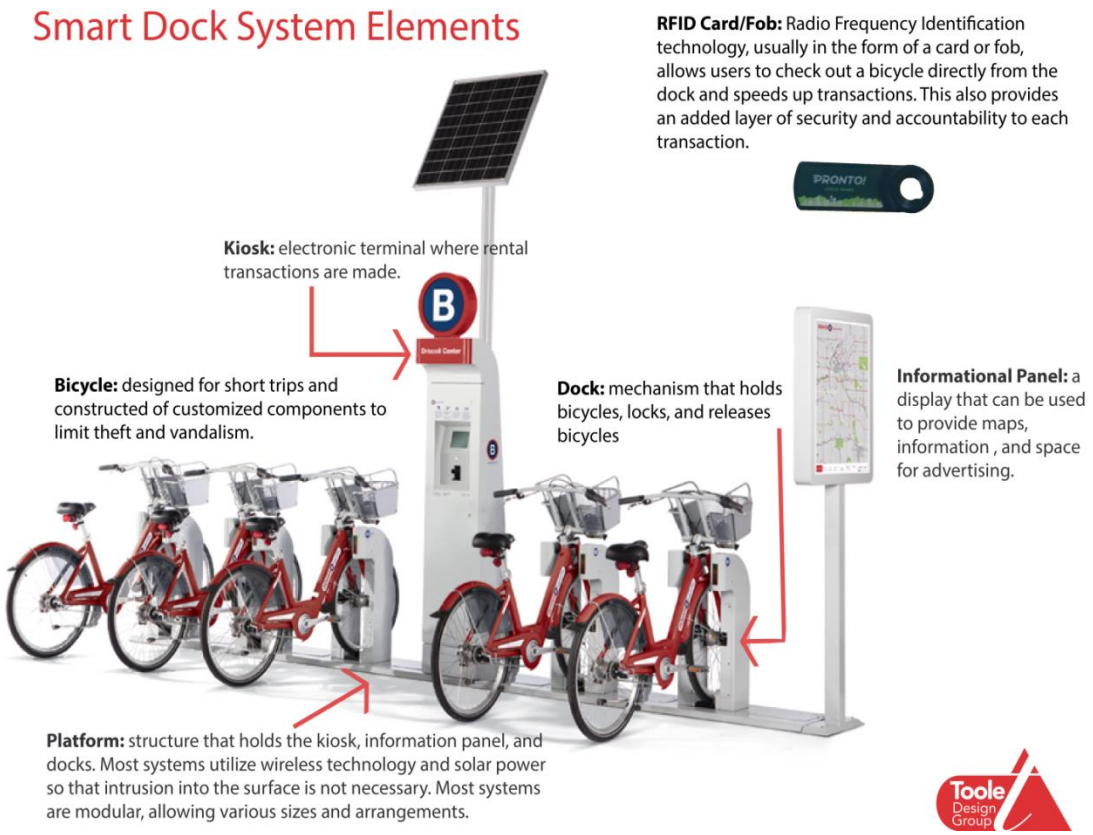

Figure 14 Smart Dock System Elements

[38] Bike Sharing in the United States: State of the Practice and Guide to Implementation. Federal Highway Administration. United States Department of Transportation. September 2012.

Smart Bike Systems

Smart bike systems are becoming more popular in the U.S. These systems apply many of the features of the smart dock system to bicycles. For example, the bicycles shown in **Figure 15** include a transaction terminal, locking mechanism, and GPS unit. This allows more flexibility as to where bicycles can be locked and users must use mobile and web-based applications to locate available bicycles.

Smart bike systems do not provide the same user reliability as smart dock systems in finding a bicycle. To counteract this uncertainty, vendors create defacto stations using regular bike racks and "geo-fenced" areas that serve as station areas.

Smart bike systems are approximately 25 to 50 percent less expensive per bicycle than station-based systems. Operating costs for smart bike systems are unknown.

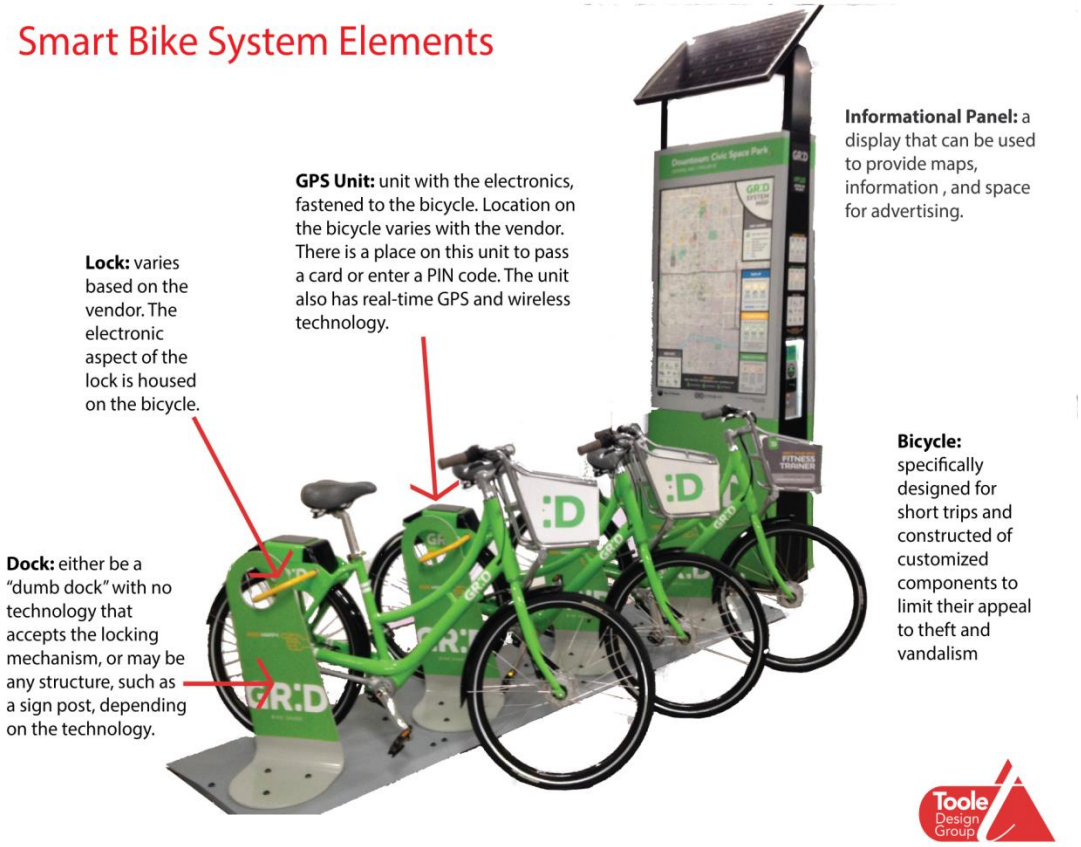

Figure 15 Smart Bike System Elements

Table 7 Comparison of Smart Dock and Smart Bike Technologies

	Smart Dock	Smart Bike
Capital Purchase Price	**-** Still significantly less than other transit options, but more expensive than smart bike.	**+** Significantly less expensive than smart dock because no technology is needed on the docking points. Exact pricing depends on how many kiosks and custom bike racks are to be included.
Understanding of Costs and Operation of System	**+** Over 40 systems around the U.S. with well-understood operations and related costs.	**-** Fewer systems in the U.S. with unknown operational costs and issues.
Utility in an Urban Setting	**+ / -** With large and visible stations, more likely to garner attention from passers-by, be considered part of the permanent transportation infrastructure, have a higher sponsorship valuation and obtain more walk-up visitors because of the easy-use kiosk. Overall these stations likely will attract more revenue to the system. However, this advantage is balanced by a higher upfront capital cost.	**+ / -** Because the docks are "dumb", they can be separated or non-existent. Therefore, site planning for a smart bike system is much simpler. The ability to lock outside a station can potentially lower rebalancing costs. However, these costs savings may be balanced by unforeseen operational costs that may arise, e.g., "chasing" bikes parked in odd places or on private property and replacing batteries on bikes parked in the shade.

Emerging Trends

Electric-assist ("e-assist") bicycles can reduce the barriers to access, such as difficult terrain, hills, altitude, aging populations, or health concerns. E-assist bicycles can also extend the area by which someone can comfortably ride.

The use of e-assist bicycles for part or all of the bike share fleet is an emerging trend for bike share systems, although these systems remain largely untested in citywide bike share systems. As of September 2015, Birmingham, Alabama was the first city in the U.S. to launch a bike share system that includes a partial fleet of e-assist bicycles.[39]

Recommendations for Colorado Springs

Based on the success of the Denver and Boulder smart dock systems and the goal of focusing Colorado Springs' system on the visitor market, a smart dock system is recommended for Colorado Springs. This technology would provide greater visibility and local consistency than a smart bike system.

However, understanding how quickly the smart bike technology market evolves, smart bike systems should be reevaluated at the time of releasing a Request for Proposals (RFP) for a bike share operator. In regard to bicycle type, we recommend that both e-assist and traditional bicycles be included in the RFP.

[39] Zyp Bike Share. Accessed Oct. 22, 2015. https://www.zypbikeshare.com/

9. Financial Analysis

This section explores the financial needs and performance of a potential bike share program in Colorado Springs. A financial pro forma was prepared to understand the capital, installation, and operating costs and to forecast potential revenues. The pro forma evaluates a five-year initial operating period, which is a typical contract length for bike share in the U.S. It includes an evaluation of expected program costs and revenues starting six months before system launch, a typical timeline for equipment manufacture and installation. Completion of the pro forma relies on numerous inputs, including information that was gathered from membership, ridership and financial data of the peer cities chosen for this study. A ten percent contingency was added to account for any unknown increases in capital and operational costs.

System Phasing and Implementation Timeline

For the purposes of the pro forma, it is assumed that the system is rolled out in phases as shown in **Table 8**. Ratios of eight bikes per station and 1.75 docking points for every bicycle were used in this analysis and are based on averages from comparison cities. This results in a total of 496 bikes and 868 docking points for an average station size of approximately 14 docks.

Table 8 System Roll-Out Schedule

Phase	Description	Stations	Bikes	Docks	Installation Date
1	Downtown, Colorado College, and inner-city neighborhoods	26	208	364	Q1 Year 1
2	Old Colorado City and inner-city neighborhoods, Manitou Springs, Red Rock Canyon Open Space, and Ivywild	10	80	140	Q1 Year 3
3	UCCS Campus, University Village Colorado, Printers Parkway, and eastern neighborhoods	26	208	364	Q1 Year 5
TOTAL		**62**	**496**	**868**	

Business Model Assumptions

The financial model assumes that the system is owned, managed, and operated by a new non-profit and as such all operating costs are taken on by this organization. The non-profit may decide to contract some services such as site planning, marketing, or operations to a third-party contractor. Operating costs would need to be revised to account for this change.

This model also assumes that the City will support the bike share launch and continued operations with time and expertise, particularly in regard to site planning and operations.

Capital, Installation, and Pre-Launch Costs

Because a decision between smart bike and smart dock technologies has not yet been made, this analysis includes capital and installation costs for both systems. In both cases, the pro forma includes $1,000 per station for installation, which includes travel for the equipment vendor, and any extra labor

and equipment not provided by the equipment vendor. It also includes $2,000 per station if site planning and permitting is contracted to a third party. These costs are based on rates quoted in other cities.

Smart Dock Assumptions

Based on an average of recent prices for the major bike share smart dock equipment vendors in the United States, an 8 bike/14 dock station represents a total cost of $40,000 per station that includes the base equipment plus shipping and other fees, spare parts, system keys, stickers, and a system map.

Smart Bike Assumptions

For a smart bike system, as assumption of $3,080 per bike was included in the pro forma.[40] This price can vary widely depending on how many walk-up kiosks and specially designed bike racks (or docking points) are included. For a pure smart bike system with no kiosks or specialized racks, the price would be less expensive. The assumption for this model is 62 kiosks, 868 specialized bike racks, and 496 bikes.

Startup Costs

The financial model includes a series of system startup costs during the pre-launch period. These costs total $209,000 and include:

- Six months' salary for the organization to hire an Executive Director to oversee the approximately 6-month period between procurement and launch of the system. Tasks during the intensive startup effort include: coordinating equipment and operator procurement, contract negotiation, grants and sponsorship acquisition, inter- and intra-agency coordination, stakeholder outreach, public outreach on station siting (residences and businesses near station locations), general meetings with the public, and any additional outreach to low-income communities;
- Administrative costs such as insurance, legal services, and accounting;
- Marketing costs such as hiring an agency to establish the name and brand of the system, website development, and marketing materials (brochures, collateral, etc.) and event staff; and
- Direct operational costs such as real estate acquisition for this period, vehicle costs, purchase of uniforms and equipment, and employee training.

Table 9 Capital, Installation, and System Startup Costs for a Smart Dock System

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Capital Purchase, Installation, and Permitting	$1,232,000	-	$506,000	-	$1,386,000	$3,124,000
System Startup	$209,000	-	-	-	-	$209,000
Non-profit administrative costs, pre-launch	$44,000	-	-	-	-	$44,000
Total Capital Cost	**$1,485,000**	**-**	**$506,000**	**-**	**$1,386,000**	**$3,377,000**

[40] Includes $100 per bike for shipping.

Table 10 Capital, Installation, and System Startup Costs for a Smart Bike System

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Capital Purchase, Installation, and Permitting	$638,000	-	$264,000	-	$726,000	$1,628,000
System Startup	$209,000	-	-	-	-	$209,000
Non-profit administrative costs, pre-launch	$44,000	-	-	-	-	$44,000
Total Capital Cost	**$891,000**	**-**	**$264,000**	**-**	**$726,000**	**$1,881,000**

Operational Costs

The pro forma includes operational costs from the system's first date of operation that represent everything needed to keep the system operational including rebalancing, bike maintenance, station maintenance, customer service, marketing, software support, reporting, insurance, and all other day-to-day operations.

The operational cost is presented on a per-dock-per-month basis. This approach is taken for several reasons:

- Docking points are the most accurate representation of a system size, and represent stable infrastructure (as opposed to a bike fleet which varies on a daily basis due to repairs, rebalancing and seasonality).
- Data is available for this metric from several system contracts around the country.
- It is easily scalable as the system expands.

The pro forma assumes the following operational costs:

- A per-dock-per-month general operating cost of $100 in the first year.[41]
- Annual spare parts and bike replacement to cover theft, vandalism, and regular wear and tear.[42]

Table 11 Operating Cost Breakdown

Phase	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	$434,500	$451,000	$462,000	$478,500	$489,500	$2,315,500
2	-	-	$176,000	$181,500	$187,000	$544,500
3	-	-	-	-	$489,500	$489,0500
Total	**$434,500**	**$451,000**	**$638,000**	**$666,000**	**$1,166,000**	**$3,349,500**

[41] Based on potential labor costs and real expenses for a system of Colorado Springs' size. Most systems cost anywhere between $75 and $135 per dock per month. The operating cost will ultimately be determined by (1) the wages and salaries offered by the operator; (2) the level of service and intensity of system rebalancing required; and (3) operational efficiencies that can result in cost reductions (e.g., in-kind donations, use of City-owned property for operating space, etc.).

[42] The replacement of some spare parts will be covered by warranty and/or equipment insurance and therefore is not included in the financial model.

System Revenue

There are three basic drivers of system revenue: annual membership, casual membership, and usage fees. For revenue forecasting, the pro forma assumes the rate structure shown in **Table 12** that is based on similar pricing structures in other bike share systems.[43] For this analysis, a traditional pricing structure was assumed as there is significant data to support membership and ridership assumptions.

Revenue drivers and their related model inputs are summarized in **Table 13** and are based on trends observed in peer cities.

Table 12 Suggested Fee Schedule for Colorado Springs Bike Share

Access Fee		Usage Fees	
		0-30 mins	Additional Half Hours
Annual	$80	$0.00	$2.50
24-hour	$8		

Annual Membership Revenues

- Annual membership fee: the model assumes an $80 fee to become an annual member. This amount is within the current range of fees in the U.S.
- Annual members per bike per person: the model assumes that the system will have 0.52 persons/bike/100,000 residents purchasing annual memberships and that this will grow 10 percent annually. The model does not include any special membership promotions or group sales to increase membership.

Casual Membership Revenues

- Casual membership fee: The model assumes an $8 daily fee to become a 24-hour member. This amount is in the range of current fees in the U.S.
- Casual members per station per year: Casual members typically learn about a bike share system by seeing a station. Therefore, the pro forma uses the metric of casual members per station to estimate casual membership. The model assumes that Colorado Springs will annually attract 594 casual members per station.

Usage Fees

Available data from other U.S. systems was used to estimate revenues coming from the system including:

- Rides per member: Data shows an average of 40 rides per year per annual member amongst peer cities. For casual members, data show approximately 1.9 rides per member. These have been used to calculate ridership for Colorado Springs.
- Percent of rides incurring usage fees: Data show that approximately 30 percent of casual trips and two percent of member trips incur usage fees. These numbers are consistent across the systems for which data is public.

[43] The model of a membership fee, free-ride period, and usage fees for longer rides is a potential barrier to entry for lower socio-economic populations (see **Chapter 7**). While there are options to incorporate different pricing structures such as a monthly fee with a certain number of free "minutes" (similar to a cell phone plan) or a "per ride" trip fee (similar to how transit is priced), a traditional pricing structure was used for this analysis.

- Average usage fee incurred: The average usage fee incurred for annual members ranges from $4 to $6 for annual members and $6 to $10 for casual members. The pro forma assumes an average usage fee of $5 for annual members and $9 for casual members.

Table 13 Comparison of Model Inputs for Case Study Bike Share Cities

	Boulder	Denver	San Antonio	Salt Lake City	Model Input	Comments
Annual members/bike/ 100,000 population	5.04	0.86	0.09	1.43	**0.52**	All but Denver are outliers compared to other non-profit models. The pro forma input is based on an average of Denver, Austin, Charlotte, Cincinnati, and Nashville membership rates.
Casual members/ station	266	837	356	1,083	**594**	Average of other non-profit run systems including the case study cities.
Trips per casual member	1.9	1.9	n/a	1.9	**1.9**	Average
Trips per annual member	16	61	n/a	44	**40**	Average

Forecast Results

Using the inputs above, the pro forma was prepared to forecast membership, ridership, capital and installation costs, annual operating costs, and system revenues. The output was checked against metrics from peer cities (see **Table 14**) and analyzed to understand capital and operational funding needs.

Table 14 Comparison of Performance Measures to Peer Cities

	Boulder	Denver	San Antonio	Salt Lake City	Peer System Averages	Forecast for Colorado Springs
Trips per Bike per Day	0.42	1.46	0.47	1.54	**0.97**	**0.66**
Annual/Casual Ridership Split	45%/55%	36%/64%	NA	71%/29%	**51%/49%**	**41%/59%**
Farebox Recovery[44]	37%	72%	43%	34%	**47%**	**54%**

[44] Farebox recovery is the amount of operating cost recouped by membership and usage charges.

The forecast results, summarized in **Table 15,** include the following metrics:

Membership and Ridership Metrics

- Trips/bike/day: Used globally to measure system usage. The pro forma predicts an average ridership of approximately 0.66 trips per bike per day over five years. This is below the average rate of 0.97 trips per bike per day observed in peer cities. This is likely because several of the peer city systems see high annual membership rates which tend to drive up ridership numbers more than cities with a greater number of casual users.
- Percentage of casual and annual member rides: The forecast output predicts a split of approximately 59 percent of rides made by casual members and 41 percent by annual users. This split is weighted more toward casual members than in peer cities which is reasonable considering the tourism potential in Colorado Springs and the goal for the system to serve as a visitor amenity.

Financial Metrics

- Farebox recovery: This factor is important in understanding the financial needs of the system. The pro forma shows that approximately 54 percent of operating expenses is expected to be recouped through membership and usage fees. This is higher than the peer city average and reflects an expectation of high use by visitors that are less price sensitive than annual members. Expected farebox recovery is within the range of other non-profit bike share systems operating in cities of similar size (e.g., Charlotte operates at 52 percent farebox recovery).
- User revenue split: User revenues are expected to be split approximately 50 percent from casual membership sales, 30 percent from usage fees, and 20 percent from annual membership sales. Data for this metric is not released by all cities; however, in most cities this split is approximately equal with 33 percent of revenue from each type. The forecasted split in Colorado Springs is weighted more toward visitors, which is reasonable given the intent of the system to serve as a visitor amenity.

Table 15 Forecast Membership, Ridership, and Financial Performance of the Colorado Springs Bike Share Program

	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Stations	26	26	36	36	62	62
Bikes	208	208	288	288	496	496
Docks	364	364	504	504	868	868
Membership and Ridership						
Annual Members	476	523	797	877	1,661	N/A
Casual Members	15,444	15,444	21,384	21,384	36,828	N/A
Annual Member Rides	12,085	20,240	27,888	33,909	54,994	149,115
Casual Member Rides	29,344	29,344	40,630	40,630	69,973	209,920
Total Rides	41,428	49,583	68,517	74,539	124,967	359,035
Trips per Bike per Day	0.73	0.65	0.65	0.71	0.69	0.66
Operations						
Bike Share Operating Costs	$434,500	$451,000	$638,000	$660,000	$1,166,000	$3,349500
Revenues						
Bike Share Revenue	$240,000	$245,000	$345,000	$355,000	$620,000	$1,805,000
Farebox Recovery	55%	54%	54%	54%	53%	54%
Operations Fundraising Need						
Total Operating Fundraising Need	$(194,500)	$(206,000)	$(298,000)	$(305,000)	$(5446,5000)	$(1544,500)
Per Bike Per Year	$(935)	$(990)	$(1,036)	$(1,059)	$(1,101)	N/A

Credit: Bike Chattanooga

Summary

A summary of the five year funding need for implementation of a 62 station/496 bicycle bike share system in Colorado Springs is summarized in **Table 15** and includes:

- Capital and Installation Costs: $1.9 million for smart bike or $3.4 million for smart dock, including capital, installation, and system startup.
- Operating Costs: Approximately $435,000 per year for the first phase, increasing with the introduction of additional phases, for a total of approximately $3.4 million during the first five years of operation. This includes operating costs and system upkeep.
- Revenue: Approximately $240,000 per year for the first phase, increasing with the introduction of additional phases, for a total of $1.8 million during the first five years of operation. This includes revenue earned through membership sales and trip fees.

Funding Shortfall

The financial model shows that that the outstanding fundraising needs to cover the capital and operations expenditures for a bike share system include $1.9 million for a smart bike system or $3.4 million for a smart dock system and $3.4 million over five years for system operations.

Capital and installation costs, which are one-time costs, lend themselves to one-time funding sources such as grants and/or private donations. Nevertheless the choice of vendor or type of equipment (i.e., smart dock or smart bike technology) may change the capital funding need.

Ongoing operating costs are more difficult to fund and typically rely on user-generated revenues and sponsorship. Therefore, reducing operating costs or increasing revenues will reduce the amount of funding required.

Sensitivity Analysis

Sensitivity tests were conducted to assess the effect of variables in the financial model. The following sensitivity analyses were conducted:

- Varying the annual membership price from $60 to $100 and the casual membership price from $4 to $12 yields a range of the second year operating funding need from $135,000 to $280,000 (between 66 percent and 136 percent of the base operating cost).
- Varying the uptake of annual membership from 0.32 to 0.72 annual members/bike/100,000 people and casual members per station per year from 535 to 735 yields a range of the second year operating funding need from $155,000 to $255,000 (between 75 percent and 124 percent of the base operating cost).
- Varying the operations cost per dock per month from $81 to $121 yields a range of the second year operating funding need from $155,000 to $295,000 (between 56 percent and 143 percent of base operating cost).

The sensitivity tests show that the factors that can most influence operational funding need are:

- The operating cost per dock per month.
- The attraction of casual members (i.e., the number of casual members per station).
- The uptake and price of annual membership, assuming no offset in demand from raising the price.

10. Implementation Considerations and Framework

By selecting an appropriate governance structure and making other bike share implementation decisions, Colorado Springs can begin to lay the groundwork for a bike share system that will meet its goals of increased mobility, economic benefits, and bicycling in the city. Next steps related to system governance, fundraising, procurement, branding and marketing, site planning and permitting, deployment, and launch are discussed below.

Governance Structure

One of the key decisions for any bike share system is to select a governance structure. Existing U.S. bike share programs operate under different governance models depending on a jurisdiction's funding environment, institutional capacity, and local transportation needs. The relationship between system owners and system operators in select U.S. bike share systems is shown in **Table 16.**

Table 16 Relationships between System Owners and System Operators in American Bike Share Systems

Operator → / Owner ↑	Public Agency	Non-Profit Organization	Private Company
Public Agency	Boise green Bike (Boise, ID)	San Antonio B-cycle (San Antonio, TX)	Capital Bikeshare (Washington, DC) Hubway (Boston, MA)
Non-Profit Organization	*None*	Boulder B-cycle (Boulder, CO) GREENbike (Salt Lake City, UT) Denver Bike Sharing (Denver, CO) Nice Ride (Minneapolis, MN)	Pronto (Seattle, WA)
Private Company	*None*	*None*	Citi Bike (New York, NY)

For cities the size of Colorado Springs, the most common governance models are city-owned with a private or non-profit operator or non-profit owned and operated. Some cities have privately owned and operated systems, however this model is largely dependent on interest from a private company to assume the financial risk for the system. Therefore, privately-owned systems are generally reserved for cities with large sponsorship and advertising markets or where bike share companies are looking to establish an industry foothold. A summary of the governance structures employed in the four peer cities of Denver, Boulder, Salt Lake City, and San Antonio are provided in **Table 17**.

Table 17 Governance Structure Characteristics of Comparable Bike Share Systems

	Denver, CO	Boulder, CO	Salt Lake City, UT	San Antonio, TX
Equipment Owner	Bike share non-profit	Bike share non-profit	Bike share non-profit	City of San Antonio
Operator	Bike share non-profit	Bike share non-profit	Downtown Alliance	Bike share non-profit
Impetus for System Driven by	City	Interested community members	City	City staff
City role	Represented on Board; staff support	Represented on Board; staff support	Founding partner; Mayor serves as a Board member, funding partner	Office of Sustainability oversees the operating contract and seeks capital funding
Number of Board Members	16	14	11	6
Board Representatives	Legal, marketing, accounting/financial, public affairs, health, developers, researchers, City of Denver, RTD (transit agency)	Accounting/financial, legal, advertising, marketing/ communications, real estate, bicycle advocacy, University of Colorado, City of Boulder	Mayor of Salt Lake City, Utah DOT (Director), City Transportation Director, Wasatch Front Regional Council (Deputy Director), Utah Transit Authority (CPO), Downtown Alliance, Visit Salt Lake, Sponsors	Bike retailer, legal, developer, marketing, health, City of San Antonio staff
Summary	A specific bike share non-profit was established to manage surplus funds from the 2010 Democratic National Convention that were part of the Mayor's initiative toward developing a bike share system	A specific bike share non-profit was established by a group of engaged bike share champions that built support amongst the City and other organizations	GREENbike is a non-profit established by Salt Lake City, the Chamber of Commerce, and the Downtown Alliance. The Board is represented by high level positions in local and regional government as well as participating sponsors	The City obtained federal and state capital funding to implement bike share. Funding requirements made establishing an operating non-profit the most feasible option for operations

Considering the political climate of Colorado Springs, it is recommended that the bike share system be governed within an existing non-profit such as the Downtown Partnership. This would provide stability in the short term without precluding the bike share program in becoming its own non-profit later in time. However, regardless of the governance structure, the following decisions should still be considered:

- Who has the organizational capacity and interest to take on ownership of the program (and other functions)?
- Who will be responsible for fundraising capital?
- Who will operate the system and be responsible for fundraising operations?
- What potential funding sources are available under this business model?
- Does the model allow for quick and nimble mobilization?
- Does this model give an appropriate voice to interested local stakeholders?
- How does the model meet local priorities including:
    - Complementing and expanding the range of transportation options in Colorado Springs for residents, students, employees, and visitors;

- Increasing the attractiveness of Colorado Springs as a place to live, work, and do business and the potential for the system to provide an amenity to visitors; and
- Increasing the rate of bicycling in Colorado Springs and providing a catalyst for more bicycling infrastructure.

Next Steps

In addition to governance considerations given to the system's, there are a number of decisions and next steps involved to move the Colorado bike share system from a concept to implementation (see **Figure 16**) related to:

- Organization: Making a decision on the final governance structure. As a first step, it is recommended that the bike share committee assess what interest and capacity there are amongst its membership to take on the various bike share functions or whether additional capacity needs to be built (e.g., through a dedicated non-profit model). If a non-profit model is selected, this will include setting up the 501(c)3 designation. If the system is to be housed in an existing organization such as the Downtown Partnership, then a funding and staffing plan may be necessary to take on the additional work created by the program.
- Fundraising: This includes two streams: identifying funding sources for capital cost of the equipment and implementation and finding ongoing funding sources for operations and maintenance.
- Procurement: Depending on the business model selected, this could include developing, issuing, and evaluating Requests for Proposal (RFP) for equipment and a system operator. Deciding the type of bike share system (i.e., smart bike or smart dock and e-assist) should occur before an RFP is released.
- Branding and Marketing: This will include deciding on a name, logo, color, and other branding decisions and developing and implementing a marketing program to promote the system pre- and post-launch.
- Site Planning and Permitting: Depending on the City's permitting process, this task may be conducted internally, but will need to consider identifying final station locations and seeking approvals and permits for installation.
- Deployment: Starting some months before launch, this step includes finding staff and space for inventory and assembly of the equipment and installing equipment on the street – starting with the stations a few weeks from launch and followed by the bikes a day or two before launch.
- Launch: The launch of the system is usually preceded by an intense lead-up period that includes a heavy role for deployment and marketing in advance of the program starting. The launch itself is usually celebrated by a grand opening event typically attended by local dignitaries.
- Operations: Post-launch, this includes all tasks associated with maintaining, rebalancing, and operating the bike share system.

Funding will likely drive the implementation schedule, due to the unforeseen timing of capital funding and sponsorships.

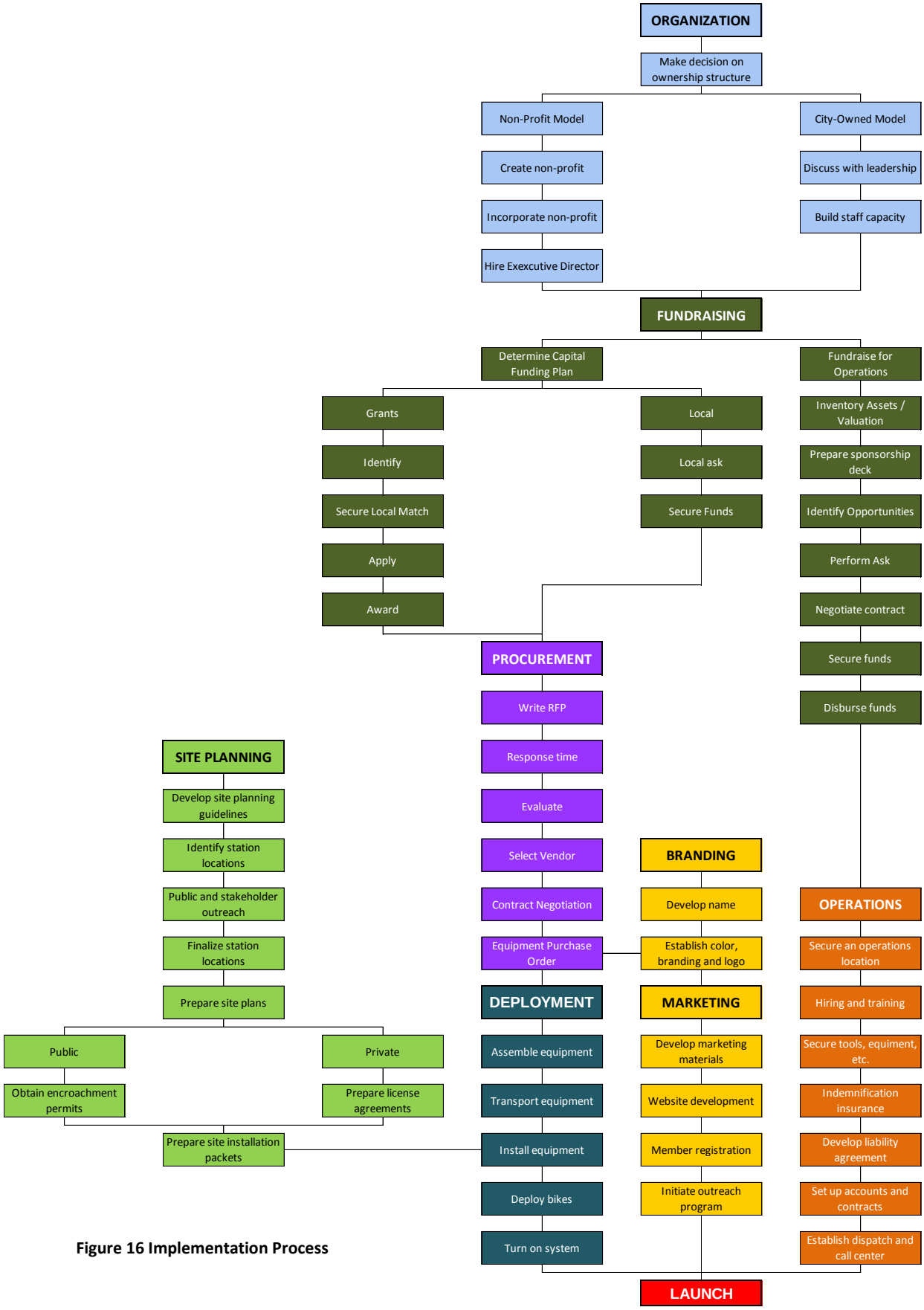

Figure 16 Implementation Process