2030 WESTMINSTER BICYCLE MASTER PLAN

WESTMINSTER

WESTMINSTER, COLORADO
2030 BICYCLE MASTER PLAN

THIS PLAN ADOPTED BY WESTMINSTER CITY COUNCIL

ON JUNE 27, 2011

The City of Westminster, Colorado
Department of Community Development
4800 West 92nd Avenue
Westminster, Colorado 80031

Produced and Published for the
City of Westminster, Colorado by
The Street Plans Collaborative and
BICI Planning & Design

First Edition February 2011

Above: A rendering of potential improvements on Countryside Drive as part of Westminster's new bicycle network.

Below: The proposed 2030 Bicycle Network

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EXECUTIVE SUMMARY

WHAT IS BICYCLE PLANNING?

Bicycle planning is the process of assessing and addressing the needs of a community in the area of bicycle infrastructure, programs, and policies. It involves taking an inventory of the community's existing bicycle resources, and identifying strategies to build upon those resources. Bicycle planning means consulting with the citizens of the community to facilitate their vision of future transportation networks—understanding their concerns, addressing their needs, and crafting a road map to a more bicycle-friendly community. It means assessing the strengths and weaknesses of bicycle resources through on-the-ground observations and public outreach, and finding ways to capitalize on their strengths and minimize their weaknesses.

Ultimately, bicycle planning is about giving a community a viable transportation alternative that complements the existing network—an alternative that encourages lively streetscapes, a healthy population, and a more livable and sustainable environment.

WHY PLAN?

Whether for health, economy, utility, the environment, or pure joy, the bicycle offers an incredibly simple solution to some of society's most vexing problems. After decades of declining use, and being pushed to the margins of society—and our roadways—people are increasingly returning to bicycling in record numbers. This may be attributed to any number of related factors, but it mostly demonstrates the growing need to accommodate bicycling in our communities' physical and social fabric. Indeed, those towns and cities that accommodate bicycling the best are also our country's most healthy, economically competitive, and desirable places in which to live, work, and visit.

In response to this growth in cycling has come the recognition that bicycling is valuable to the community of Westminster, and that it is time for the City of Westminster to undertake its first Bicycle Master Plan.

Moreover, the bicycling industry brings more than $1 billion dollars to the Colorado's state economy each year. Whether for tourism, sales, events, or maintenance and repair, it's clear that bicycling brings economic benefits to Colorado. However, bicycling also helps keep Colorado communities vibrant, active, and livable—traits that support its reputation as the nation's healthiest state. As Colorado's 7th largest city, The City of Westminster has a vital role to play in sustaining and advancing the health of its local economy, the natural and built environment, and its 110,000 residents. However, because the City does not exist in a vacuum, it must also look outward in contributing to an increasingly dynamic metro-Denver region, and the overall livability of the State of Colorado.

As Westminster's first comprehensive bicycle planning effort, the 2030 Bicycle Master Plan is intended to guide the City in fostering bicycling as a viable, safe, and sustainable form of transportation and recreation. More importantly, the Plan provides a critical foundation for further positioning Westminster as a highly livable, safe, and forward-looking City in which to live, recreate, or do business.

The Westminster 2030 Bicycle Master Plan is comprised of 6 main components. They include:

1. Background and Existing Conditions Analysis
2. Public Involvement Program
3. On-Street Bikeway Network Plan
4. Bikeway Network Wayfinding and Signing Plan
5. Bicycle Parking Plan
6. Education, Encouragement, Enforcement and Evaluation Plan

The realization of the goals set forth in this Plan will require the City to re-balance its local and regional transportation network by altering the way it currently plans, designs, funds, and implements roadway projects. Indeed, the City should first consider its streets and public rights of way not as corridors of auto mobility, but as corridors that enable accessibility—streets that serve people walking, bicycling, taking transit, and driving to their destinations.

BACKGROUND & EXISTING CONDITIONS ANALYSIS

The Big Dry Creek Trail winds its way through Westminster's extensive open space system.

The City of Westminster is not starting from scratch. Already home to an impressive network of off-street shared use paths, the City is far beyond many of its suburban peers. The majority of this network has been built since 1985, the year in which voters approved a local sales tax tied to the ongoing preservation of open space and the development of a bicycle and pedestrian path system.

Today, the city proudly boasts more than 74 miles of off-street paths within 2,928 acres of preserved open space. Combined with dozens of parks and its golf courses, green space comprises 1/3 of Westminster's total land area—one of the highest percentages in Colorado. The Farmers' High Line Canal, Little Dry Creek, Big Dry Creek trails, and the future Walnut Creek Trail, effectively serve as recreational trunk lines for numerous other paths that extend like branches into residential sub-divisions, and to nearby schools and commercial centers. By consistently voting to extend the local ¼ cent open space tax, the City's residents clearly continue to value the ongoing development of their open space network.

Despite its success in developing a path system, the City of Westminster has not actively pursued the implementation of a commensurate on-street bikeway network. As a result, the city lacks direct, identifiable, and safe on-street bikeways. The creation of this 2030 Bicycle Master Plan should help motivate the City to put as much effort into developing the proposed on-street network as it did in developing the off-street network. If this is accomplished, Westminster will be a healthier, livable, and economically competitive city.

A summary of Westminster's existing bikeways reveals the current imbalance between the City's on- and off-street bikeways.

- Existing Bikeway Network Miles: ~ 74 miles
- Percentage of City Street Network with Bikeways: 0%
- Number of Bikeways: 4, with numerous branches
- Bikeway Types: 2 (shared us paths, bicycle lanes)
- Bicycle Lanes Miles: > .1 miles
- Shared Use Paths: ~ 74 miles

PUBLIC INVOLVEMENT PROGRAM

A robust public input and communications process was developed to best guide the development of the Westminster 2030 Bicycle Master Plan. Numerous innovative and time-tested communication tools were utilized to obtain input from the City of Westminster's elected officials and municipal employees; local bicycle advocates; the greater Westminster community; and neighboring municipalities and regional governments. They include:

- Two Westminster Bicycle Summits
- Multiple-day Handlebar Survey
- Web and Paper Existing Conditions Survey
- Westminster Corporate Employer Outreach Survey
- Key Stakeholder Interviews
- Neighboring City and County Outreach
- Web-based Social Media Tools (Facebook, Twitter, Project Website).

All input gathered provided the planning team with a deeper understanding of public sentiment towards Westminster's existing bicycling conditions. The input gathered was then used to inform the final recommendations included in this 2030 Bicycle Master Plan.

ON-STREET BIKEWAY NETWORK PLAN

Proposed 2030 Bikeway Network Summary

- Bikeway Network miles: 132 miles
- Percentage of Street Network To Have Bikeways: 28
- Total Number of Bikeway Projects: 102
- Bikeway Types: 7
- Countermeasure Types: 4

Beyond interacting with those already bicycling in Westminster, the Handlebar Survey was used by the planning team to understand the unique characteristics of each street and its surrounding land use context. Analysis included street width, street type, existing land use, urban form, density, traffic control devices, posted speed limits and actual travel speeds, and traffic volume. These elements were considered holistically before assigning the various on-street bikeway types. When conducting this analysis, special attention was paid to how each of these elements affects the perceived and actual comfort for all types of bicyclists.

The City of Westminster currently has three basic street types: local, collector and arterial. To more completely meet the needs of beginner, intermediate, and expert bicyclists, and to advance the viability of active transportation within the city and region, the 2030 Master Plan proposes 132 miles of on-street bikeways along Westminster's street network. The network plan is comprised of three bikeway classes, and eight unique bikeway types. They include:

Class I

- Off-street Shared Use Path
- Sidepath located within roadway right-of-way

Class II

- Conventional Curbside Bicycle Lane
- Conventional Bicycle Lane adjacent to parallel parking
- Buffered Bicycle Lane curbside

Class III

- Signed Bike Route
- Signed Bike Route with Shared Use Lane Markings (Sharrows) adjacent to parking

Additionally, four bikeway countermeasure treatments are recommended to further enhance the visibility, safety, operation, and appeal of the proposed bikeway network. These include:

- Bicycle Boxes
- Peg-a-Tracking
- Bicycle Detection and Pavement Markings
- Bicycle Turn Pockets and Bicycle Refuges

Wayfinding signs should include helpful information to aid navigation and improve the overall visibility of the bikeway network.

BIKEWAY NETWORK WAYFINDING & SIGNING PLAN

Without an existing on-street bikeway network, there are only a few on-street bicycle signs sprinkled throughout the City. Those signs that do exist are located at sporadic points throughout the city, typically where the off-street Shared Use Path system crosses or adjoins the street network. Those signs that do exist only target people driving, alerting them to the presence of bicyclists.

Westminster's robust shared use path network features a comparatively sparse and incomplete wayfinding system. While path markers are present, the greater system is inconsistent, often leaving large gaps that diminish the value of the existing signs.

Additionally, there appears to be no consistent standard as to when bicycle signs will be installed, as there are numerous possible instances of on-street/off-street interactions in which signs are not present.

To improve these conditions, the bicycle wayfinding and signing plan includes eight actions for improving the entire bikeway network. The recommendations include, but are not limited to identifying appropriate bicyclist warning signs, recommending where to install path markers, and adding clear directional signs, while removing those that are confusing.

Those who choose to bicycle should be rewarded with a safe, convenient, and dignified place to store their bicycle.

BICYCLE PARKING PLAN

While bikeways are the most visible element within a bicycle network, cyclists must also have safe and convenient places to store their bicycles. Thus, providing bicycle parking and other "end-of-trip" facilities is critically important to supporting bicycling as a viable mode of transportation. Solutions range from the basic "inverted-U" bicycle rack, to semi-enclosed bicycle shelters, to full bicycle "stations" that often include bicycle storage and repair facilities, showers, lockers, changing rooms, rentals, and even café/social gathering space.

No matter the type, bicycle parking is commonly excluded or insufficiently addressed in the planning, urban design, and development process. As a result, accessible, attractive, and safe parking options for both short and long-term use are often under- or oversupplied, and/or poorly sited.

The Westminster 2030 Bicycle Parking Plan is intended to provide all stewards of the Westminster Bicycle Master Plan with the information needed to improve bicycle parking conditions, and by extension, the City's bikeway network.

While countless bicycle parking designs and configurations exist, there are only two basic types, which include six basic sub-types. These include:

Short-Term Parking Facilities

- Bicycle racks
- Self-service bicycle sharing systems.
- Temporary event "valet" parking

Long-Term Parking Facilities

- Semi-enclosed bicycle shelters
- Fully enclosed bicycle lockers
- Fully enclosed bicycle stations/storage rooms

A discussion of the above facilities types, as well as location, performance standards, and bicycle parking ratios are included in this Plan.

Bike Denver's attractive and informative poster campaign demonstrates the many benefits associated with cycling.

EDUCATION, ENCOURAGEMENT, ENFORCEMENT, & EVALUATION PLAN

Expanding the appeal of cycling in Westminster will require the utilization of numerous strategies. These include, but are not limited to, organizing bicycling skills courses, launching motorist and bicyclist safety campaigns, promoting the benefits of bicycling, supporting local bicycle-centric events, utilizing social media and web-based advocacy communication tools, enforcing existing motor vehicle-bicyclist laws, and maintaining traditional communication strategies that position bicycling as a viable option for people who are interested in bicycling, but concerned about safety.

When education, encouragement, and enforcement campaigns are crafted, great care should be taken to appeal to cyclists and non-cyclists alike. Too often such campaigns unintentionally reinforce the widely held belief that bicycling is, and will always be, a marginal activity reserved for children and athletic, risk-adverse men. By contrast, truly successful efforts position cycling as a normal mode of transportation that does not require expensive bicycles, extreme travel patterns, and/or spandex outfits.

While the City of Westminster should take the lead on local bicycle safety issues, most education, encouragement, enforcement, and evaluation campaigns require regional cooperation.

The Westminster 2030 Bicycle Master Plan includes 17 Education, Encouragement, Enforcement, and Evaluation recommendations.

1. BACKGROUND & EXISTING CONDITIONS ANALYSIS

Top: Westminster's Big Dry Creek Trail provides miles of non-motorized recreation and transportation options.

Bottom: Westminster's thoroughfare network is currently designed for people driving, not people bicycling.

The City of Westminster, Colorado is home to an impressive network of off-street shared use paths. The majority of this network has been built since 1985, the year in which voters approved a local sales tax tied to the ongoing preservation of open space and the development of a bicycle and pedestrian path system. Today, the city proudly boasts more than 74 miles of paths within 2,928 acres of preserved open space. The Farmers' High Line Canal, Little Dry Creek, and Big Dry Creek trails, along with the future Walnut Creek Trail, effectively serve as recreational trunk lines for numerous other paths that extend like branches into residential subdivisions, schools and commercial centers. By consistently voting to extend the local ¼ cent open space tax, the city's residents clearly continue to value the ongoing preservation of open space and the development of a shared use path network.

Despite great success developing this off-street network, The City of Westminster has not actively pursued the implementation of a commensurate on-street bikeway network. The result is a lack of direct, identifiable, and safe on-street bikeways. There also exists a need to develop a more robust approach to bike education, encouragement, enforcement, and evaluation. Along with engineering, these five categories comprise the League of American Bicyclists "5 E's," which are used in determining the relative bicycle-friendliness of a given municipality. These "5 E's" consequently provide the armature on which the Westminster 2030 Bicycle Master Plan is formed.

1.1. LITERATURE REVIEW

To become familiar with the City of Westminster's bicycle planning and physical development context, the planning team conducted a review of more than 37 city, county, state, and neighboring municipality plans. This effort ensures that this bicycle planning process is well informed by all past and present planning efforts. Additionally, several large planning initiatives that affect the Westminster Bicycle Master Plan were closely reviewed, including the Highway 36 Corridor Plan, which introduces a regional bicycle path between Westminster and Boulder, the eventual location of RTD's Northwest commuter rail line stations, and the redevelopment of the outmoded Westminster Mall into a walkable, transit-oriented, mixed-use district.

Looking beyond the City of Westminster, the planning team analyzed existing bicycle infrastructure and the current bicycle planning efforts of the surrounding municipalities. The review guided this planning process so that Westminster's future on-street bikeways contribute to an ever-expanding regional bikeway system.

Beyond reviewing existing and ongoing plans, Westminster's existing bicycle conditions were primarily documented and reviewed by utilizing the Handlebar Survey methodology, whereby the

1.1: The redevelopment of the Westminster Mall will provide the city with a walkable, mixed-use center. (Image: Van Meter Williams Pollack LLP)

The complete list of plans reviewed during this planning effort includes:

- City of Westminster Zoning Code and Land Use Map
- City of Westminster Guidelines for Traditional Mixed Use Neighborhood Developments
- Westminster Center Urban Reinvestment Project and Mall Redevelopment Massing Study
- City of Westminster Strategic Plan (2009-2014 -2023)
- City of Westminster Traffic Volume Counts (2010)
- 36 Corridor Bike Links Map
- City of Westminster Trails Plan Map
- City of Westminster Existing Trail System Map
- City of Westminster Metzger Farm Open Space Master Plan (2010)
- City of Westminster Site Development Standards (Chapter 7)
- City of Westminster Streetscape Improvement Projects (2010-2011)
- City of Westminster Roadway Plan (2008)
- City of Westminster Pedestrian and Bicyclist Crash Data (2009)
- City of Arvada Trails Plan (2001)
- City of Arvada Trails and Open Space Master Plan (2001)
- City of Arvada Citywide Bicycle System Summary (2009)
- City of Arvada TOD Access Plan, Citywide Bicycle System Overview & Connections (2009)
- City of Broomfield Existing Trail System Map
- City of Broomfield Existing Trail Conditions Map
- City of Broomfield Proposed Trails Map
- City of Broomfield Open Space, Parks, Recreation, and Trails Master Plan (2005)
- City of Northglenn Parks and Trails Map
- City of Northglenn Parks And Greenways Map
- City of Thornton Existing Public Parks, Open Space, and Trails Map
- City of Thornton Parks and Trails Master Plan Map
- City of Thornton Proposed Community and Regional Trails Network
- City of Thornton Parks, Open Space, and Trails User Map (2007)
- DRCOG's 2010 Guidelines for Successful Pedestrian and Bicycle Facilities in the Denver Region
- Adams County Parks, Trails, and Open Space Map
- Adams County Trail Map (1999)
- Jefferson County Open Space Master Plan Update (2008)
- Jefferson County Existing and Potential Trails Map (2008)
- Jefferson County Open Space System Map (2008)
- City of Davis, California Bicycle Master Plan (2009)
- City of Boulder, Colorado Bicycle Master Plan (2006)
- City of Boulder, Colorado Transportation Plan (2008)
- City of Denver Bicycle Master Plan Update (2001)

planning team bicycled throughout the entire city. The Handlebar Survey process, detailed in Section 2.2, made use of physical mapping, photography, extensive note taking, and interviews with bicyclists.

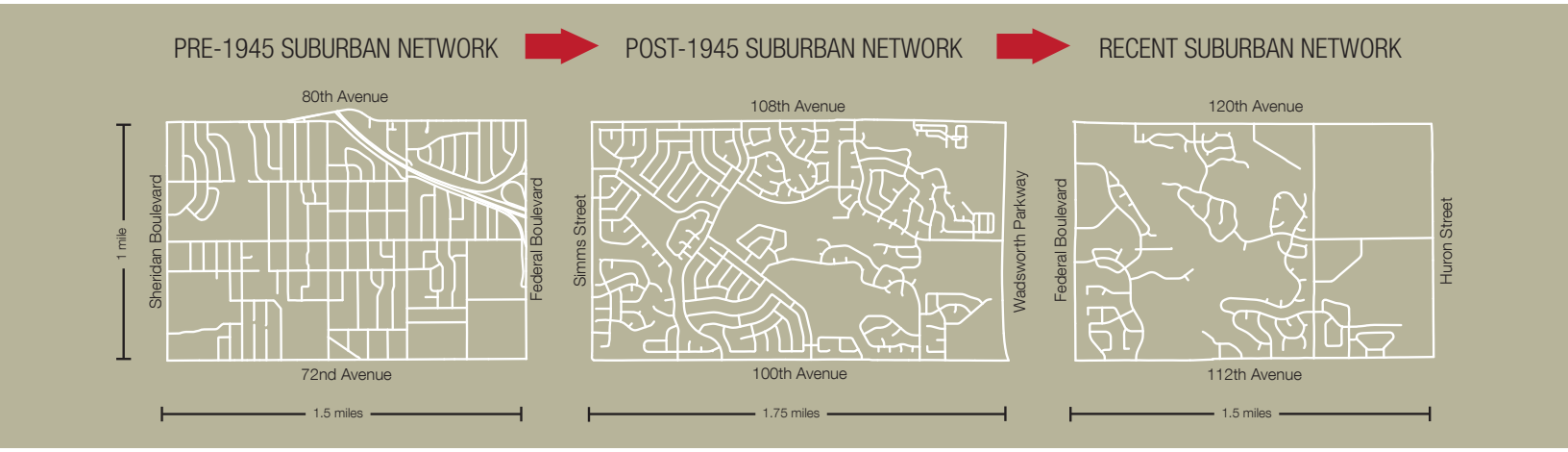
The results of this work—along with Westminster City staff recommendations, the print, online and Westminster corporate employer outreach surveys, and key stakeholder interviews—played an instrumental role in establishing the Westminster 2030 Bicycle Master Plan.

1.2 STREET NETWORK

Westminster's street network is primarily structured for motor vehicle movement and storage. Specifically, the city exists within a quasi-irregular, regional super-grid of arterial roadways spaced at approximately 1.5 mile (north-south) and 1.0 mile (east-west) intervals.

Analysis reveals that Westminster's older residential neighborhoods, located south of 88th Avenue, between Sheridan and Federal Boulevards, were developed primarily within a gridded network of curvilinear and rectilinear residential streets and commercial avenues. However, all other portions of the city—those built largely in the last 30 years—feature a pattern of disconnected collector and cul-de-sac streets located between the regional arterial super-grid. While this pattern keeps traffic away from the neighborhood interiors, it greatly limits the permeability of the city's street network, effectively forcing the majority of motor vehicle trips onto a limited number of arterial roadways. The congestion caused by this pattern has ultimately been used to substantiate the need to widen streets to their maximum width. Such conditions are not conducive to bicycling, especially when there exists little to no on-street bicycle infrastructure in place, as is the case in Westminster.

Fortunately, the city's extensive shared use path (trail) system and policy of encouraging pedestrian and bicycle paths through cul-de-sacs provide some mitigation. However, while this network is amenable to recreational bicycling, it is frustrating to bicyclists searching for efficient and direct trips to specific destinations, such as working or shopping locations. Bicyclists using thin road bike tires may find the network difficult to navigate because of the crushed gravel conditions. Finally,



1.3: Westminster's network has become increasingly disconnected.

because of the shared use path network's tributary configuration, wayfinding remains difficult if one is not already familiar with the system.

1.3 LAND USE

Like many suburban American cities, Westminster's regulatory practice of separating land uses by function—e.g. commercial, residential, industrial, etc., has directed commercial and employment districts to locate adjacent to high volume streets, away from residential neighborhoods. Such land use patterns, in combination with a disconnected street network, effectively isolate rather than knit together the city's neighborhoods. As a result, access to daily destinations is challenging when traveling on foot or by bicycle. Indeed, the existing arterial streets engender high motor vehicle volumes and speeds, which do not provide a comfortable environment for non-motorized transportation. At present, south Westminster, Bradburn Village, and the Westminster Mall redevelopment plans provide working examples of a more balanced and integrated land use and transportation network pattern.

1.4 EXISTING BIKEWAY NETWORK

While the city's existing bikeways map (*see* pages 10 and 11) reveals a lack of on-street bicycle facilities, it also demonstrates that the city's shared use path network provides a well-developed framework for advancing non-motorized recreation and transportation.

Navigating Westminster's off-street network can be difficult, especially for those unfamiliar with the system. While some wayfinding signs are sporadically located throughout the network, they are not particularly legible, and there exists two different design configurations. In key locations, such as where a pathway splits, directional signs are often missing. At present, there are few bikeway network or caution signs along city streets, hindering cyclist safety and reducing the legibility of the network. Specific wayfinding and signing recommendations are located in Section 4: Wayfinding and Signing Plan.

1.5 BICYCLE COLLISION DATA

During the period of 2000 to 2009, a total of 151 collisions involving bicycles occurred on public streets and were reported to the City. In 99 of these crashes, the cyclist was reported as injured and needed medical attention. One cyclist death was reported in 2004. Other information about the

EXISTING BIKEWAY NETWORK

74	Total bikeway network miles
2	Bikeway types: Shared Use Paths & Bicycle Lanes
74	Miles of Shared Use Paths
>.1	Miles of Bicycle Lanes
0	Percentage of city street network with bikeways
4	Number of main bikeways, with numerous branches

Left: 1.3: While cul-de-sacs greatly limit network connectivity, they can be fused together with non-motorized connections.
(Photo Credit: Google Earth)

Right: 1.4: Numerous key decision points along Westminster's Shared Use Path system lack wayfinding signs.

crashes, such as date, time, vehicles involved and a brief summary of the cause of the crash is also available for each incident.

The map on pages 12 and 13 shows the number and location of these bicycle-related crashes during this period. Other details of each incident have been omitted in order to focus on the spatial and numerical relationships of crashes. The purpose of this map is to understand where bicycle accidents are occurring, which specific corridors are most dangerous for cyclists, and what areas have the highest concentration of bicycle crashes. This information will help the City to better plan for future bicycle education, engineering and enforcement efforts.

Bicycle-related accidents tended to cluster around highly trafficked corridors and intersections, and areas where the off-street network encounters the street network. Neither of these two facts is surprising. Crashes are happening along busy streets, such as Federal Boulevard, 92nd Avenue and Wadsworth Parkway, because they have higher automobile speeds that put cyclists at risk. These corridors highlight the need for bicycle facilities to counteract these trends. Interfaces with the off-street network also see high rates of collisions, as these key areas feature high volumes of cyclists. This stresses the need for the City to prioritize signing and other roadway treatments to ensure the continued safety of Westminster's cyclists at these junctions.

The southeastern section of the city, below 76th Avenue, had the highest incidents of cyclist-related crashes. The section of 72nd Avenue between Sheridan Boulevard and Zuni Drive had 18 reported crashes in the period from 2000 to 2009. Other arterials, such as Lowell Boulevard and Federal Boulevard experienced frequent incidents of crashes. Unsurprisingly, the intersection of Federal Boulevard and 72nd Avenue, the two busiest corridors for this quadrant of the city, saw the highest number of bicycle related crashes in the area. The high rates of accidents in this part of the city are most likely due to the relatively dense land-use pattern, the traffic-heavy commercial streets and adjacent residential areas. The City should target specific education and awareness efforts (*see* Section 6: Education, Encouragement, Enforcement, and Evaluation) in this part of Westminster.

The intersection that had the highest number of crashes was 92nd Avenue and Yates Street. Six collisions were reported at this busy intersection during this ten-year period.

1.6 BICYCLE PARKING

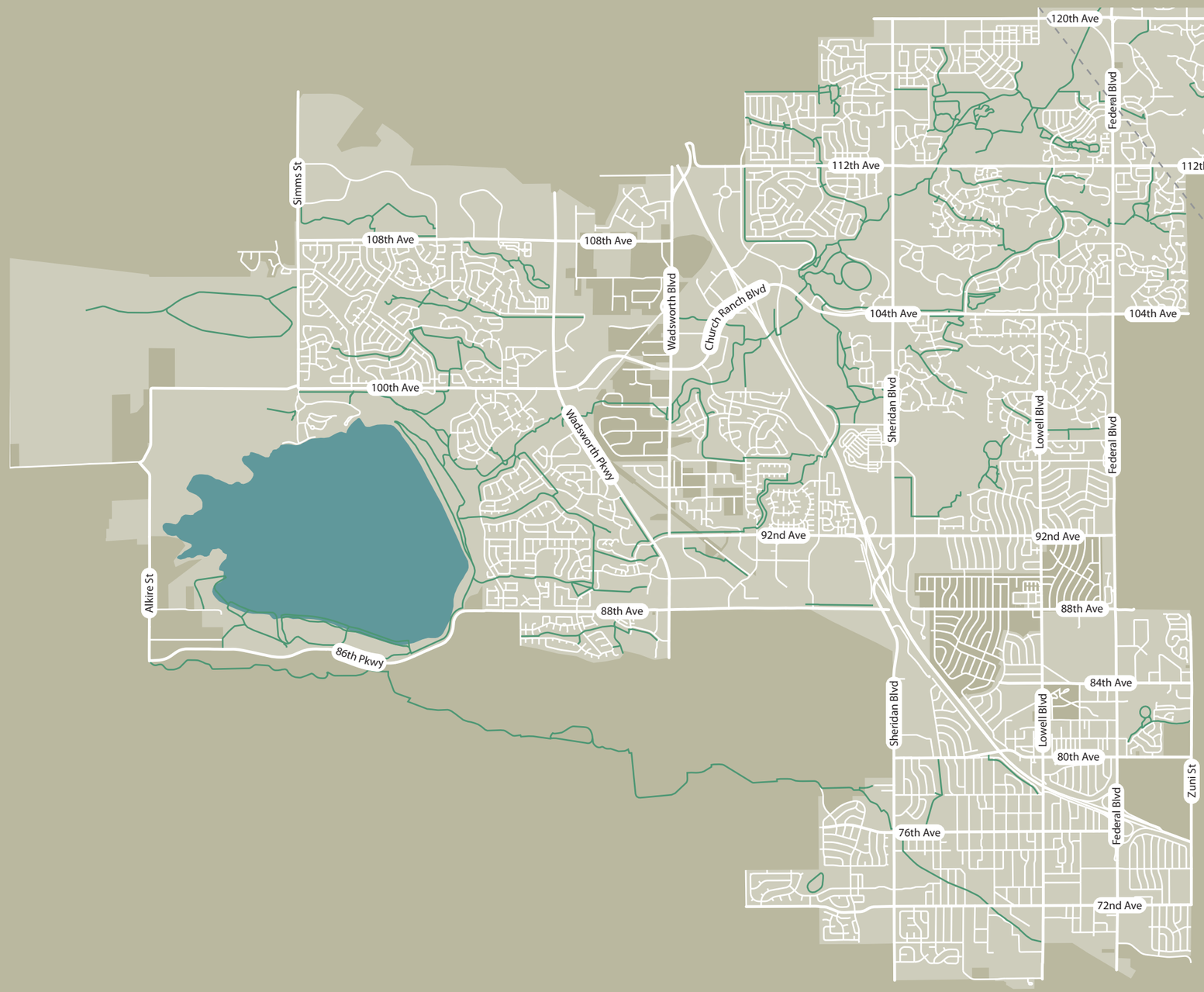
Bicycle parking facilities are commonly found across the city, especially at schools, civic buildings, and some commercial shopping areas. However, the quality of these end-of-trip facilities varies greatly, and the quantity needs calibration—some locations seem to have too little bike parking, while others have too much. There exists a need to "right-size" the City's approach to bicycle parking, and ensure that types and locations are standardized. Section 5: Bicycle Parking Plan includes detailed bicycle parking recommendations.

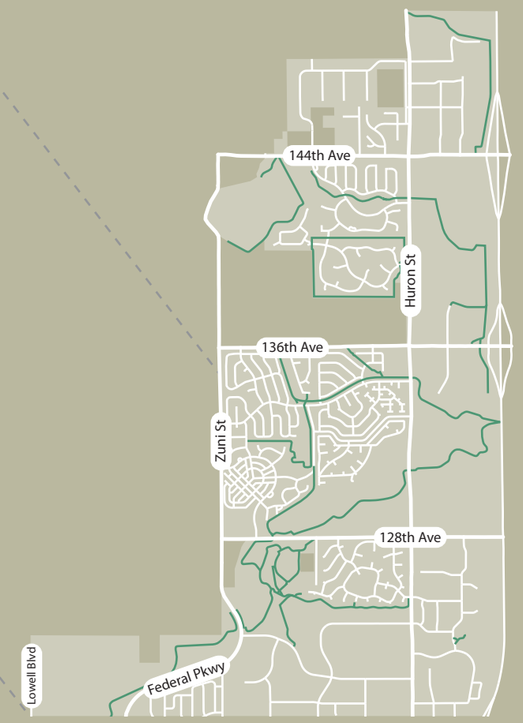
EXISTING BIKEWAY NETWORK

Shared Use Path Network

Unincorporated Areas

See inset for area north of 120th Avenue.



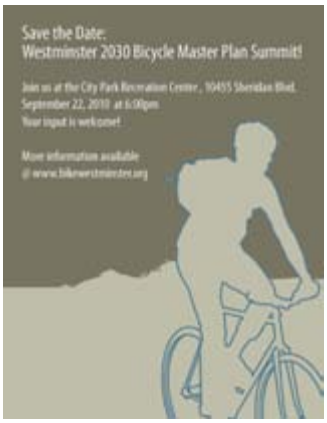


Area north of 120th Avenue.

2. PUBLIC INVOLVEMENT PROGRAM

The Westminster 2030 Bicycle Master Plan public input and communications process utilized numerous innovative and time-tested methodologies to obtain input from the City of Westminster's elected officials and municipal employees; local bicycle advocates; the greater Westminster community; and neighboring municipalities and regional governments. All input gathered provided the planning team with a deeper understanding of public sentiment in regards to the city's current bicycle conditions. The input gathered helped formulate the final recommendations included in this bicycle master plan.

The following section details a summary of the public input and communications processes, which included two Westminster Bicycle Summits, the planning team's Handlebar Survey, web- and paper-based surveys, the City of Westminster's Corporate Employer Outreach Survey, key person interviews, neighboring City and County outreach, and internet and social media tools.



2.1: Two Bicycle Summits engaged Westminster's bicycle community.

2.1 WESTMINSTER BICYCLE SUMMITS

The planning team facilitated two public Bicycle Summits. The first Bicycle Summit occurred on May 27th, 2010. It included a project kick-off overview; initial project orientation; and a presentation on the planning team's best practices assessment and preliminary Handlebar Survey findings, as described below. Input from this summit was used to formulate the recommendations included in the Westminster 2030 Bicycle Master Plan.

The second Bicycle Summit took place on September 22nd, 2010. A representative of the planning team presented the full draft master plan for public review, which included a summary of all recommendations and all draft bikeway plan maps.

2.2: The Handlebar Survey allowed the planning team to collect qualitative and quantitative information.

2.2 HANDLEBAR SURVEY

The planning team bicycled large portions of every neighborhood in the City of Westminster. This was done in advance of leading the city's first Bicycle Summit so that the planning team could best understand and document Westminster's existing bicycling opportunities and challenges—beyond what may be ascertained by reviewing existing maps and plans.

Information gathered included current existing bicycle facility use, street width/street types, network gaps, wayfinding conditions, posted and actual vehicular speeds, land uses, open space connections, bicycle parking supply and demand, bicycle trip generators, and existing bikeway infrastructure types. Throughout the Handlebar Survey process, the planning team was also able to connect personally with those already bicycling in Westminster.

2.3 WEB- AND PAPER-BASED PUBLIC SURVEYS

The planning team collaborated with the City of Westminster to conduct a web- and paper-based community survey to establish a benchmark for bicycling trends, preferences and behaviors. The information gathered was evaluated and used to prioritize project recommendations. Specifically, the planning team utilized Surveymonkey.com, a web-based survey tool, to solicit input from frequent, occasional, and non-cyclists through the Bike Westminster project website for five months, from mid-May to mid-October. Paper copies of the survey were also distributed to cyclists encountered during the planning team's Handlebar Survey. The planning team added these responses to the online database. The survey asked Westminster residents to answer a series of bicycling-related questions.

2.3.1 SURVEY FINDINGS

The Westminster 2030 Bicycle Master Plan Survey garnered 209 responses. From this survey, numerous conclusions can be inferred. For example, the majority of respondents are recreational cyclists, ride a few times a week, and desire the City to concentrate its bikeway planning efforts on implementing an on-street bicycle network.

Based on the response, it is clear that the survey targeted, and reached, a limited demographic segment of Westminster residents—intermediate and highly-skilled cyclists who ride fairly regularly. In order to best understand the overall state of cycling in the city, a more far-reaching survey effort would have to be designed and disseminated to cyclists and non-cyclists alike. Such an effort was not part of the scope for Westminster's first Bicycle Master Plan. However, as the City begins to implement the 2030 Bicycle Master Plan, such an effort should be considered to best steer ongoing planning and implementation efforts.

When analyzing the results of the survey, it should be noted that not all 209 respondents answered all 11 questions contained within the survey. As a result, percentages always apply to the aggregate number of survey respondents who answered the question.

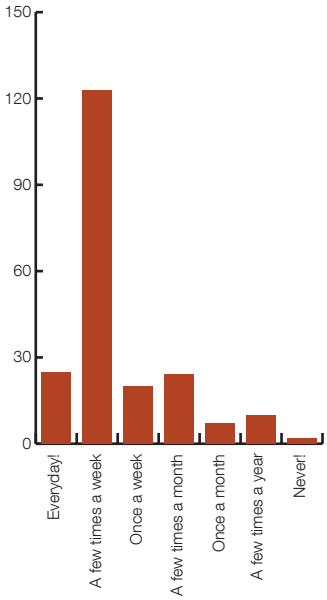


Figure 1: How often do you bicycle?
The vast majority of survey respondents bicycle frequently: 79.7 percent of our survey takers (161 people) said they cycle at least once a week or more.

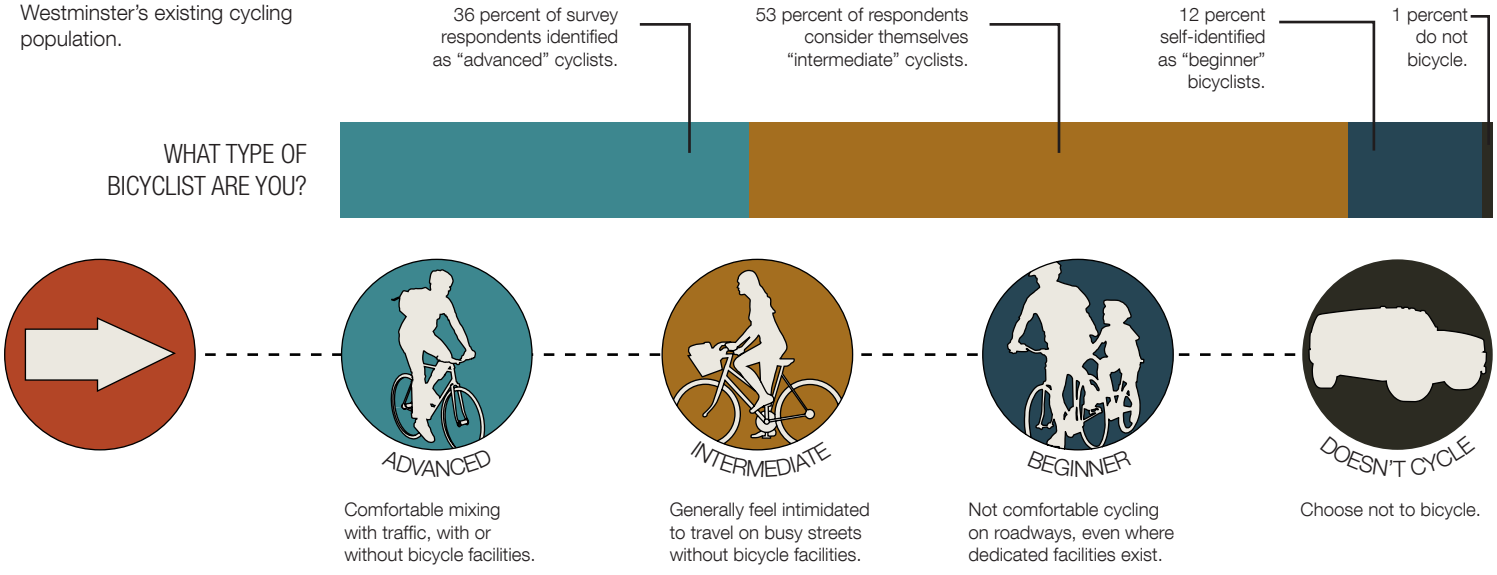
2.3.1.1 Question 1: How often do you bicycle?

One hundred twenty-three respondents (58.9 percent) bike a few times a week; 25 respondents (12.0 percent) bike everyday. Twenty people (9.6 percent) noted that they bike once a week; an additional twenty-four (11.5 percent) bike a few times a month. Only seven people said they cycle once a month (3.3 percent), an additional ten (4.8 percent) cycle a few times a year.

2.3.1.2 Question 2: What type of bicyclist are you?

About a third of survey respondents consider themselves to be quite skillful cyclists, with 73 people (36.0 percent) identifying themselves as 'advanced cyclists'—cyclists who feel comfortable mixing with traffic. However, the majority of respondents, 107 (52.7 percent), consider themselves 'intermediate cyclists—people who feel comfortable bicycling where facilities exist, but generally prefer to stay away from busy streets (even though they mostly feel safe riding in their own residential streets).

Figure 2: What type of bicyclist are you?
The survey generally reached Westminster's existing cycling population.



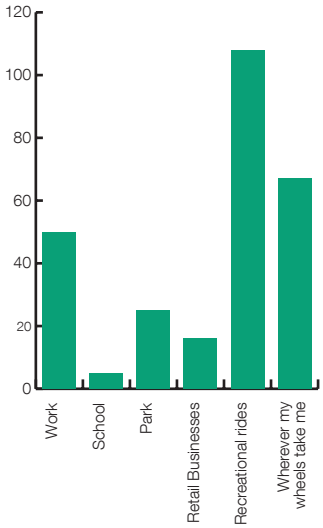


Figure 3: What is your most common destination?
Recreational bicycling is more popular in Westminster than utilitarian bicycling.

Twenty-four people (11.8 percent) identify themselves as beginning cyclists—cyclists who feel safe riding on the sidewalk or at bicycle events such as Bike MS, but who generally do not mix with traffic.

2.3.1.3 Question 3: What is your most common destination?

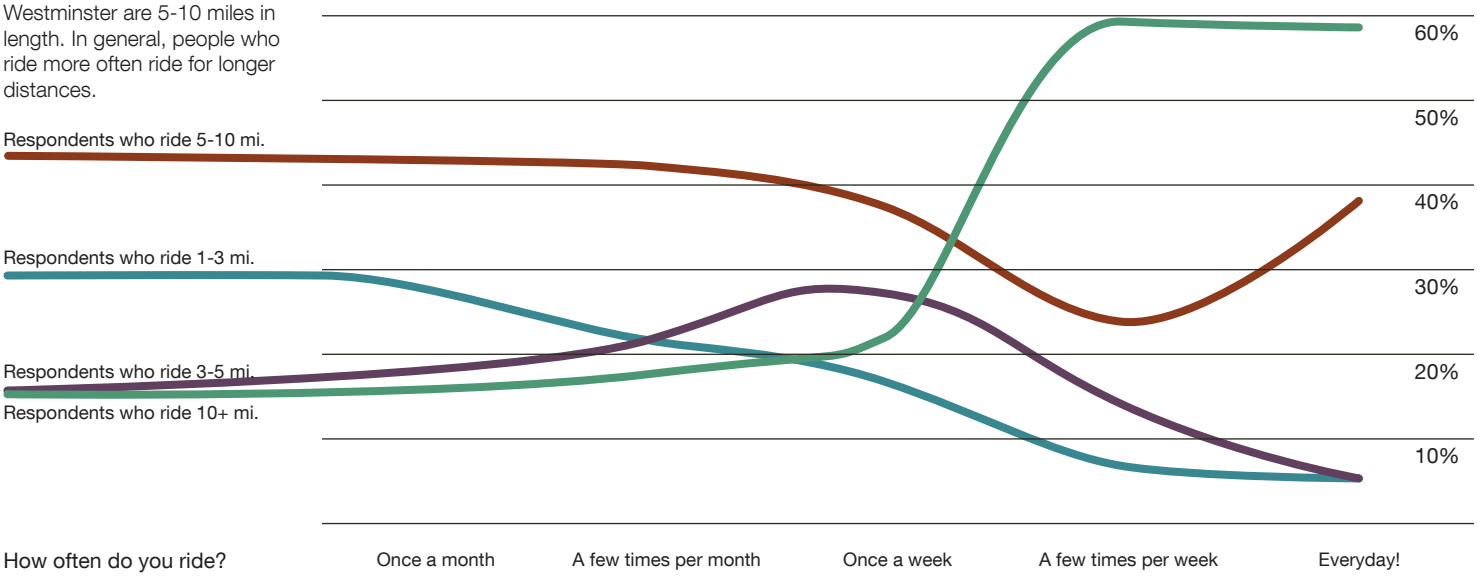
In general, recreational bicycling is more prevalent than bike commuting. Fifty respondents (25.1 percent) said they bike to work, while many more associated biking with recreation. For instance, 25 respondents (12.6 percent) said they bike to parks, while 108 (54.3 percent) participated in recreational group or solo rides. Sixteen respondents (8.0 percent) said they use their bike to access retail businesses. In addition, 67 respondents (33.7 percent) said they ride 'where ever my wheels take me,' meaning no matter the trip type, cycling is always an option. Amongst others, those surveyed cited Standley Lake and the Big Dry Creek Trail as their primary recreational destinations. A substantial number of survey takers commented that they mostly ride on the city's network of paths, but do not feel safe riding on the City's existing roadways. Also, many cyclists cross Westminster's borders to bike to Arvada, Broomfield, Boulder, Denver, and points beyond—an indication of the need for a well-connected regional bicycle network.

Several survey takers also mentioned that they ride for exercise. Those who ride for exercise tend to go on longer rides. This is reflected in the average bicycle trip length.

2.3.1.4 Question 4: What is your average bicycle trip length?

When asked, 96 people (46.6 percent) indicated their average trip length was over ten miles (perhaps, this reflects the prevalence of recreational riding, or that the survey reached mostly recreational distance riders). Another 59 (28.6 percent) said this number was between five and ten miles, while 29 people (14.1 percent) claimed their average trip length was between three and five miles. Only 22 respondents (10.7 percent) claim their average trip length was between one and three miles. The number of cyclists who average less than a mile per bicycle trip is negligible: three people (1.5 percent). Note that the number of respondents decreases in line with the drops in average trip length.

Figure 4: What is you average bicycle trip length?
Most cyclist trips in Westminster are 5-10 miles in length. In general, people who ride more often ride for longer distances.



2.3.1.5 Question 5: To what extent do you agree with the following statement: Bicycling in Westminster is safe and enjoyable.

Westminster cyclists are divided over the question whether bicycling in Westminster is safe and enjoyable. Fifty-six people (or 28.1 percent) somewhat or strongly disagree with this statement. And while 133 people (66.8 percent) somewhat or strongly agree that it is indeed safe and enjoyable to bicycle in Westminster, a myriad of concerns and comments surfaced in the competed surveys.

While people generally agreed that bicycling in Westminster is "safe and enjoyable," open comments demonstrated a myriad of concerns about the city's street network, including:

- Riding in a bicycle lane that suddenly disappears
- Westminster drivers not being used to bicyclists or expecting bicyclists
- The trail system is safe and enjoyable—but roadways are NOT!
- Lack of bike lanes to major destinations
- Traffic volume on major arterials is intimidating
- As long as one is on designated paths, cycling is very safe. Safe street cycling options are limited
- Westminster lacks bicycle connections to other municipalities
- Biking on Westminster's trails is very safe. Biking in Westminster traffic is not so safe. I am an aggressive, brightly colored rider so I tolerate riding on Westminster streets. A timid, beginner or unsure bicyclist would not fare so well
- Cars reign supreme over bikes in Westminster, as evident when streets are repaved with no new bike lanes added when room exists
- Bicycle lanes in Arvada and Broomfield end when they meet the Westminster municipal boundary
- Drivers in Westminster need more education and awareness - get off the cell phones, drop the cigarettes and blackberries, and pay attention to the road
- Motorists are extremely hostile to cyclists. Education and facilities are needed.

2.3.1.6 Question 6: Please indicate how strongly you agree/disagree with the following statements: "There are not enough bicycle facilities—lanes, paths or well-marked routes—that connect to my destinations," "There is not enough safe, secure bicycle parking available at my destination(s)," "Roadway conditions (potholes, narrow shoulders, too many travel lanes, etc.) make me feel unsafe," "Motorists behave in a way that makes me feel unsafe," "The weather is not conducive to cycling," and "I am concerned about bicycle theft."

The below graph illustrates that bicycling isn't just a matter of building more bike lanes. Many factors play a role in the decision of whether to cycle or not.

Indeed, the graph indicates that in order for cycling to become a more attractive transportation option, more bicycle facilities are needed—bike lanes, paths or well-marked routes that connect to people's desired destinations. Roadway conditions are also a critical factor to many survey respondents, and according to them, poor roadway conditions make them feel unsafe. Furthermore, the behavior of motorists in Westminster must be addressed—a substantial number of survey takers indicate that their behavior makes them feel unsafe. While cyclists identified a number of barriers to biking in Westminster, survey respondents do not perceive the city's inherent characteristics—the weather and topography—as barriers to cycling. Though some cities have overcome weather and topographical issues—Seattle and San Francisco have relatively high bicycle mode splits despite their

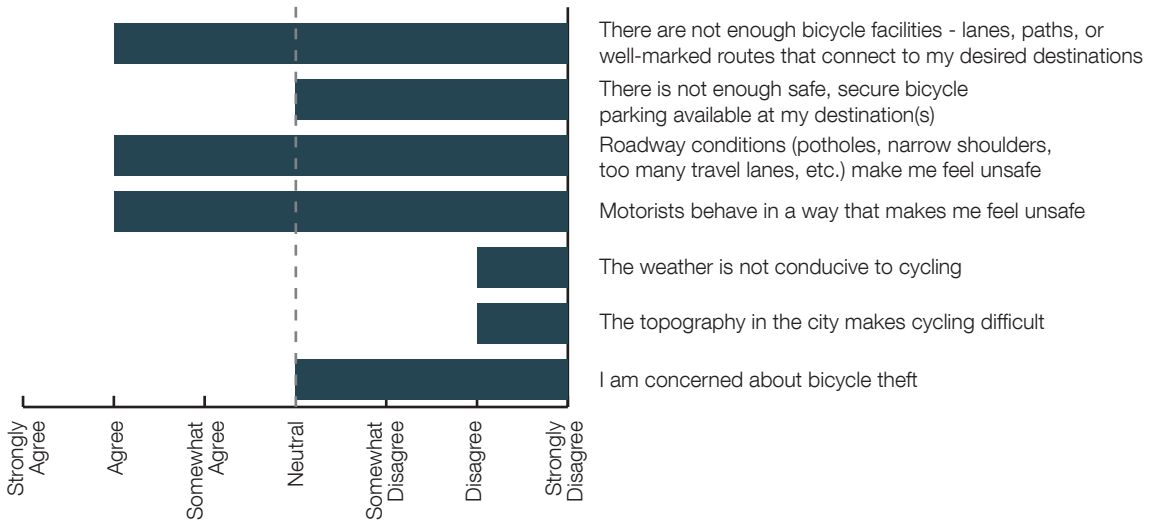


Figure 5: How strongly do you agree or disagree with the following statements?
The graph to the left shows the mode response to each statement; most identified bikeway facilities as a critical issue.

respective rainy weather and hilly topography—Westminster's relatively mild, sunny climate gives the city a natural advantage in promoting cycling. Finally, the bulk of respondents felt neutral about bicycle parking and theft; some pointed out in the comments that, as recreational cyclists, they never leave their bicycles locked up anywhere, so their usage patterns make parking and theft non-issues.

2.3.1.7 Question 7: Which are the priorities the City needs to address to make Westminster a safer city for bicycling?

When asked which priorities the City of Westminster needs to address to make it a safer city for cycling, the need for more bicycle lanes, paths, signed routes, and bicycle boulevards was highlighted by 175 survey takers (88.4 percent). Sixty-seven people (33.8 percent) indicated they wanted to have motor vehicle/bicycle safety education and awareness promotion. In addition 58 respondents (29.3 percent) considered safe routes to schools for children a priority.

Eleven people, or just 5.6 percent of survey takers, viewed lower motor vehicle speeds on the city's major corridors as a priority, while 22 survey takers (11.1 percent) pointed to the need for more speed limit enforcement for motorists.

2.3.1.8 Question 8: Where is bicycle parking needed the most?

The need for better bicycle parking facilities was mentioned by 32 survey takers (16.2 percent). Subsequently, when asked where bicycle parking is needed the most, 87 survey takers (52.7 percent) mentioned shopping centers, 53 (32.1 percent) mentioned parks, 38 (23.0 percent) mentioned bus stops, 27 (16.4 percent) mentioned civic buildings and 16 (9.7 percent) mentioned schools. In addition, 61 (37.0 percent) survey takers claimed more bicycle parking is needed along major commercial corridors. Survey takers commented on the issue of bicycle parking as well:

- Unless it is easy to ride a bicycle to a shopping destination there is no purpose to add bicycle parking at those locations.
- Some facilities exist now, but not enough—Especially at shopping centers
- The Westminster Promenade park n' ride parking need more bicycle parking, as do many shopping areas.

2.3.1.9 Bicyclist-Type Analysis

Based on the survey results, the cyclists of Westminster can be broken down into three broad categories: commuters, frequent recreational riders and occasional recreational riders. While there is some overlap between the groups, and even the action of grouping cyclists together under such broad labels is somewhat arbitrary, the distinction between these groups is illuminating.

Cyclists were placed into these categories depending on how they responded to question 3: What is your most common destination? The 50 (25 percent) respondents who indicated 'Work' are considered commuters. The 25 (13 percent) individuals who chose 'Park' are considered to be occasional recreation riders. Frequent recreational riders are the 108 (54 percent) respondents who indicated 'Recreational group or solo rides'. Again, it should be emphasized that there is the great potential for overlap between these groups. A commuter could easily participate in group and solo recreational rides, but have indicated 'Work' because that is his/her most common destination.

Compared to the other groups, commuters tend to ride more often, are more likely to consider themselves 'advanced' cyclists, are least satisfied with Westminster's existing bicycle facilities, most strongly desire the installation of more bicycle facilities and are more likely to participate in government-led bicycle initiatives. It would seem obvious that commuters ride most often, as there are inherently more opportunities given the number of days in the work week. These riders are most likely utilizing both the off-street network and on-street network during their commutes. Their exposure to the bicycle-unfriendly roadway conditions may indicate why commuters are the least satisfied with bicycling conditions in Westminster, and why they strongly desire on-street bicycle facilities. As their responses indicate, this group of cyclists are an underserved demographic segment that would benefit most from the installation of on-street facilities. As commuter bicyclists log the most days and miles, and are most likely to participate in government actions, their insight and participation could be a very valuable asset to the City, as it implements and evaluates the 2030 Bicycle Master Plan.

Westminster's occasional recreational cyclists, by contrast, ride the shortest distances, are

most intimidated by automobiles and more likely to consider themselves "beginners." These cyclists indicated that their primary destination is the 'Park,' which would most likely mean the closest green space to where they live. More likely than not, they will bicycle on quiet neighborhood streets, or perhaps parts of the existing off-street network in order to reach that destination. These trips are short and traverse relatively safe corridors. Whereas commuters are more likely to utilize collector or arterial roads during their daily trips, infrequent recreation riders do not have the same exposure to motor vehicles, and are thus more inexperienced and fearful of bicycling on the roadway. This group of cyclist is typically more satisfied with cycling conditions than commuters because of this lack of exposure. As they most often ride to and from the park, utilize calm streets or off-street trails, Westminster's existing conditions satisfy this group.

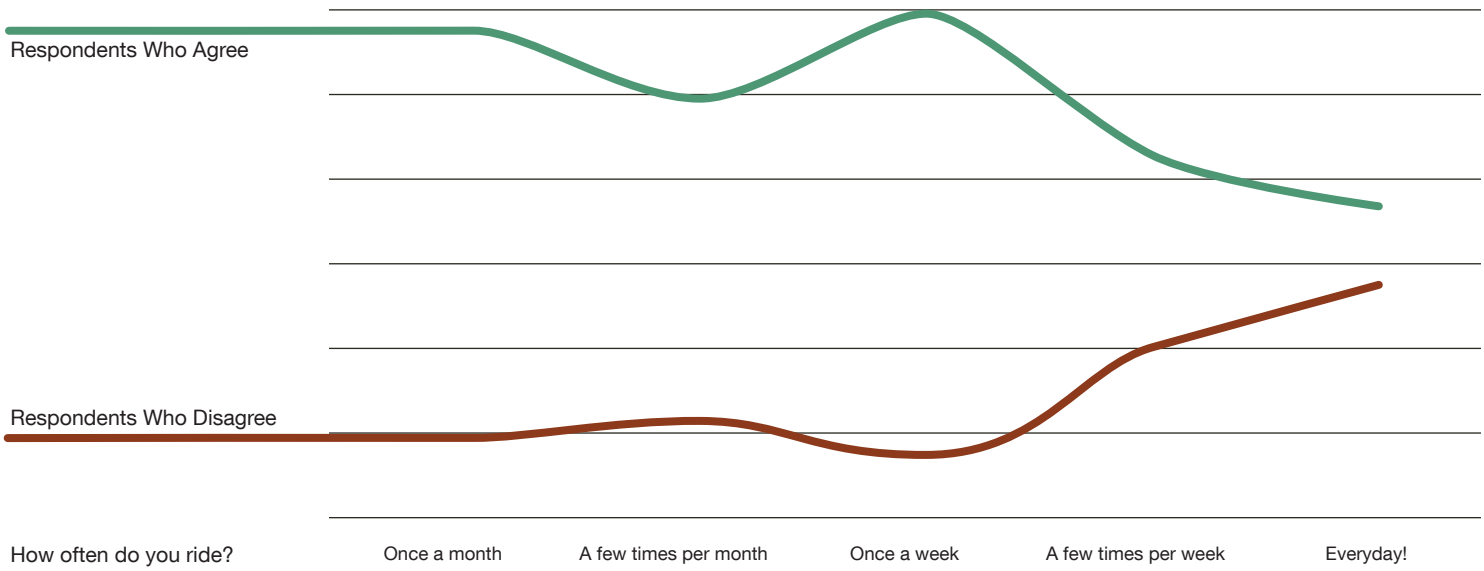
Frequent recreational cyclists have the longest trips; bicycle nearly as often as commuters; are more satisfied with existing conditions than commuters; but less so than occasional recreational riders, and are nearly as likely to participate in government proceedings as commuters. This group of cyclists are a dedicated group, who will tend to bicycle for long distances, most likely utilizing the off-street network. They will have more exposure to bicycling on the roadway than the occasional recreational riders, due to the fact that longer rides would most likely require some time spent on the roadway network. However, compared to commuters, frequent recreational riders most likely spend more time on the off-street network, due to the fact that their primary destination is not a fixed location. This fact would explain why frequent recreational cyclists are more satisfied with existing cycling conditions than commuters, but less so than infrequent recreational riders.

2.3.1.10 Conclusion

The survey has shed new light on the deterrents of bicycling in Westminster, as well as on its current assets. One fact remains clear: the more exposure that cyclists have on Westminster's roadways, the less satisfied they are with overall cycling conditions. Recreational cyclists, who most likely limit their trips to shared use paths, are more satisfied by the safe and robust off-street network. However, as people spend more time cycling on Westminster's roadways, and encounter dangerous and sometimes hostile conditions, their views invariably shift. Cyclists who make trips on the roadways of Westminster recognize the need for and importance of on-street facilities to create more comfortable and enjoyable riding conditions.

The survey results should continue to be an excellent source of information and additional surveys should be conducted on a regular basis to track the shifting opinions and perceptions of Westminster's bicyclists as the 2030 Master Plan is implemented. Particular effort should be made to solicit the opinions and perceptions of bicycle commuters, as they would be the most receptive and have the most insight to offer.

Figure 6: Bicycling Frequency and Satisfaction with Existing Conditions
There is an inverse relationship between frequency of cycling and satisfaction with existing conditions. Westminster's cyclists who ride more often tend to be less satisfied.



2.4 WESTMINSTER CORPORATE EMPLOYER OUTREACH SURVEY

Concurrent to the planning team's survey and outreach efforts, the City of Westminster surveyed several large businesses in the city regarding current bicycle facility use/demand and commuter preferences. The information received revealed that Westminster's large businesses generally support bicycling as a form of transportation to and from the work place, agreeing that it aligned with their corporate philosophy. Some employers already offer places to store bicycles and would agree to allowing the City to provide additional end-of-trip facilities should funding become available. Additionally, several businesses noted that their employees often ride together for exercise during their lunch hour, further supporting the need for showers, which a few businesses already offer. The planning team integrated the full survey results into the recommendations contained herein.

2.5 KEY PERSON INTERVIEWS

The planning team conducted more than fifteen individual interviews with key stakeholders, including Westminster City employees, key bicycle advocates, and bicycle-pedestrian professionals from neighboring municipalities.

2.6 NEIGHBORING CITY AND COUNTY OUTREACH

The planning team reached out to all five neighboring municipalities, as well as Jefferson and Adams Counties, to inform each of the bicycle master planning processes, as well as ensure Westminster's planned bikeways would link into a larger regional network.

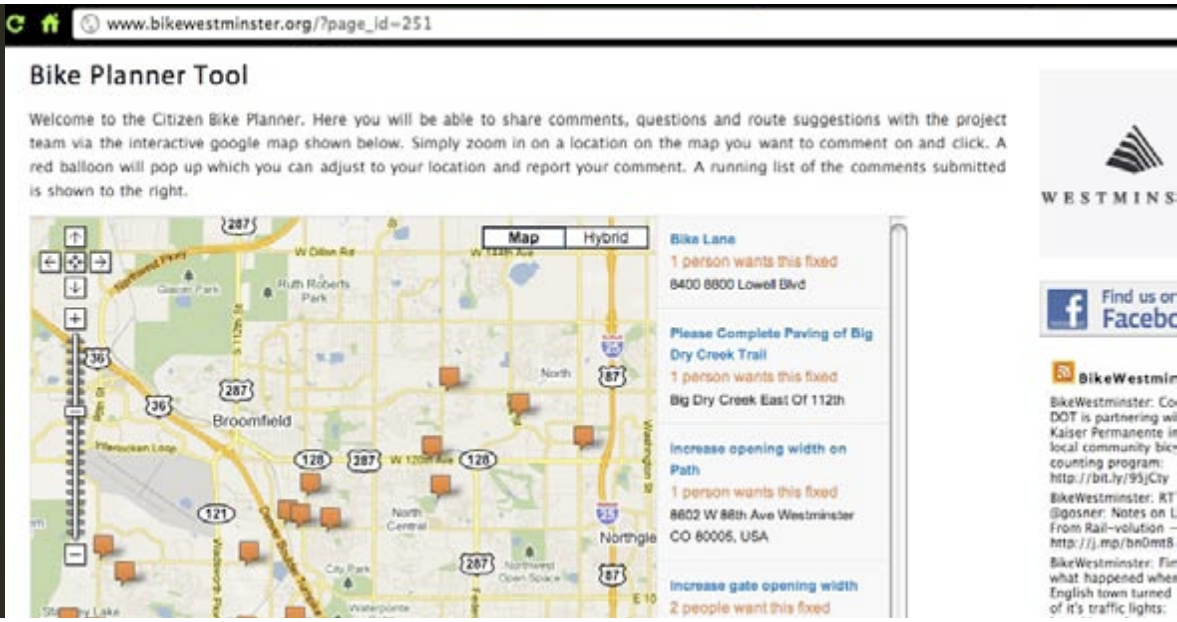
2.7 INTERNET AND SOCIAL MEDIA TOOLS

To maximize public participation during the planning process, a suite of internet and social media tools was developed. The Bike Westminster website (www.bikewestminster.org) was designed to serve as the project's online hub. The website includes a project blog, general community and regional bicycle information, a well-used interactive web-mapping tool, and a link to the project survey. It also integrates the project's Twitter and Facebook accounts to maximize the opportunities for participants to receive and share project related information in real-time.

WEBSITE SUMMARY STATISTICS

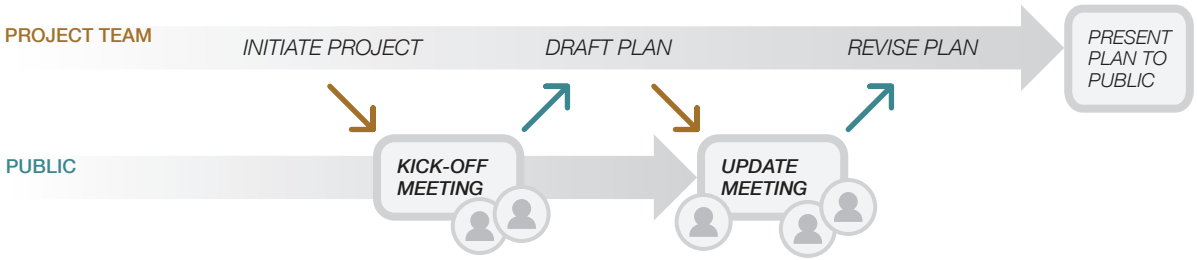
32 Website News Blog Posts
9 Website Comments
90 Bike Planner Tool Comments
46 Facebook Posts
81 Facebook "Fans"
94 Twitter Posts
61 Twitter Followers

2.7: The Bike Westminster website served as the project's information hub, allowing users to connect to the project and each other. It also provided multiple ways to provide input over the duration of the project, including an innovative mapping tool called Bike Planner. Users could highlight areas in need of improvement and comment on issues brought up by other cyclists.

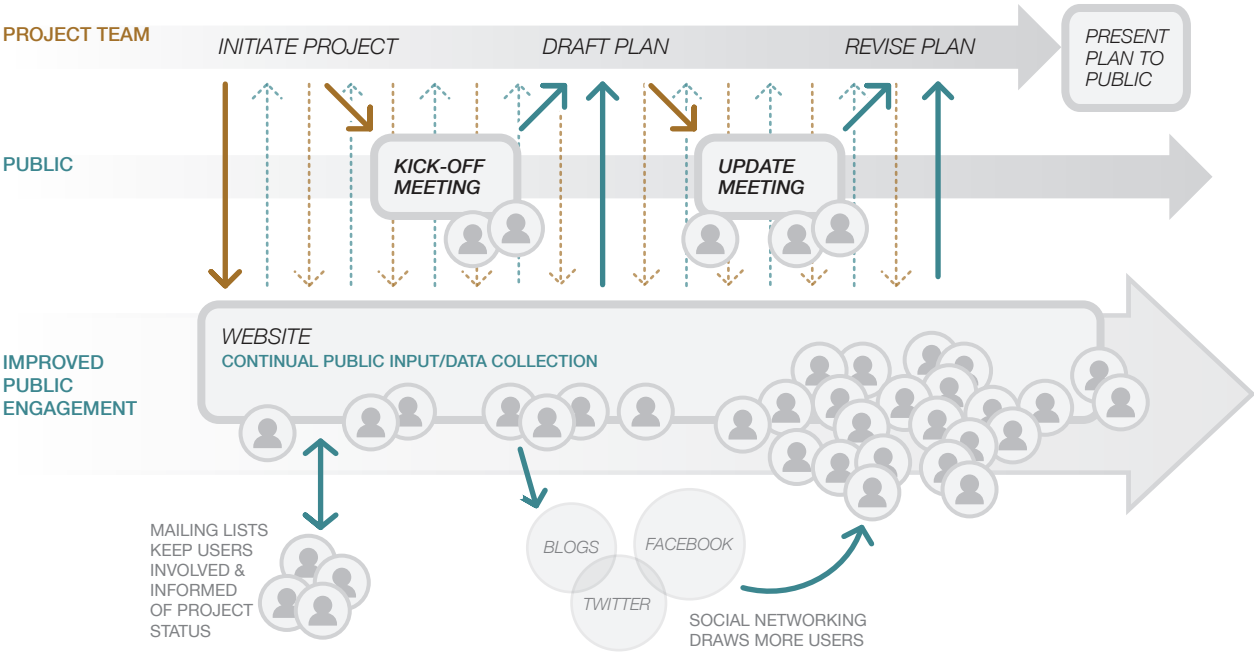


2.7: This process diagram, created by Andy Cochran at The Open Planning Project, shows how using social media and web-based tools can improve the public outreach process by engaging people virtually.

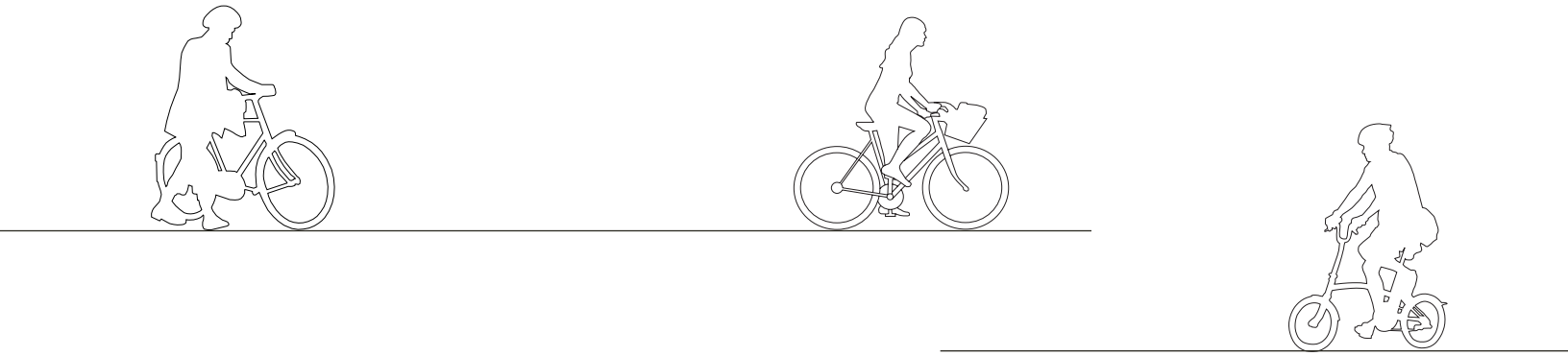
TRADITIONAL PUBLIC INVOLVEMENT PROCESS



IMPROVED PUBLIC INVOLVEMENT PROCESS



3. ON-STREET BIKEWAY NETWORK PLAN



WHAT IS BICYCLE PLANNING?

Bicycle planning is the process of assessing and addressing the needs of a community in the area of bicycle infrastructure, programs, and policies. It involves taking an inventory of the community's existing bicycle resources, and identifying strategies to build upon those resources. Bicycle planning means consulting with the citizens of community to facilitate their vision of future transportation networks—understanding their concerns, addressing their needs, and crafting a road map to a more bicycle-friendly community. It means assessing the strengths and weaknesses of bicycle resources through on-the-ground observations and public outreach, and finding ways to capitalize on their strengths and minimize their weaknesses.

Ultimately, bicycle planning is about giving a community a viable transportation alternative that complements the existing network—an alternative that encourages lively streetscapes, a healthy population, and a more livable and sustainable environment.

WHY PLAN?

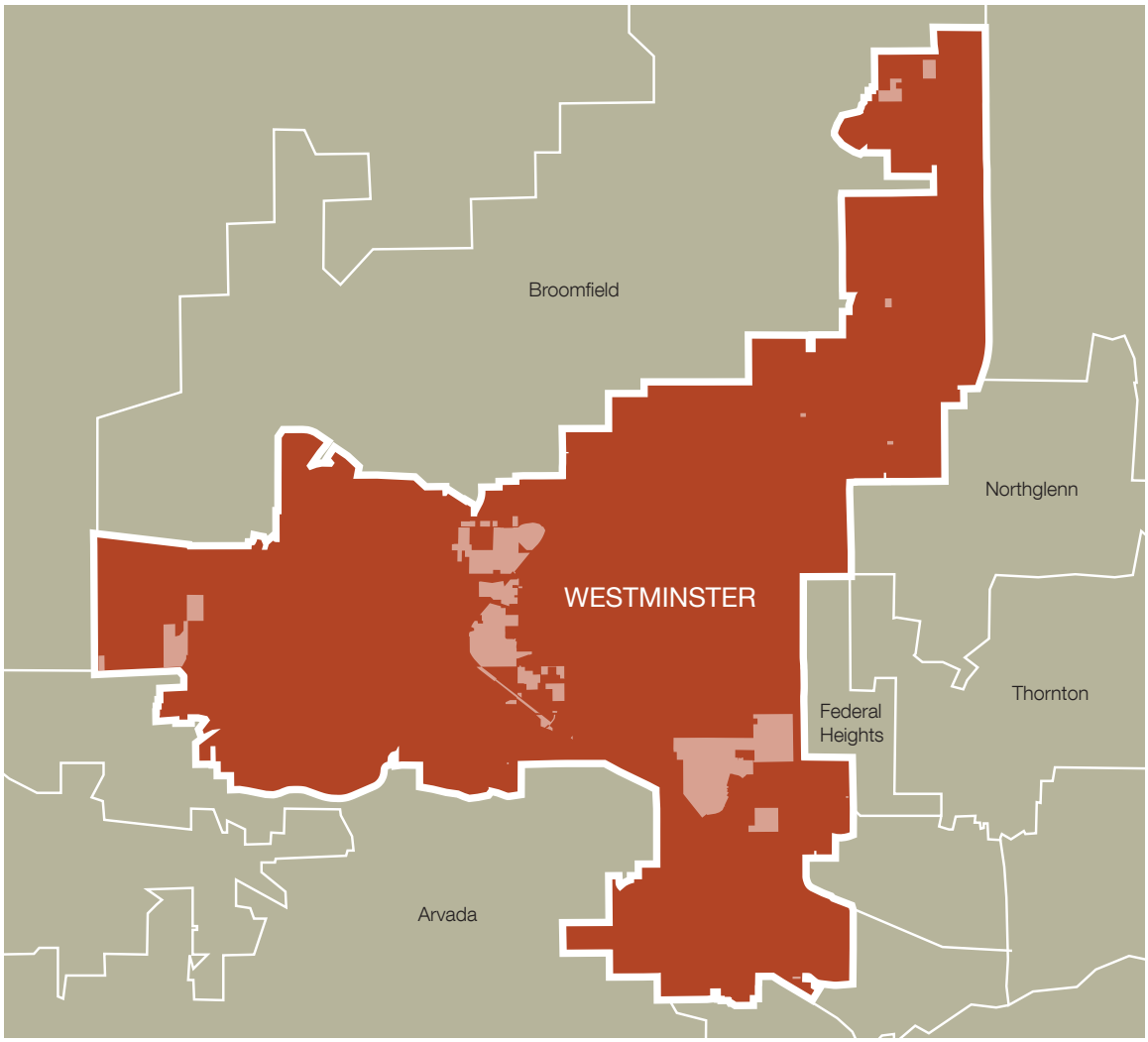
According to the Colorado Department of Transportation, bicycling brings more than $1 billion dollars to the state's economy each year. Whether for tourism, sales, events, or maintenance and repair, it's clear that the bicycle industry brings economic benefits to Colorado. However, bicycling also helps keep Colorado communities vibrant, active, and livable—traits that support its reputation as the nation's healthiest state.

As Colorado's 7th largest city, The City of Westminster has a vital role to play in sustaining and advancing the health of its local economy, the natural and built environment, and its 110,000 residents. However, because the City does not exist in a vacuum, it must also look outward in contributing to an increasingly dynamic metro-Denver region, and the overall livability of the State of Colorado. As Westminster's first comprehensive bicycle planning effort, the 2030 Bicycle Master Plan is intended to help the City do just this.

3.1 PLAN SCOPE

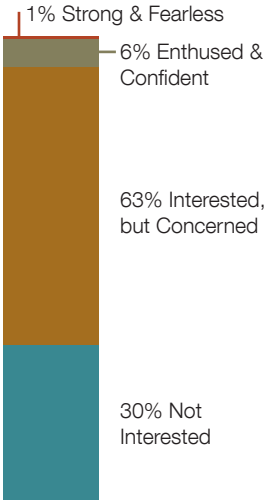
The primary focus of this planning effort is to encourage commuter bicycle travel not only within the City of Westminster, but also throughout the adjacent communities and the metro-Denver region. While the city's existing shared use path network was reviewed extensively, this plan focuses on identifying key bicycle facility improvements throughout the city's existing street network. Efforts were made to ensure that key destinations for commuting—such as shopping centers, employment centers, civic and educational institutions, and other gathering areas—will be well served by the proposed network. Increasing multi-modal connectivity is also a goal of this plan. Existing and planned transportation facilities, such as bus routes, transit stations, and park and ride locations, were considered to be particularly important destinations.

The Westminster 2030 Bicycle Master Plan study area includes all 33.7 square miles of land within the city's borders, with the exception of unincorporated areas within the boundaries, highlighted below in a lighter shade of red. However, in order to make bicycle travel a viable option, this study looks closely at Westminster's borders to make connections with existing and proposed infrastructure in neighboring municipalities.



3.1: The City of Westminster is situated between Denver and Boulder, CO, and is surrounded by a number of municipalities and unincorporated areas of Adams County.

3.2 APPROACH



3.2: While Roger Geller identifies four types of bicyclists, appealing to the "interested, but concerned" can do much to increase the cycling rates in any given community.

Before assigning bikeway types, the unique characteristics of each street and its physical context are considered holistically. Analysis includes street widths, street types, existing land uses, urban form, residential and commercial density, traffic control devices, posted speed limits, actual travel speeds, and existing/projected traffic volumes. When conducting this analysis, special attention is paid to how each of these elements affects the perceived and actual comfort for all types of bicyclists.

Taking a cue from their European counterparts, North America's most bicycle-savvy cities are now designing bikeways to accommodate the least confident user. This approach provides an opportunity to increase bicycle mode share by further enriching the safety of the overall bikeway network. Peter Jacobsen's frequently cited "Safety in Numbers" research shows that safer bicycling conditions attract more bicyclists to the roadway, which in turn, creates even safer conditions, and ever more people bicycling.[i] This so-called 'virtuous cycle' is set in motion when accommodating the most vulnerable users becomes a standard approach enhancing the viability of bikeway networks.

To that end, research conducted by Roger Geller, Bicycle Coordinator for the City of Portland, Oregon, identifies four general types of bicyclists, of which the majority seek more comfort and safety. "Riding a bicycle should not require bravery. Yet, all too often, that is the perception among cyclists and non-cyclists alike," says Geller.[ii] Bikeway infrastructure that appeals to those who are interested in bicycling, but who are too often deterred by the perception—and reality—of unsafe bicycling conditions, is emphasized in this plan.

3.3 2030 BIKEWAY NETWORK MASTER PLAN

At present, the city's bikeway network consists of approximately 74 miles of off-street shared use paths. To date, the City maintains no on-street bikeways. By physically outlining how the City should foster bicycling as a viable, safe, and sustainable form of transportation and recreation, the 2030 Bikeway Network Plan provides a critical foundation for further positioning Westminster as a safe and desirable place to bicycle.

Specifically, the Westminster 2030 Bicycle Master Plan includes more than 132 miles of new or improved bikeways. The plan proposes 102 bikeway projects, with eight total bikeway types, and seven total countermeasure types. The plan's implementation will ultimately result in bikeways on 28 percent of Westminster's street network.

The City of Westminster currently has three basic street types: local, collector and arterial. To more completely meet the needs of beginner, intermediate, and expert bicyclists, and to advance the viability of active transportation within the city and region, the Westminster 2030 Bicycle Master Plan

PROPOSED 2030 BIKEWAY NETWORK

132	TOTAL BIKEWAY NETWORK MILES
102	TOTAL NUMBER OF BIKEWAY PROJECTS
28	PERCENTAGE OF STREET NETWORK TO HAVE BIKEWAYS
8	NUMBER OF BIKEWAY TYPES
4	NUMBER OF COUNTER MEASURE TYPES

includes three classes of bikeway types, which may be configured in numerous ways to best match the physical characteristics inherent to each of the three basic street types.

In total, eight types of bikeways within these three classes are proposed. They include Class I: Off-street Shared Use Path, and Sidepath located within roadway right-of-way; Class II: Conventional Curbside Bicycle Lane, Conventional Bicycle Lane adjacent to parallel parking, and Buffered Curbside Bicycle Lane; and Class III: Signed Bike Route, Signed Bike Route with Shared Use Lane Markings (Sharrows) adjacent to parking, and Signed Bike Route with Curbside Shared Use Lane Markings (Sharrows).

A map of the proposed 2030 Bikeway plan can be found on pages 26 and 27. Though eight bikeway types are proposed in total, for simplicity, some bikeway types have been grouped together. The map does not make a distinction between different Class I and Class II facility types. It does, however, make a distinction between Class III facilities that include shared use lane markings and those that do not. In total, four bikeway facility types are highlighted: sidepaths (all Class I Infrastructure), bike lanes (all Class II infrastructure), signed bike routes (all Class III infrastructure without sharrows), and shared use lane markings (all Class III infrastructure with sharrows).

While the plan specifically aims to address the street network, many connections have been made with Westminster's extensive off-street shared use path network. Moreover, connections with adjacent communities have been pursued wherever possible. A map of these connections can be found on pages 28 and 29.

Additionally, seven bikeway countermeasure treatments are recommended to further enhance the visibility, safety, operation, and appeal of the proposed bikeway network. The countermeasure treatments include Bicycle Boxes, Bicycle Detection Systems and Pavement Markings, Peg-a-Tracking, and Bicycle Turn Pockets and Refuges.

Each proposed bikeway and countermeasure types are defined and illustrated in Section 3.4: Bikeway Type Summary and Section 3.5 Countermeasure Treatment Summary.

While this document offers recommendations for the location of each bikeway facility and countermeasure type, a cyclist-preferred bikeway type (i.e. Class I vs. Class II) and additional countermeasures should be considered if the opportunity for future improvement exists. For example, if a corridor is currently designated as a Class III Bicycle Route, but, in the future, is able accommodate Class II Bicycle Lanes, then the higher level of service should be pursued if and when funding and political support becomes available.

Finally, a close working relationship will have to be established with the Colorado Department of Transportation (CDOT) and Adams and Jefferson Counties in the pursuit of the plan's implementation, as competing jurisdictional interests and funding constraints may prove detrimental to the realization of the Westminster 2030 Bicycle Master Plan.

PROPOSED BIKEWAY & COUNTERMEASURE TYPES

CLASS I

- Off-street Shared Use Path
- Sidepath located within roadway right-of-way

CLASS II

- Conventional Curbside Bicycle Lane
- Conventional Bicycle Lane adjacent to parallel parking
- Buffered Curbside Bicycle Lane

CLASS III

- Signed Bike Route
- Signed Bike Route with Shared Use Lane Markings (Sharrows) adjacent to parking
- Signed Bike Route with Curbside Shared Use Lane Markings (Sharrows) curbside

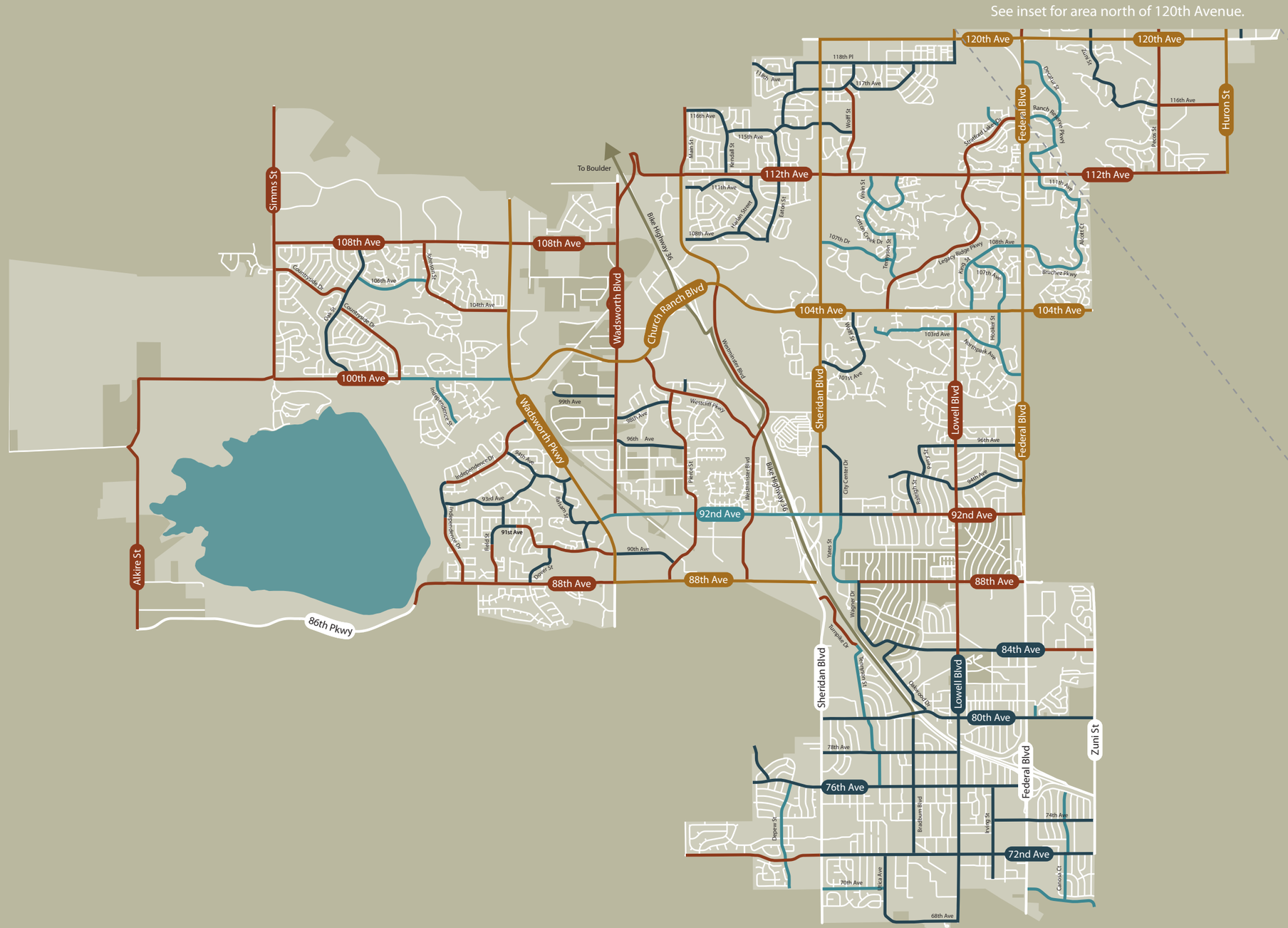
COUNTERMEASURES

- Bicycle Boxes
- Bicycle Detection Systems and Pavement Markings
- Peg-a-Tracking
- Bicycle Turn Pockets & Bicycle Refuges

ON-STREET BIKEWAY NETWORK PLAN

FINAL BIKEWAY NETWORK

- Proposed Sidepath
- Proposed Bicycle Lane
- Proposed Highway 36 Bike Route
- Proposed Signed Bicycle Route
- Proposed Shared Use Lane Markings
- Unincorporated Areas



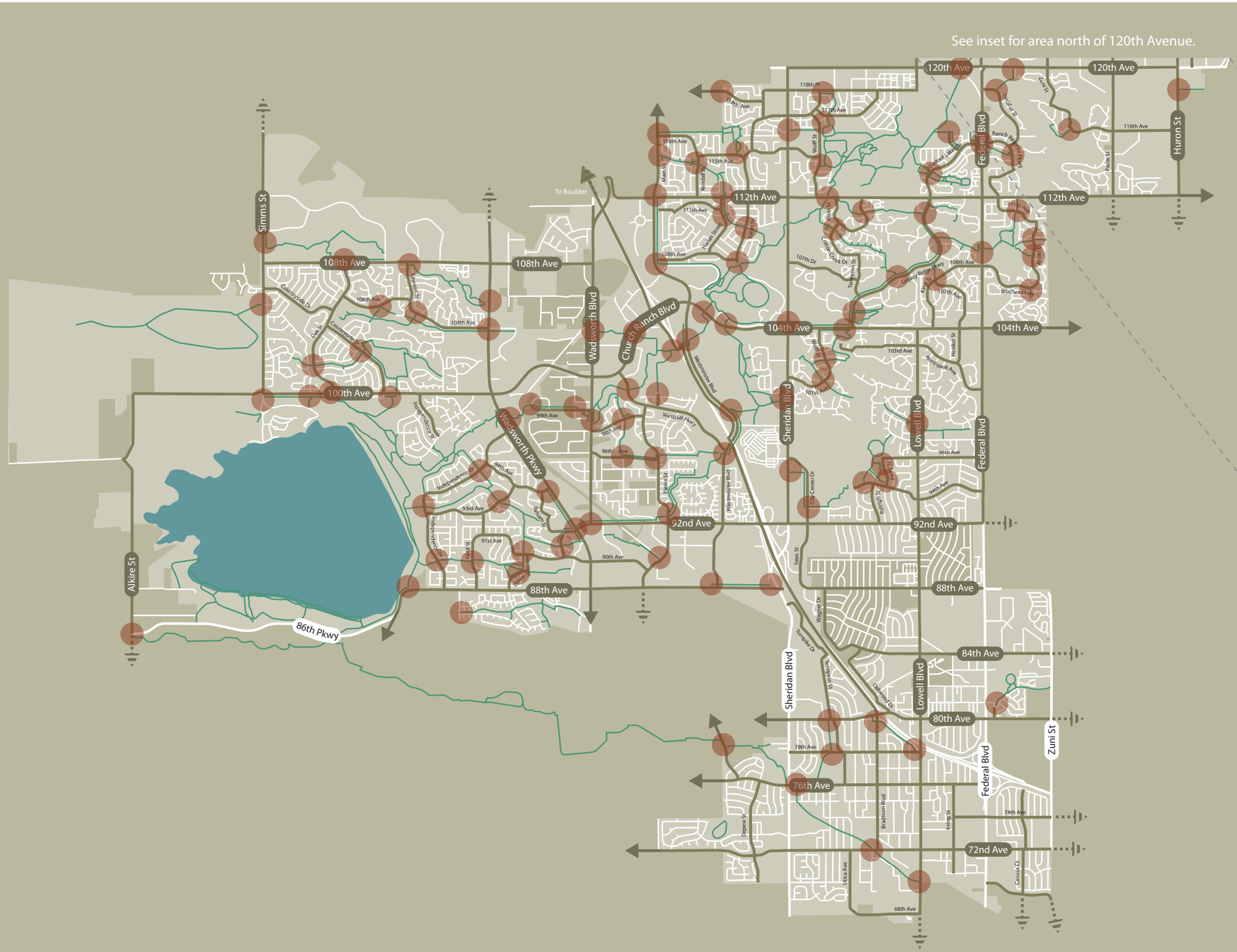
Area north of 120th Avenue.

ON-STREET BIKEWAY NETWORK PLAN

EXISTING & PROPOSED BIKEWAY NETWORK CONNECTIONS

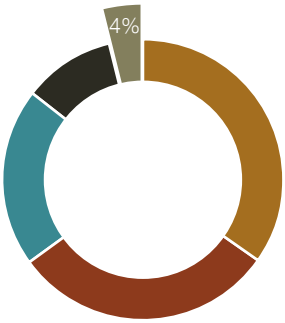
Shared Use Path Network
Proposed Bicycle Network
Unincorporated Areas

Connection with Existing Network in Adjacent City
Connection with Proposed Network in Adjacent City
Connection with Westminster Shared Use Path Network



Area north of 120th Avenue.

3.4 BIKEWAY TYPE SUMMARY



5 miles of off-street shared use paths, 4% of network total.

3.4.1 CLASS I – OFF-STREET SHARED USE PATHS

Off-Street Shared Use Paths—sometimes called Bicycle Trails or Bicycle Paths—are categorized as Class I facilities that feature dual-direction movement within a separate, non-motorized right-of-way. Not always paved, but almost always shared with pedestrians, inline-skaters, and joggers, Shared Use Paths are commonly located within local/regional parks, large open space preserves, and along bodies of water. Shared Use Paths are also commonly implemented within utility corridors, abandoned or unused rail right-of-ways (rails-to-trails) or adjacent to a functioning rail right-of-way (rails-with-trails).

As noted in Section 1: Background and Existing Conditions Analysis, Westminster already benefits from an extensive off-street Shared Use Path network (74 miles). To enhance connectivity, Westminster's Share Use Path network uses more than 40 bicycle/pedestrian underpasses. This system is generally comprised of two path types: eight foot or ten foot wide paths that feature a crushed gravel surface and eight foot or ten foot wide paths that are constructed with concrete. To improve use by commuter cyclists, it is recommended that Westminster use concrete for all new path segments and retrofit all existing gravel segments with concrete, while providing parallel gravel trails for non-cyclists where space permits.

3.4.1.1 Pros

Because of their physical separation from motor vehicles, Shared Use Paths are particularly attractive to a wide spectrum of bicyclists, including children, beginner, recreational, and commuter bicyclists. Additionally, Shared Use Paths often provide access to otherwise inaccessible places, particularly those with scenic qualities. For these reasons and others, studies have demonstrated that paths attract tourism, and often raise the value of adjacent homes.

3.4.1.2 Cons

Shared Use Paths quickly become prized community amenities. While this is generally positive, certain path segments may become congested during peak use hours, which can lead to conflicts amongst different user types. Additionally, securing the needed right-of-way to create meaningful linkages, and providing grade-separated roadway crossings is not inexpensive. Finally, because of the alignments and right-of-ways in which paths are constructed, they do not always connect to daily destinations—such as places of employment—which can deter use among commuter and utilitarian bicyclists who value direct routes to their destination(s).

3.4.1.3 Design Guidance

Shared Use Paths are appropriate in various rural, suburban, and urban contexts. However, along that spectrum, design treatments vary in order to accommodate natural and unnatural features, expected user density, and various land use characteristics; in short, a Shared Use Path functions differently in Denver than it does in Westminster.

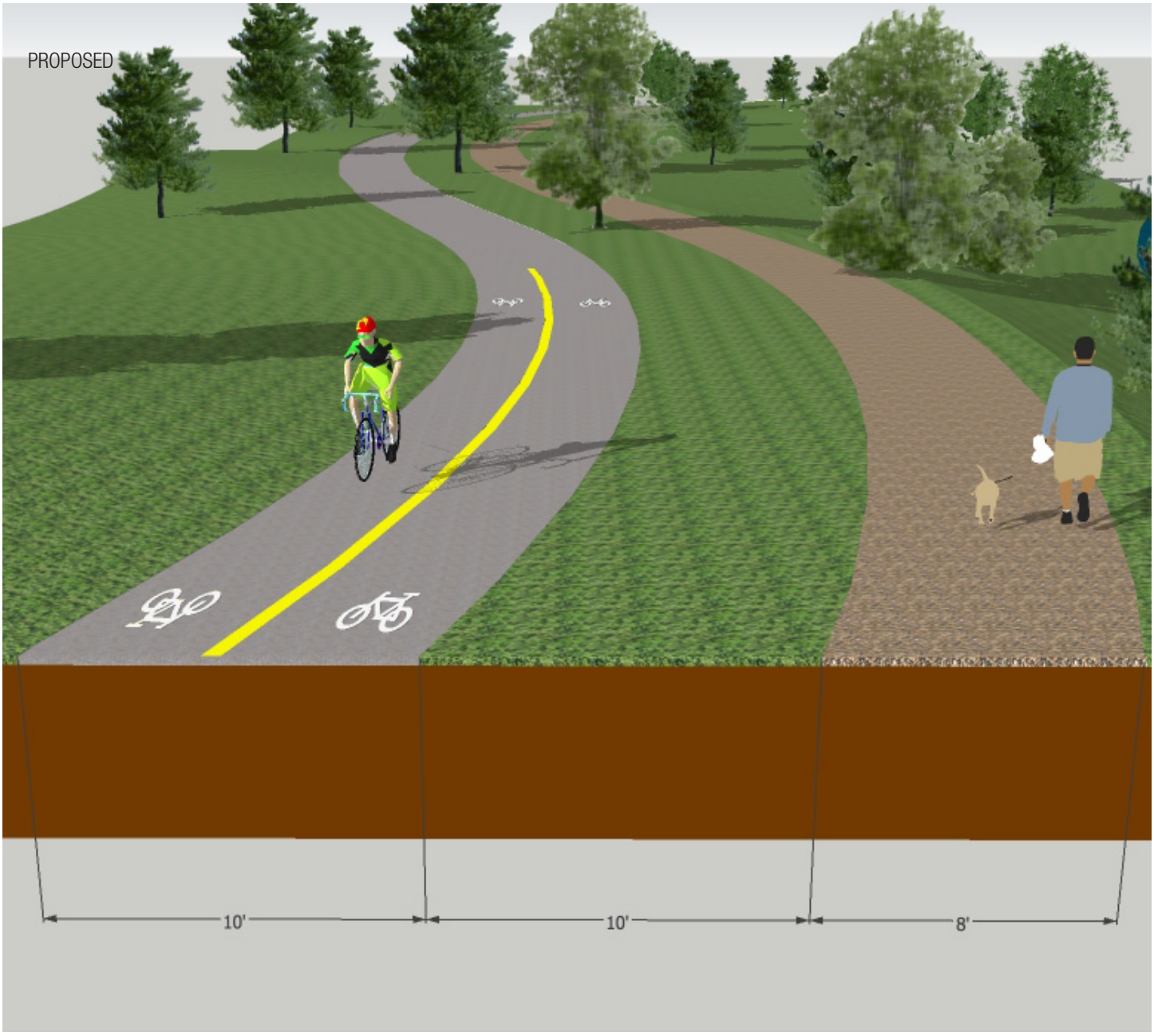
In general, Shared Use Paths should provide clear and frequent access points to the regional and local street network, as limited access discourages use and potentially encourages bicyclists to drive an automobile to reach path entrances.

3.4.1.4 Width

Where right-of-way constraints are not an issue, two parallel paths 10' paved, 8' crushed gravel, may be created with 10 feet of separation between them. Under certain conditions, where use is expected to be light and user types relatively homogenous, paths may be narrower.

Though Westminster's existing eight-foot and ten-foot Shared Use Path configurations do not meet AASHTO design standards, they do accommodate the current intensity of use with ease. However, where concrete pavement already exists, or is planned for the future, formal soft shoulders

SHARED-USE PATHS: EXISTING AND PROPOSED CONFIGURATIONS



The proposed Shared Use Path configuration creates clear spaces for users traveling in each direction, as well as defined areas for cyclists and pedestrians to reduce potential conflicts. Because bicyclists generally prefer hard and smooth riding surfaces, such as concrete, and joggers often prefer running on soft, low-impact surfaces, such as gravel, path configurations may include parallel treatments where space and funding permits.

may be provided to comfortably accommodate people walking and jogging. Additionally, at least one foot of lateral clearance, for a total of three feet (including the graded shoulder), must be given for any path related furniture (trash receptacles, benches, etc.) and signs.

3.4.1.5 Striping and Pavement Markings

It is recommended that striping and bicyclists/pedestrian pavement markings be added to all existing and future concrete segments of the path network in advance of all underpasses, overpasses, non-motorized bridges, intersections, sharp curves, and other locations where site lines are diminished and/or safety concerns are present. These markings should engender the courteous sharing of space.

Striping should consist of a four inch wide yellow centerline. The centerline should appear at least 100 feet in advance of any underpass, bridge, intersection, etc.

3.4.1.6 Grade-Separated Crossings

In many contexts, grade-separated crossings are essential to providing uninterrupted movement and safety. This is especially important where Shared Use Paths meet roadways of multiple lanes, vehicles moving at high speeds, rail right-of-ways, and/or other such barriers.

There are two types of grade-separated crossing: underpasses and overpasses. At minimum, vertical clearance for underpasses should be ten feet. Overpasses should be constructed with at least a 17 feet vertical clearance between the roadway and bottom of the overpass. These numbers may be greater for freeways or rail rights-of-way.

Where at grade crossings do occur, appropriate countermeasure treatments should be employed to maximize the visibility of bicyclists to motorists, and vice-versa. Potential treatments are discussed in Section 3.5: Countermeasure Treatment Summary.

◀ 3.4.1.12: Cracks and weed growth are quickly diminishing the viability of this path segment.

◀ 3.4.1.6: More than 40 underpasses enhance Westminster's Shared Use Path System.

▼ 3.4.1.5: Striping and signs help raise caution awareness and organize path users in the presence of limited site lines.

◀ 3.4.1.1: Shared Use Paths provide great comfort for all types of bicyclists.

▼ 3.4.1.8: Westminster's Paths feature both concrete and crushed gravel surfaces.

◀ 3.4.1.11: Desire lines indicate the need for future path expansions.

3.4.1.7 Wayfinding and Signing

Wayfinding signs are critical in providing visual and directional linkage between on- and off-street bicycle facilities. Westminster's Shared Use Path system features numerous loops around natural water features, path splits, and neighborhood spurs that can disorient users (*see* Section 4.3 Bikeway Network Wayfinding and Signing Plan for specific recommendations as they relate to Westminster's Shared Use Path network).

3.4.1.8 Surface Materials

Westminster's network of Shared Use Paths makes use of two types of material: crushed gravel and concrete. The former provides a low-cost, low impact surface material and appeals to walkers and joggers who appreciate the soft surface. However, gravel appeals to a smaller spectrum of bicyclists, and can be difficult to maintain during the winter and spring.

It is recommended that, as funding becomes available, the City convert all primary Shared Use Path segments to concrete, while also including a parallel walking and jogging path where possible. Likewise, all new primary Shared Use Path segments should include the same configuration.

3.4.1.9 Grade Changes

Because Shared Use Paths must serve a variety of users, including beginner and juvenile bicyclists, walkers, joggers, and skaters, grades greater than five percent should be avoided wherever possible, as long downhill stretches may force such users to reach uncomfortable speeds, especially when mixing with pedestrians. Furthermore, many path users will avoid lengthy uphill segments.

3.4.1.10 Lighting

Sufficient lighting should be provided where night activity is common—segments used consistently by commuters, students, etc.—and where tunnels, bridges, sharp curves, and intersections exist.

3.4.1.11 Desire Lines (Social Trails)

While the City of Westminster cannot provide paths everywhere, it should be noted that there is wisdom in the worn 'desire lines' that exist throughout the city. Also called 'social trails,' these unsanctioned paths indicate the eventual need for future path extension/upgrades and should be considered for improvements as existing Shared Use Path segments are expanded or maintained.

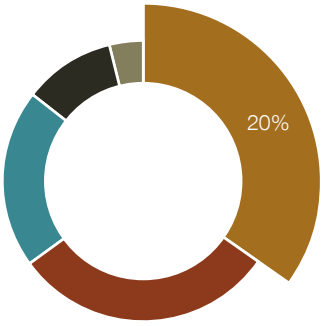
3.4.1.12 Maintenance

Adequately maintaining all Shared Use Paths is essential to ensuring their safe and continued use. Routine maintenance should include removing natural/plant debris; painting over vandalism; re-grading soft shoulders; filling holes caused by stormwater, prairie dogs, etc; paving obtrusive concrete cracks; and removing weed growth and loose gravel. Taking these steps helps prevent larger maintenance issues in the future that will only be more costly to fix. Wherever possible, snowfall should be plowed and ice removed along the length of all major Shared Use Paths, such as Farmers' High Line Canal, Little Dry Creek, and Big Dry Creek.

3.4.1.13 Curb Ramps

Where the Shared Use Path network meets the street network, ramps should be provided to ease the transition from one facility type to another. In cases where this has not occurred, it is recommended that the City of Westminster retrofit the curb and sidewalk condition to include curb ramps.

3.4.2 CLASS I - SIDEPATHS



27 miles of sidepaths, 20% of network total.

Sidepaths are a type of Shared Use Path located adjacent to a vehicular street. They generally resemble wide sidewalks and allow for two-way pedestrian or bicycle movement. Beginner and intermediate cyclists often prefer this bikeway type. However, numerous safety measures must be taken into consideration so that Sidepaths function safely.

3.4.2.1 Pros

As proposed in the Westminster 2030 Bicycle Master Plan, Sidepaths offer an opportunity to convert some of Westminster's sparsely used eight-foot sidewalks into Sidepaths. When applied to the right context, with the proper safety countermeasures, Sidepaths can provide a high degree of comfort to a wider range of cyclists, especially along heavily trafficked arterial streets that preclude on-street bicycle facilities. When compared to Shared Use Paths, Sidepaths can be cheaper to build and maintain because they are most frequently implemented within existing right-of-ways.

3.4.2.2 Cons

For Sidepaths to function safely, many design challenges must be considered and overcome. Indeed, research demonstrates that in most instances, Sidepaths lead to more conflict points and crashes between people bicycling, walking, and driving than on-street bikeway facilities. AASHTO's Guide for the Development of Bicycle Facilities highlights the following drawbacks associated with Sidepaths:

- Unless separated, they require one direction of bicycle traffic to ride against motor vehicle traffic, contrary to normal rules of the road. This is especially dangerous at intersections.
- When the Sidepath ends, bicyclists going against traffic will tend to continue to travel on the wrong side of the street. Likewise, bicyclists approaching a Sidepath often travel on the wrong side of the street in getting to the path. Wrong-way travel by bicyclists is a major cause of bicycle/automobile crashes and should be discouraged at every opportunity.
- At intersections, motorists entering or crossing the roadway often will not notice bicyclists approaching from their right, as they are not expecting contra-flow vehicles. Motorists turning to exit the roadway may likewise fail to notice the bicyclist. Even bicyclists coming from the left often go unnoticed, especially when sight distances are limited.
- Signs posted for roadway users are backwards for contra-flow bike traffic; therefore these cyclists are unable to read the information without stopping and turning around.
- When the available right-of-way is too narrow to accommodate all roadway and Sidepath features, it may be prudent to consider a reduction of the existing or proposed widths of the various highway (and bikeway) cross-sectional elements (i.e., lane and shoulder widths, etc.). However, any reduction to less than AASHTO Green Book (or other applicable) design criteria must be supported by a documented engineering analysis.
- Many bicyclists will use the roadway instead of the Sidepath because they have found the roadway to be more convenient, better maintained, or safer.
- Bicyclists using the roadway may be harassed by some motorists who feel that in all cases bicyclists should be on the adjacent Sidepath.
- Although the Sidepath should be given the same priority through intersections as the parallel roadway, motorists falsely expect bicyclists to stop or yield at all cross-streets and driveways. Efforts to require or encourage bicyclists to yield or stop at each cross-street and driveway are inappropriate and frequently ignored by bicyclists.
- Stopped cross-street motor vehicle traffic or vehicles exiting side streets or driveways may block the Sidepath crossing.
- Because of the proximity of motor vehicle traffic to opposing bicycle traffic, barriers are often necessary to keep motor vehicles out of Sidepaths and bicyclists out of




From left:

3.4.2.1: Sidepaths, when designed safely and applied to the right context, provide alternatives to high-speed streets. (Photo Credit: Treasure Valley Cycling Alliance.)

3.4.2.2: Intersections, especially where built or natural features block visibility, present numerous Sidepath safety challenges.

3.4.2.3: Where few intersections exist, many of Westminster's existing 8' wide sidewalks could be retrofitted to become Sidepaths.

3.4.2.3: Where dual-direction travel is allowed along Sidepaths, safety and wayfinding signs should be installed for contra-flow movement.

traffic lanes. These barriers can represent an obstruction to bicyclists and motorists, can complicate maintenance of the facility, and can cause other problems as well.

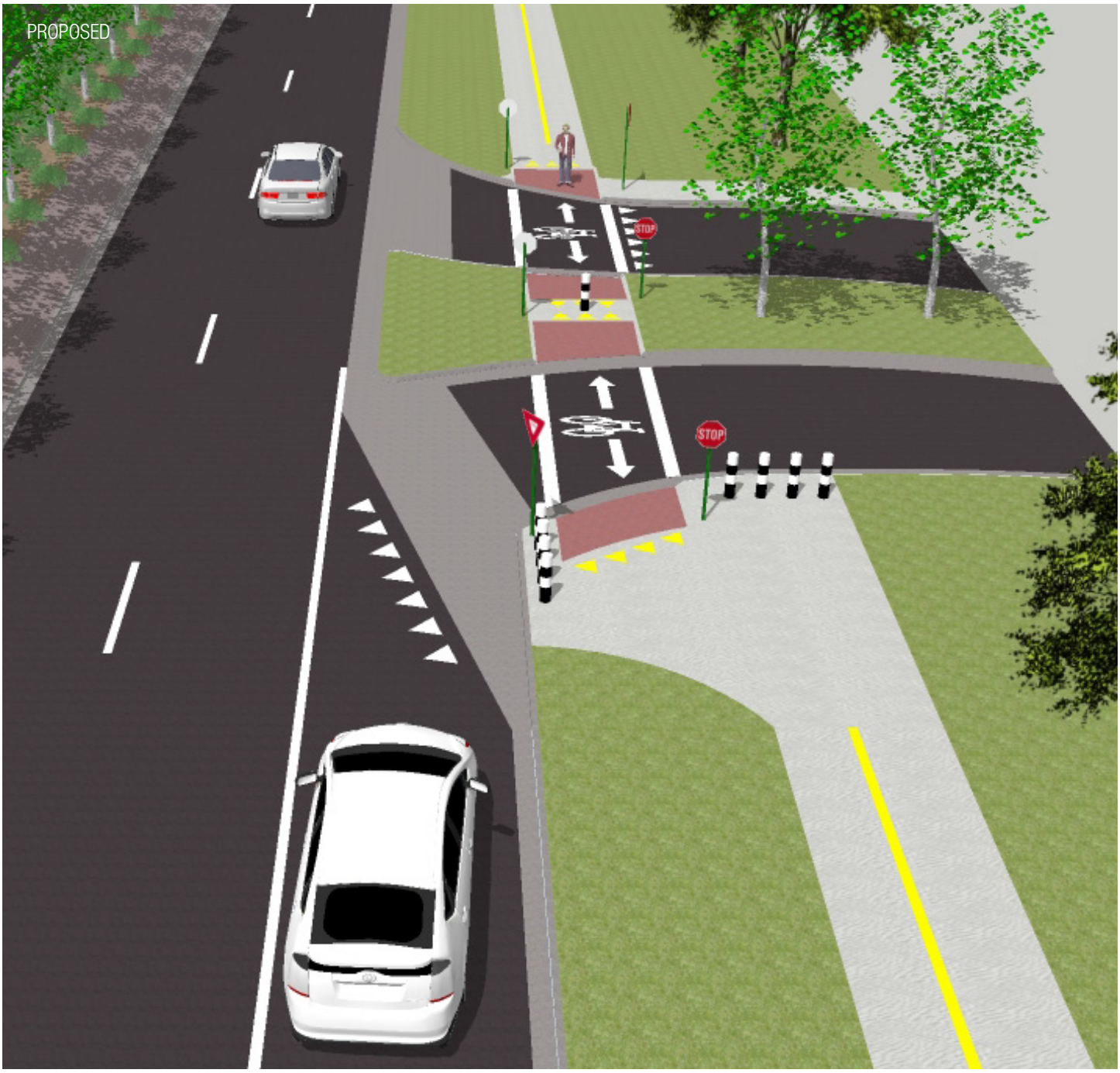
With the above in mind, Westminster should not pursue the development of Sidepaths unless the majority of the following design considerations can be achieved—where contextually appropriate—along all proposed segments.

3.4.2.3 Design Guidance

Under specific conditions, Sidepaths can be a viable Class I bikeway type. The following guidelines should be considered to maximize Sidepath function and safety in Westminster:

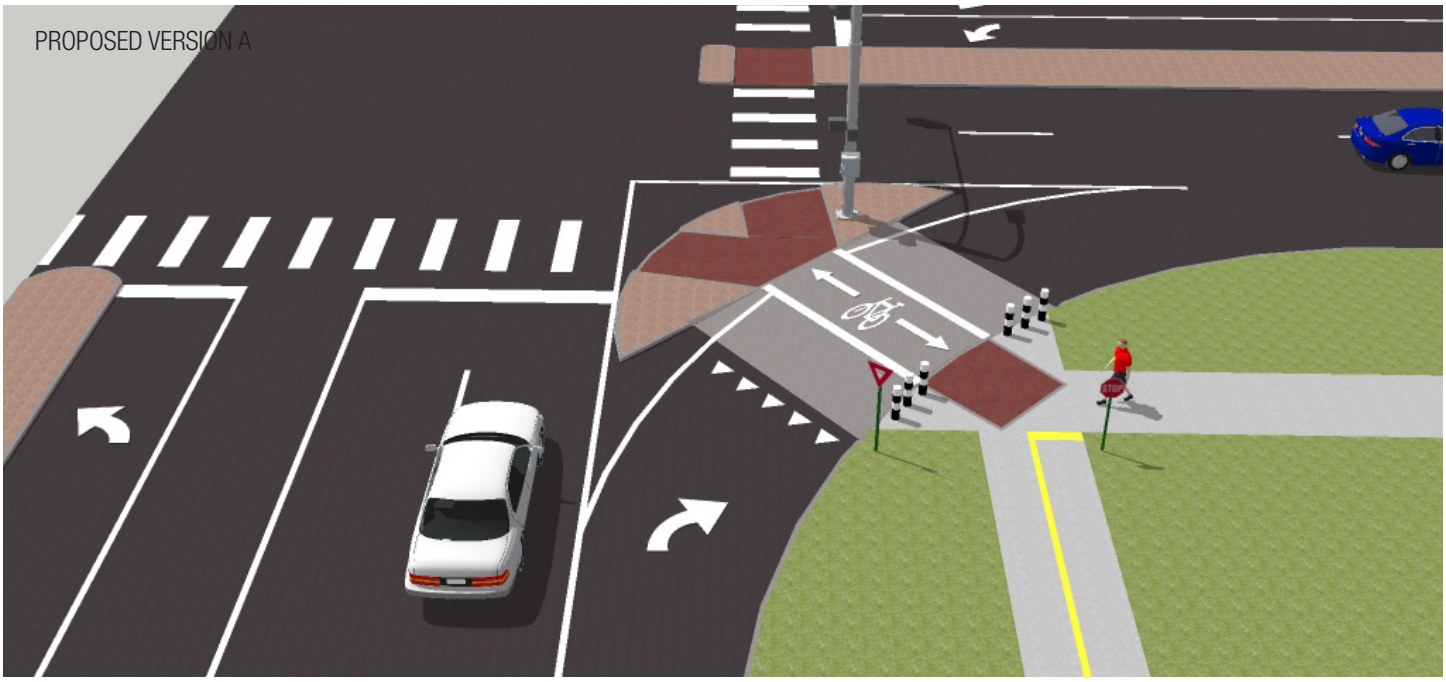
- The proposed Sidepath will be physically separated from all motor vehicle traffic.
- The number of intersections and/or curb cuts remain sparse, and where present, mitigated with appropriate safety countermeasures.
- The existing adjacent street does not allow for the implementation of safe and comfortable on-street bikeways.
- The Sidepath provides a needed connection between either the existing off-street Shared Use Path network and/or the proposed on-street network.
- The proposed Sidepath will terminate at and/or intersect with other existing or planned on- or off-street bicycle facilities.
- The Sidepath makes use of countermeasure treatments that will allow cyclists to safely transition to single direction movement from dual-direction movement, and vice-versa.
- Sidepaths users are given an equal or greater movement priority at all intersections.
- The Sidepath does not affect the legal right for bicyclists to travel within the street right-of-way, no matter how un-amenable it is to bicycling (some laws preclude this).
- The Sidepath will make use of highly visible design treatments at any/all intersections, curb cuts, or driveways along the path's trajectory.
- Parallel parking is not allowed within the vehicular right-of-way, alongside the trajectory of the Sidepath.
- The Sidepath will be maintained to an equal or greater level than any/all other bikeway and motor vehicle facilities.
- Signs, signal heads, and other pertinent information affecting safe bicycle operation can be implemented for users traveling in both directions.
- Snow clearance from the roadbed will be removed as to not obstruct the Sidepath, preventing the safe use of the path during the winter season.
- Education and outreach materials can be developed to inform the public about the safe use of the Sidepath.
- The Sidepath will meet or, wherever possible, exceed all other Shared Use Path design standards, as detailed in this document (width, grade, clearance, etc.).

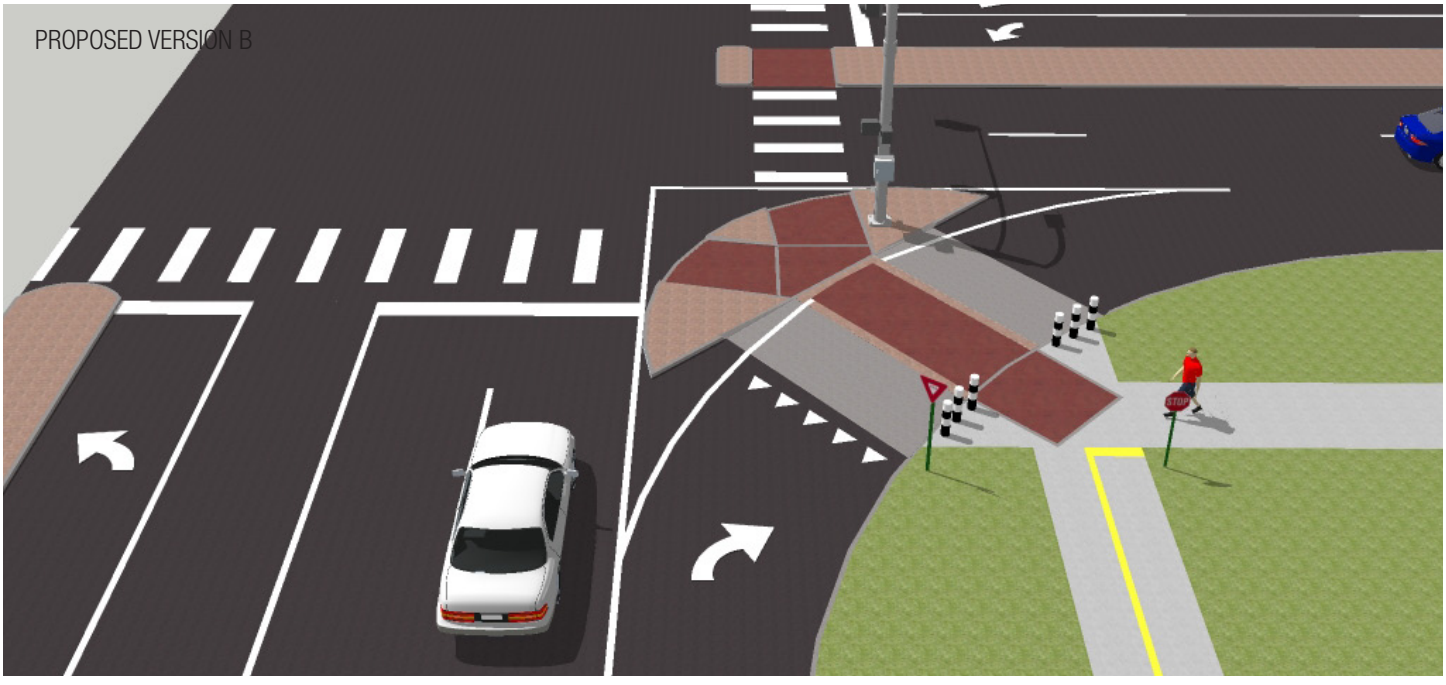
SIDEPATH: MINOR INTERSECTIONS EXISTING AND PROPOSED CONFIGURATIONS



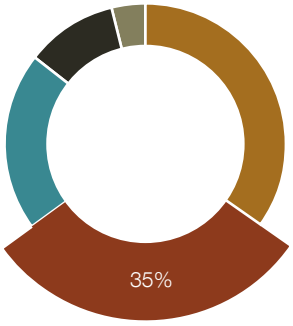
To mitigate the effects of known conflict points, additional engineering measures should be undertaken at both minor intersections and driveways.

SIDEPATH: MAJOR INTERSECTIONS EXISTING AND PROPOSED CONFIGURATIONS





To mitigate the effects of known conflict points, additional engineering measures should be undertaken at major intersections, as illustrated above.



46 miles of bicycle lanes, 35% of network total.

3.4.3 CLASS II - BICYCLE LANES

Bicycle Lanes reserve portions of a vehicular right-of-way for the exclusive use of bicyclists. At a minimum, they include painted lines, bicycle symbol pavement markings, and signs to physically demarcate their trajectory. There are many bicycle lane sub-types—conventional, buffered, contra-flow, physically-separated, shared bus-bike lane, etc.—and numerous available design configurations and countermeasures that can be deployed in response to specific roadway conditions.

3.4.3.1 Pros

Well-designed Bicycle Lanes generally appeal to many types of bicyclists because they provide exclusive travel space. Bicycle Lanes also allow people bicycling to proceed at their own pace without feeling as though they are "interfering" with motor vehicle traffic; engender more predictable movement between different roadway users; and may be configured to meet a variety of street types and urban/suburban contexts. They also provide conspicuous physical/visual links, which, along with wayfinding signs, help cyclists navigate the larger bikeway network.

3.4.3.2 Cons

Some bicyclists do not feel that separated facilities increase their safety, especially when Bicycle Lanes are placed next to parallel parking spaces with high turnover; adjacent to bus stops/ bus lanes; or at intersections, where conflicts are most likely to occur, or where motor vehicle speeds exceed 35 mph. The implementation of a Bicycle Lane requires additional right-of-way space, which, depending on a myriad of existing roadway conditions, may or may not be available. Finally, where roadways have already been widened to their maximum build-out width, the inclusion of a Bicycle Lane typically requires removing space for automobiles, which can present political and funding challenges.

3.4.3.3 Design Guidance

In general, Bicycle Lanes may be added to new or existing streets.

3.4.3.4 Width

Where parallel parking does not exist, Bicycle Lanes should be a minimum of four feet wide, as measured from edge of pavement or curb face, not inclusive of the gutter pan.

Where Bicycle Lanes are placed adjacent to parallel parking lanes, the Bicycle Lane should be at least five feet wide, and the parking lane at least eight feet wide, as measured from the curb face. If narrower parking lanes exist, bicycle lanes should be widened to mitigate the potential impact of driver side doors opening into the path of bicyclists. However, even wide bicycle lanes will not prevent all cyclists from riding within the 'door zone'—the two and a half feet immediately adjacent to the parking lane—as many people bicycling find it most comfortable to ride as far from passing motor vehicle traffic as possible. Thus, other education and enforcement policies may be necessary to promote safe cycling and driving practices.

3.4.3.5 Buffered Bicycle Lanes

When converting wide vehicular travel lanes or converting extra wide shoulders to Bicycle Lanes, diagonally striped buffers may be appropriate (*see* illustration on page 45). This space, referred to as the shy zone, allows extra space between the motor vehicle lane and the bicycle travel lane, which increases comfort for cyclists, especially along higher speed, collector or arterial roadways.

3.4.3.6 Bicycle Lanes at Channelized Intersections

Since Westminster's arterial street network makes use of numerous intersection channelization techniques, such intersections may have to be re-configured to safely include bikeway facilities. For instance, when the presence of deceleration/right turn lanes change the typical street cross section, Bicycle Lanes should be placed within a "pocket" between the right-turn lane(s) and the right-most vehicular through lane. This will require a clearly delineated merge area between the Bicycle Lane and the motor vehicle turn lane(s), which should be marked with signs to help guide motorists to yield to

BIKE LANES: EXISTING AND PROPOSED CONFIGURATIONS

Along certain streets, such as Lowell Boulevard (pictured above) more efficient use of the right-of-way will provide much needed accommodation for bicyclists. Note, Shared Use Lane Markings may transition to bicycle lanes where present width is not sufficient along a given corridor, or where turn lanes are needed at intersections.

cyclists. Where width is not available, sharrows may be used between the end of the bicycle lane and the intersection.

At a minimum, bicycle pockets and bicycle turn lanes should be a minimum of four feet in width, but five feet is preferred. In cases where the right-of-way is insufficient, the bicycle lane may transition to a Shared Use Lane Marking where deceleration/channelization occurs. This design technique allows for the visible presence of the bikeway to continue, and in conjunction with Peg-a-Tracking may help safely guide bicyclists through the intersection.

Colored pavement markings and/or Peg-a-Tracking may also be used to heighten the visibility of the bicycle lane (*see* Section 3.5: Countermeasure Treatment Summary, Section 4: Bikeway Network Wayfinding and Signing Plan). Peg-A-Tracking, which is comprised of a combination of skip lines and chevrons, should begin at least 50 feet before the stop line on the curbside of the intersection.

3.4.3.7 Wayfinding and Signing

"Share the Road," Bicycle Route, and other signs (*see* Section 4: Bikeway Network Wayfinding and Signing Plan) may also be used to further encourage bicycle travel within the bicycle network.

From left:

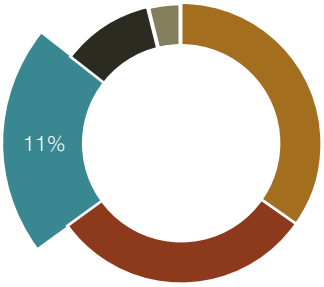
3.4.3.1: Conventional Bicycle Lanes, like this one in neighboring Arvada, are the most well-known and common bikeway type.

3.4.3.4: With an 8' foot parking lane, the majority of this bicycle lane remains outside of the door zone.

3.4.3.5: Buffered Bicycle Lanes provide added comfort along arterial streets.

3.4.3.6: Where channelized turn lanes are present, bicycle lanes should continue between the turn lane and right-most through travel lane.

3.4.4 CLASS III – SIGNED BICYCLE ROUTE



14 miles of signed bike routes, 11% of network total.

Signed Bicycle Routes, referred to as Class III bicycle facilities, are streets that do not provide exclusive space for bicycle movement; travel lanes are to be shared fully with motor vehicles. As such, Class III facilities are appropriate for those streets that may be shared comfortably with motor vehicles. Signed Bicycle Routes are most commonly marked with "Bike Route" signs (*see* Section 4: Bikeway Network Wayfinding and Signing Plan) identifying the street as part of the bicycle network. Alternatively, Shared Use Lane Markings may be used to further enhance the presence of Class III bikeways.

3.4.4.1 Pros

Signed Bicycle Routes are an inexpensive way to reinforce the identity of the bicycle network. They emphasize that all roadways, except for limited access highways, are legal places for people to bicycle. They also provide linkages where Class II and III bikeways are inappropriate or constrained by right-of-way width. In addition, "Bike Route" signs can be used as a wayfinding tool when navigating the larger bicycle network.

To maintain connectivity within the bikeway network, signed bike routes should be utilized where on-street bicycle lanes cannot be implemented.

(Photo Credits:
Middle: Dan Wolf Real Estate
Right: Bike Delaware)

3.4.4.2 Cons

Bicycle Routes are not as recognizable or attractive to beginner and intermediate bicyclists as Class II or III bikeway facilities. Thus, they may only appeal to those advanced cyclists comfortable "taking the lane" and mixing with automobile traffic on collector or arterial streets. However, where significant, contextually appropriate traffic-calming devices are deployed, Signed Bicycle Routes may become more attractive to a wider base of users.

3.4.4.3 Design Guidance

Signed Bicycle Routes should be designated along streets that are not suitable for bicycle lanes. Signed Bicycle Routes are appropriate for roadways with design speeds of less than 35 mph or less. They may include a bicycle-friendly shoulder on higher speed rural roadways, as well as conspicuous "Share the Road" signs (*see* Section 4: Bikeway Network Wayfinding and Signing Plan) to underscore the presence of the bikeway network. Signed Bike Routes should not be assigned to streets that do not connect to other streets (i.e. cul-de-sacs or dead-ends), unless a connection to an off-street Shared Use Path can be made.

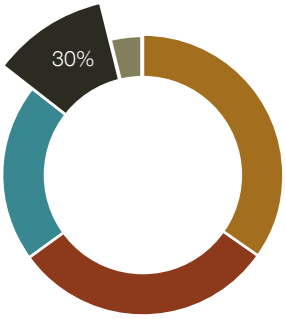
While not as accommodating as Class III or II facilities, Signed Bicycle Routes can offer other advantages such as reduced travel time, limited stop signs/lights, and or direct connections to popular destinations. Each Signed Bicycle Route should be monitored periodically so that if ADT significantly increases, further improvements, such as bicycle lanes, may be made to better accommodate cyclists.

SIGNED BIKE ROUTES: EXISTING AND PROPOSED CONFIGURATIONS

PROPOSED

EXISTING

At a minimum, Bike Route signs may be used to delineate bikeways. The proposed rendering above shows how adding Bike Route signs to a low-speed, residential street can keep cyclists aware that they are traveling within the bicycle network.



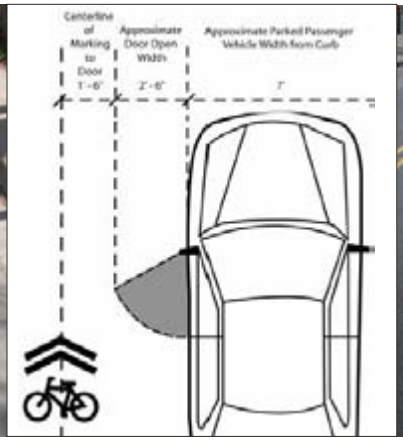
40 miles of signed bike routes with shared use lane markings, 30% of network total.

3.4.5 SIGNED BICYCLE ROUTES WITH SHARED USE LANE MARKINGS

Shared Use Lane Markings—popularly referred to as "Sharrows"—consist of a bicycle symbol pavement marking and two chevrons applied to streets too narrow to accommodate bicycle lanes and/or with design speeds that allow cyclists to travel comfortably within shared travel lanes. Sharrows are intended to enhance Signed Bicycle Routes within commercial and/or neighborhood streets where parallel parking is typically, but not always present.

3.4.5.1 Pros

Sharrows are relatively inexpensive, help enhance the visibility of Signed Bicycle Routes, and often help attract more bicyclists to the roadway. Sharrows also reinforce the proper direction of travel for bicyclists (with traffic) and provide safe lateral positioning guidance by placing the Sharrow pavement marking outside of the 'door zone.'



Left: Shared Use Lane Markings can be used on streets without parallel parking.

Middle: Where parallel parking exists, Shared Use Lane Markings should direct people bicycling out of the door zone.

Right: Shared Use Lane Markings are also appropriate on streets with parking. (Photo Credit: Streetwiki)

Although Sharrows do not offer physical separation from motor vehicles, they often appeal to intermediate bicyclists by reinforcing one's right to the full use of the lane. In certain instances, Sharrows may also provide a visual linkage between various bikeway types, especially between on- and off-street segments, and where Bicycle Lanes are discontinued due to right-of-way constraints. It's better to provide Sharrows than to let bicycle facilities "disappear" altogether.

3.4.5.2 Cons

As a relatively new design treatment, Sharrows are not fully understood by the general public, including both motorists and cyclists. Depending on the streets to which they are applied, the inherent lack of physical separation from motor vehicles may not provide enough protection from traffic to encourage beginner and some intermediate bicyclists.

3.4.5.3 Design Guidance

Like Signed Bicycle Routes, Sharrows should be applied to streets where right-of-way constraints and other design factors preclude or obviate the implementation of Bicycle Lanes. They may also be used as a continuation of Bicycle Lanes where right-of-way constraints prevent the physical extension of such bikeways.

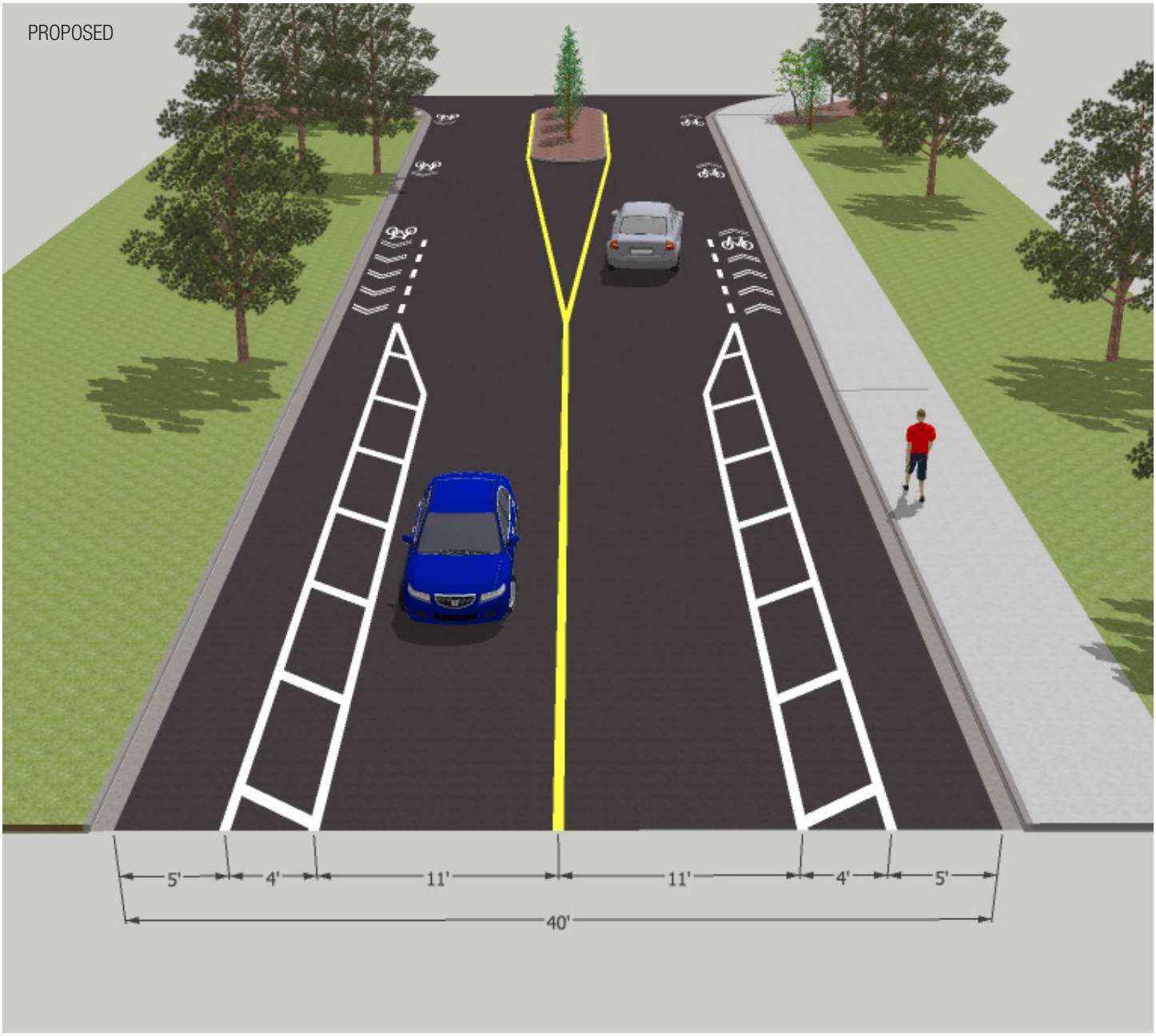
According to the 2009 Manual on Uniform Traffic Control Devices (MUTCD), the longitudinal centerline should be placed a minimum of 11 feet from the curb face where parallel parking is present. This positions the cyclist outside of the 'door zone,' where motorists and/or passengers occasionally open parked car doors outward into the path of oncoming cyclists. However, where parallel parking spaces are greater than seven feet in width, Sharrows may be placed even further into the rightmost travel lane to prevent such collisions. For example, where an eight-foot wide parking stall is present, the longitudinal centerline of the shared use lane marking should be placed 12 feet from the curb face.

Where parallel parking is not provided, the longitudinal centerline of the sharrow should be placed at least four feet from the edge of pavement where no curb exists, or four feet from the outside edge of the gutter pan where a curb does exist.

SIGNED BIKE ROUTES WITH SHARED USE LANE MARKINGS: EXISTING AND PROPOSED CONFIGURATIONS

Where appropriate, Shared Use Lane Markings can be used to enhance Bike Routes.

SIGNED BIKE ROUTES WITH SHARED USE LANE MARKINGS: AS BICYCLE LANE EXTENSIONS



Sharrows may be used to continue bicycle lanes where right-of-way constraints exist.

3.5 COUNTERMEASURE TREATMENT SUMMARY

3.5.1 BICYCLE BOX

A Bicycle Box is an intersection safety design that can discourage collisions between bicycles and cars, especially those where motorists cut off or turn into cyclists. In order to lessen the chance for collision and improve the visibility of people bicycling at intersection, the Bicycle Box makes use of two stop lines. The first, which is furthest from the intersection, is often referred to as the advanced stop line. This is the designated location where motorists should stop. The second stop line, placed just short of the crosswalk, is designated for cyclists. The Bicycle Box, therefore, allows people bicycling to wait at a signalized intersection in front of motor vehicles.

3.5.1.1 Pros

Bicycle Boxes remain an experimental countermeasure not yet adopted by the MUTCD. However, numerous municipalities have implemented the treatment with great success. Numerous research efforts, including the most recent from the Initiative for Bicycle and Pedestrian Innovation at Portland State University supports the use of Bicycle Boxes as an effective safety design countermeasure.

3.5.1.2 Cons

As a relatively new countermeasure type, the general public does not yet understand the proper use of Bicycle Boxes. Some beginner and intermediate bicyclists may not feel comfortable moving in front of motor vehicles at signalized intersections, that the cars will “run them over” when the light turns green.

3.5.1.3 Design Guidance

Bicycle Boxes should be used where high volumes of people bicycling exist and at intersections known for conflicts between bicyclists and motorists. To improve their visibility, Bicycle Boxes are often colored with green paint and include a standard white bicycle pavement marking.

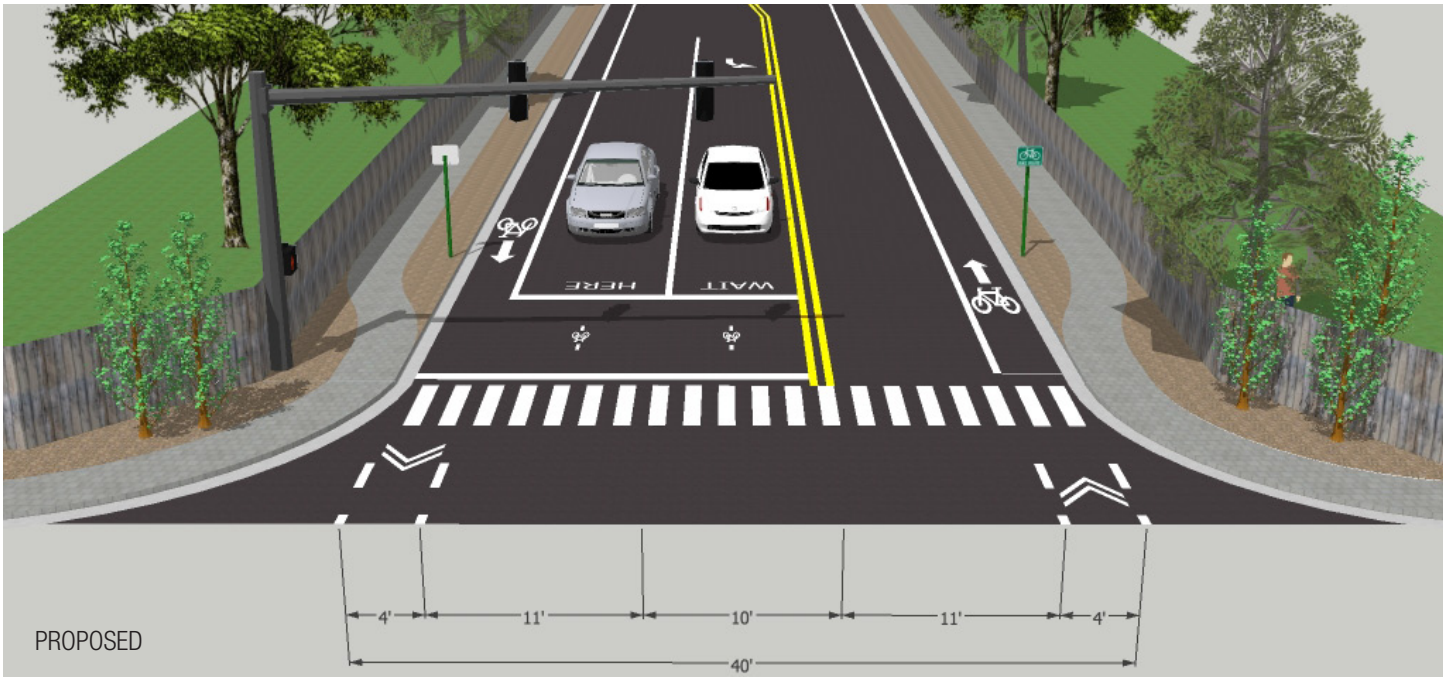
Bicycle Boxes are most commonly used in conjunction with Bicycle Lanes at signalized intersections, but may also be used on along Bicycle Routes with Shared Use Lane Markings. Bicycle Boxes should be used where two intersecting Bicycle Lanes meet, as they help facilitate cycling movement through intersections, especially left-turns.

Bicycle Boxes may be used in conjunction with Bicycle Detection Systems to help prioritize the movement of bicycles through intersections.

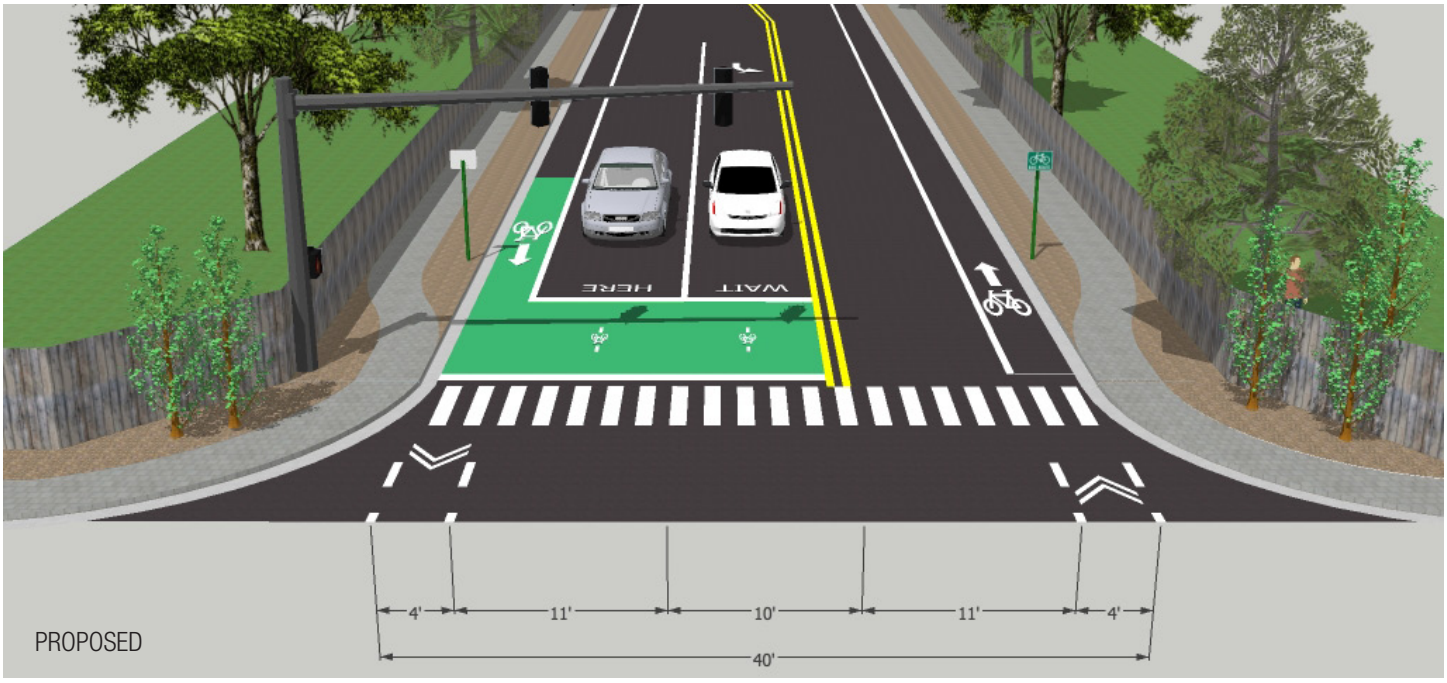
Bicycle Boxes should be at least 10 feet in depth in order to accommodate the length of a bicycle and allow enough room for other cyclists to pass behind.

Bicycle Boxes help improve the visibility of people bicycling at intersections.
(Photo Credit: Bike Portland)

BICYCLE BOXES: EXISTING AND PROPOSED INTERSECTION CONDITIONS



PROPOSED



PROPOSED

EXISTING

Standard collector-arterial intersections may be retrofitted with Bicycle Lanes and Bicycle Boxes. Bicycle Boxes may also be equipped with Signal Detection equipment and other countermeasures, such as peg-a-tracking. Cities like Portland have discovered that Bicycle Boxes can be enhanced by the use of colored pavement.

3.5.2 PEG-A-TRACKING

Peg-a-Tracking pavement markings include a series of chevrons placed between two dashed parallel lines, which identify the proper lateral position bicyclists should take when traversing an intersection. Peg-a-Tracking should be used in conjunction with Bicycle Lanes and/or Sharrows.

3.5.2.1 Pros

Peg-a-Tracking not only provides position guidance, but also wayfinding benefits when implemented alongside on-street bikeway facilities, like Bicycle Lanes or Sharrows. Peg-a-Tracking can be used to raise awareness for people bicycling and people driving at any/all conflict areas associated with curb/cuts and driveways.

3.5.2.2 Cons

Peg-a-Tracking, commonly used to demarcate vehicular placement through an arterial intersection, is found in many American municipalities. However, similar treatments for bikeway facilities are not yet common. While relatively intuitive, it may take some time for cyclists and motorists to understand the intended function of the pavement marking.

3.5.2.3 Design Guidance

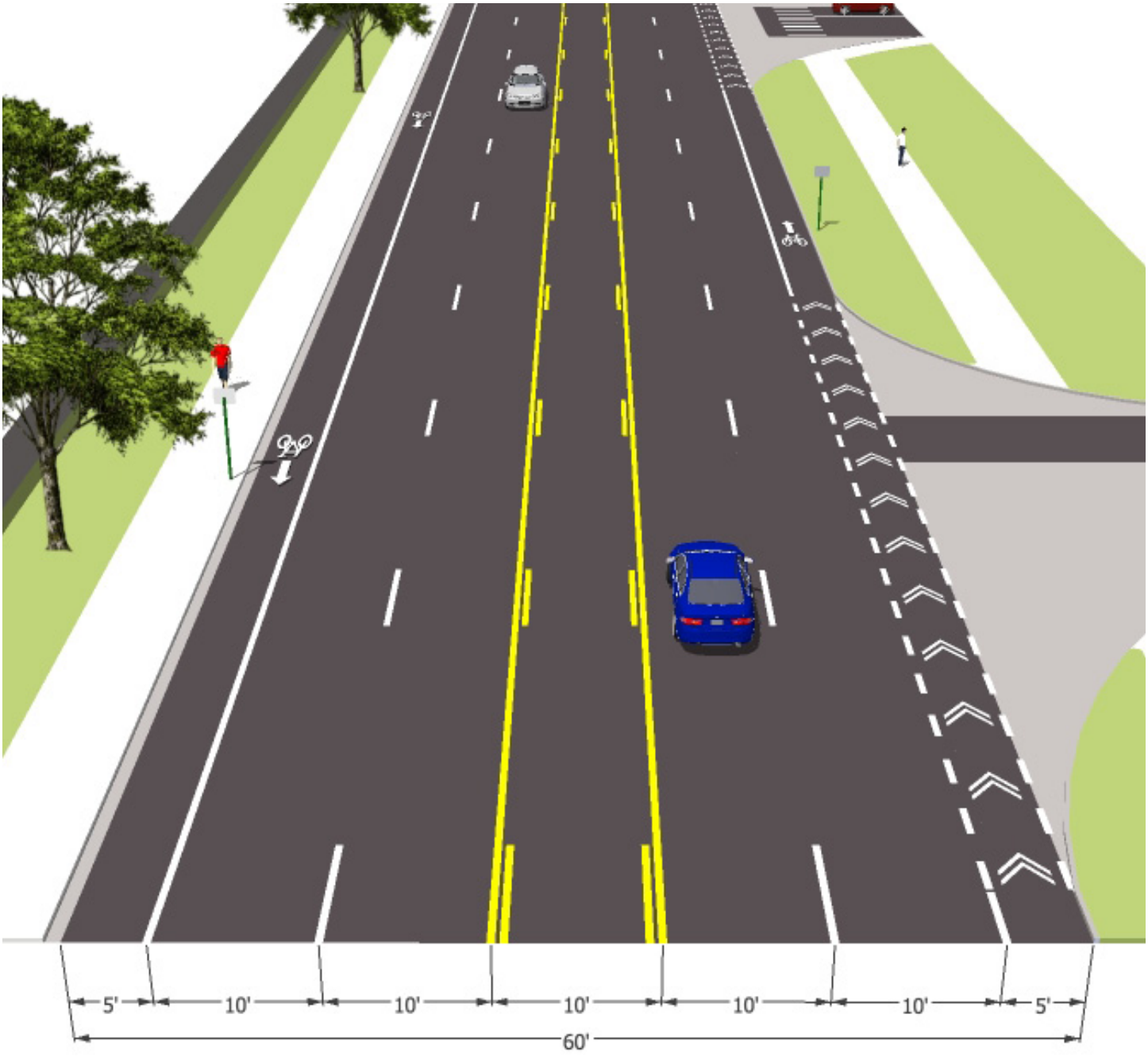
At a minimum, Peg-a-Tracking should be considered wherever Bicycle Lanes or Signed Bike Routes with Shared Use Lane Markings cross arterial or collector streets. Peg-a-Tracking is particularly useful for guidance and wayfinding where "T," "Y," or Shared Use Path intersections exist.

The width of the Peg-a-Track through an intersection should be the same as the Bicycle Lane or Sharrow with which it is associated. If implemented in conjunction with a Signed Bike Route with Shared Use Lane Markings, the Peg-a-Tracking should be at least four feet in width, but preferably five feet when used at intersections with more than two lanes of through traffic.

Peg-a-Tracking may be used in conjunction with colored paint treatments at intersections or within a Bicycle Lane interrupted by a curb-cut/driveway entrance to a parking lot. High contrast paint helps to draw the motorist's attention to the presence of cyclists.

Peg-a-Tracking helps identify the proper positioning for people bicycling through an intersection.
(Photo Credit: Bike Pittsburgh)

PEG-A-TRACKING: CURB CUTS & DRIVEWAYS EXISTING AND PROPOSED CONDITIONS



PROPOSED

EXISTING

Peg-a-tracking may be used to raise the visibility of bicyclists at known conflict points.

Left: This pavement marking indicates the general position where bicyclists will be detected.

Right: When paired with Bicycle Boxes, Bicycle Detection Systems enhance the experience of cyclists crossing an intersection.

3.5.3 BICYCLE DETECTION AND PAVEMENT MARKINGS

As the name indicates, Bicycle Detection Systems recognize the presence of bicycles at signalized intersections. Bicycle Detection Systems make use of several technologies: the most widely used are in-pavement loop detectors or video detectors; both are often coupled with pavement markings indicating where detection will occur. Several Colorado cities, such as Boulder and Arvada have already implemented bicycle detection devices with success.

3.5.3.1 Pros

Bicycle Detection Systems lessen the waiting time by prompting the signal to turn green when a bicycle waits in a designated space. Bicycle Detection Systems improve efficiency for people bicycling and discourage cyclists running red lights without causing undue delay to motorists. They also enable the cyclists to trigger the signal, without having to dismount the bicycle and press the pedestrian crossing button. Bicycle Detection Systems are relatively inexpensive to implement, and improve the bicycling experience. Video detection systems provide more flexibility by being able to be moved and adjusted when needed.

3.5.3.2 Cons

As they are not yet common, the general bicycling public does not yet fully understand the pavement markings associated with detection systems. When inductor loops are used, they occasionally have difficulty detecting carbon frames and other types of bicycles. Similarly, some video detection systems have been known to have trouble at night or when shadows are cast over the detection area, which can trigger false signal changes.

3.5.3.3 Design Guidance

A Bicycle Inductor Loop is comprised of a coil of wire embedded in the roadway surface that detects the presence of a bicycle and prioritizes an intersection signal for it. The loops should be adjusted so that they are sensitive enough to detect all types of bicycles. Likewise, video detection systems should be placed on riser poles or existing signal poles/arms to maximize the area of detection.

Bicycle Inductor Loops and video detection areas should be made visible by combining the treatment with Bicycle Inductor Loops pavement markings and/or where appropriate, a Bicycle Box.

Left: Bicycle Turn Pockets help facilitate bicycle movement and wayfinding across offset intersections.
(Photo Credit: Steven Vance)

Right: Bicycle Refuges provide space for people bicycling to rest when crossing wide, busy arterial streets.
(Photo Credit: Steven Vance)

3.5.4 BICYCLE TURN POCKETS AND BICYCLE REFUGES

Bicycle Turn Pockets provide dedicated bicycle-only turning areas along arterial or collector arterial streets. They are most commonly used to facilitate bicycle movement across divided roadways, especially where movement along a bikeway is interrupted by offset intersections. Similarly, Bicycle Refuges provide space for bicyclists to wait for clear space while crossing the full width of a given street.

3.5.4.1 Pros

Bicycle Turn Pockets and Refuges enhance the visibility of bicyclists and increase the comfort of traveling across busy streets. They also help connect bikeways where large or offset intersections create a visible or break in the continuity of a given facility.

3.5.4.2 Cons

Due to the narrow size of many Bicycle Turn Pockets or Refuges, maneuvering into them can be difficult or uncomfortable for some types of beginner or intermediate cyclists.

3.5.4.3 Design Guidance

Bicycle Turn Pockets and Refuges are best applied to divided roadways where a raised center median prevents continuous through bicycle movement. Both Turn Pockets and Refuges should be clearly marked with pavement markings and wayfinding signs to facilitate recognition and safe movement amongst the roadway's various types of users.

Bicycle Turn Pockets and Refuges through raised center medians should be large enough to allow a bicyclist to maneuver comfortably, but be narrow enough so that motorists do not use the facility.

3.6 PRIORITY PROJECTS

The Westminster 2030 Bicycle Master Plan is broken out into three general implementation phases—short-, medium-, and long-term priority. Each bikeway segment is allocated to one of these implementation phases using a variety of criteria.

Short-term priority routes have been selected by considering the City's current budget constraints, but also the great need to supplement the existing Share Use Path system with one major north-south (Lowell Boulevard) and east-west connection (104th Avenue). Other segments were selected for their ability to provide working examples of each proposed bikeway type and to provide relatively low-cost neighborhood connections between the existing off-street trail system, the two on-street priority bicycle corridors, and/or to schools, parks, and neighboring municipalities.

Medium-term priority projects have been chosen for their ability to provide a high degree of intra-neighborhood connectivity, largely using low-cost signed bikeway routes, and more intensive Sidepath treatments along major north-south corridors. These selected segments will capitalize on the few corridors and connections designated as short-term priorities to create a diverse and connected network.

Long-term priority bikeway projects are largely comprised of various on-street, arterial bicycle lanes that can only be implemented in conjunction with a widening, or major re-striping/re-surfacing project. These segments currently are slated as long-term priorities because the timetables for the needed roadway improvements are unknown.

While bicycle facilities should be added to all roadway projects where appropriate, bikeway projects may be pursued independently of larger efforts. Implementing a Sidepath intersection improvement or designating a bikeway route with signing and shared use lane markings are two examples of the type of "low hanging fruit" projects that are prioritized in the short- and medium-term priority phases.

Finally, all three phases are fluid. Should funding become available for the implementation of bikeways along any corridor, no matter the priority phase, it should be pursued.

A description of each bicycle improvement project, including phase, type, and specific countermeasure information is included in Appendix B: Bikeway Project Descriptions.

On page 53:

Top: As a short-term priority project, this Plan recommends placing sharrows on Lowell Boulevard. This rendering depicts what the streetscape might be like post-implementation.

Middle: This rendering shows the potential outcome of a recommended bicycle lane on Countryside Drive as part of the Plan's Medium-term priority projects.

Bottom: The Plan's long term vision includes sidepaths on many of Westminster's arterial streets; 144th Avenue may look something like this after the construction of the long-term priority projects.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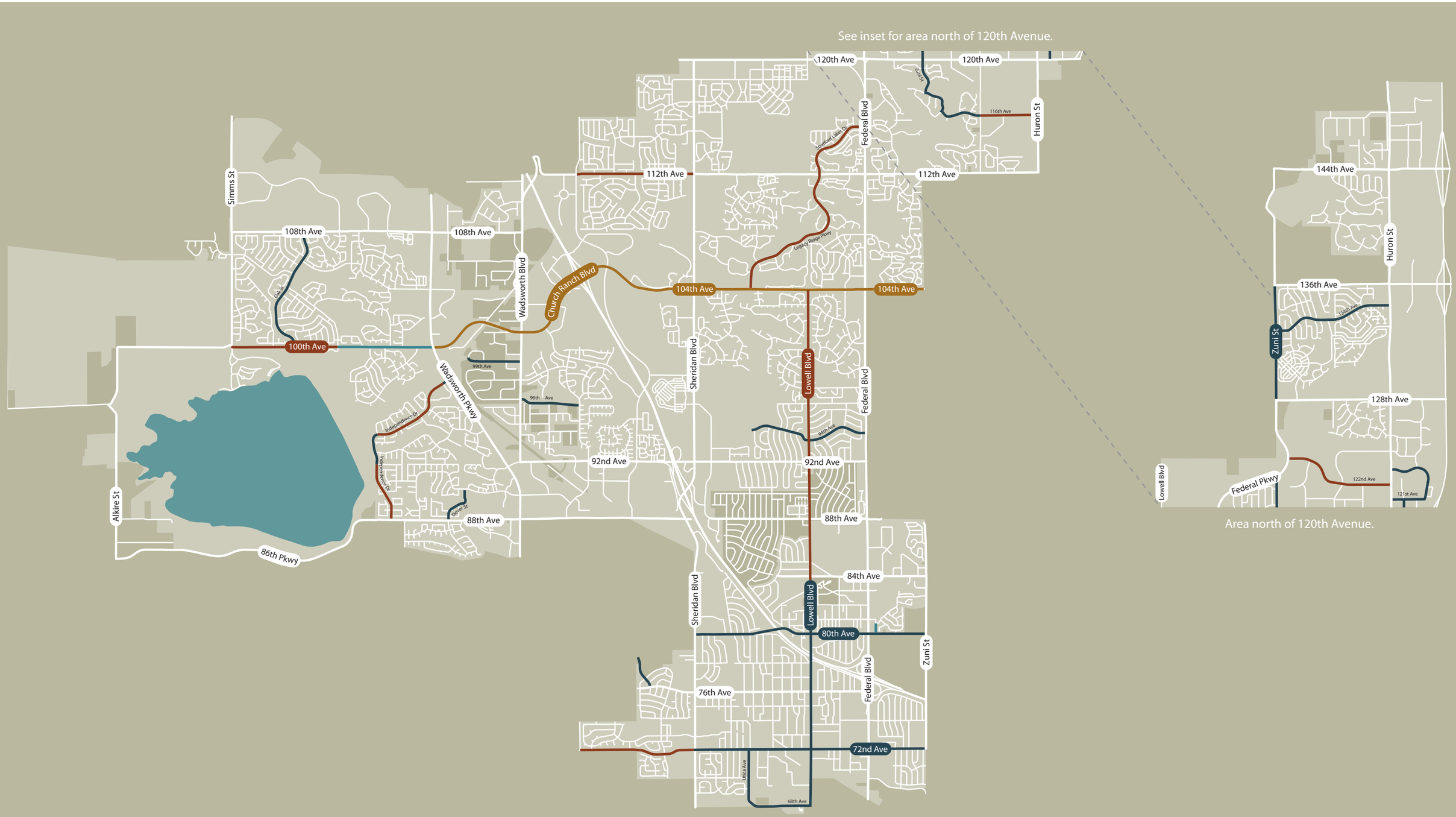
BIKE LANE
20
MPH


BIKE ROUTE

ON-STREET BIKEWAY NETWORK PLAN

SHORT-TERM BIKEWAY PRIORITIES

- Proposed Sidepath
- Proposed Bicycle Lane
- Proposed Signed Bicycle Route
- Proposed Shared Use Lane Markings
- Unincorporated Areas

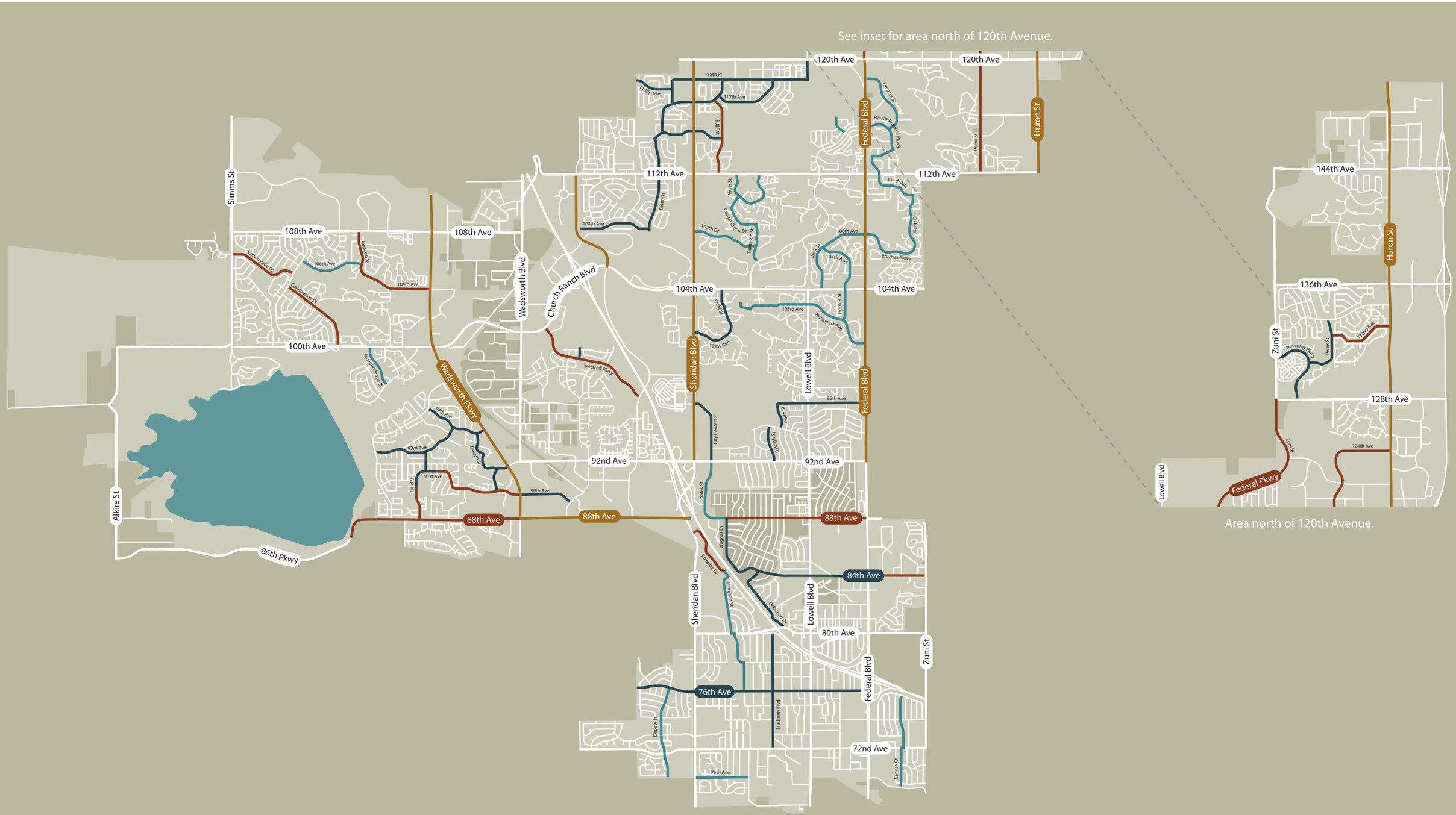


Area north of 120th Avenue.

ON-STREET BIKEWAY NETWORK PLAN

MEDIUM-TERM BIKEWAY PRIORITIES

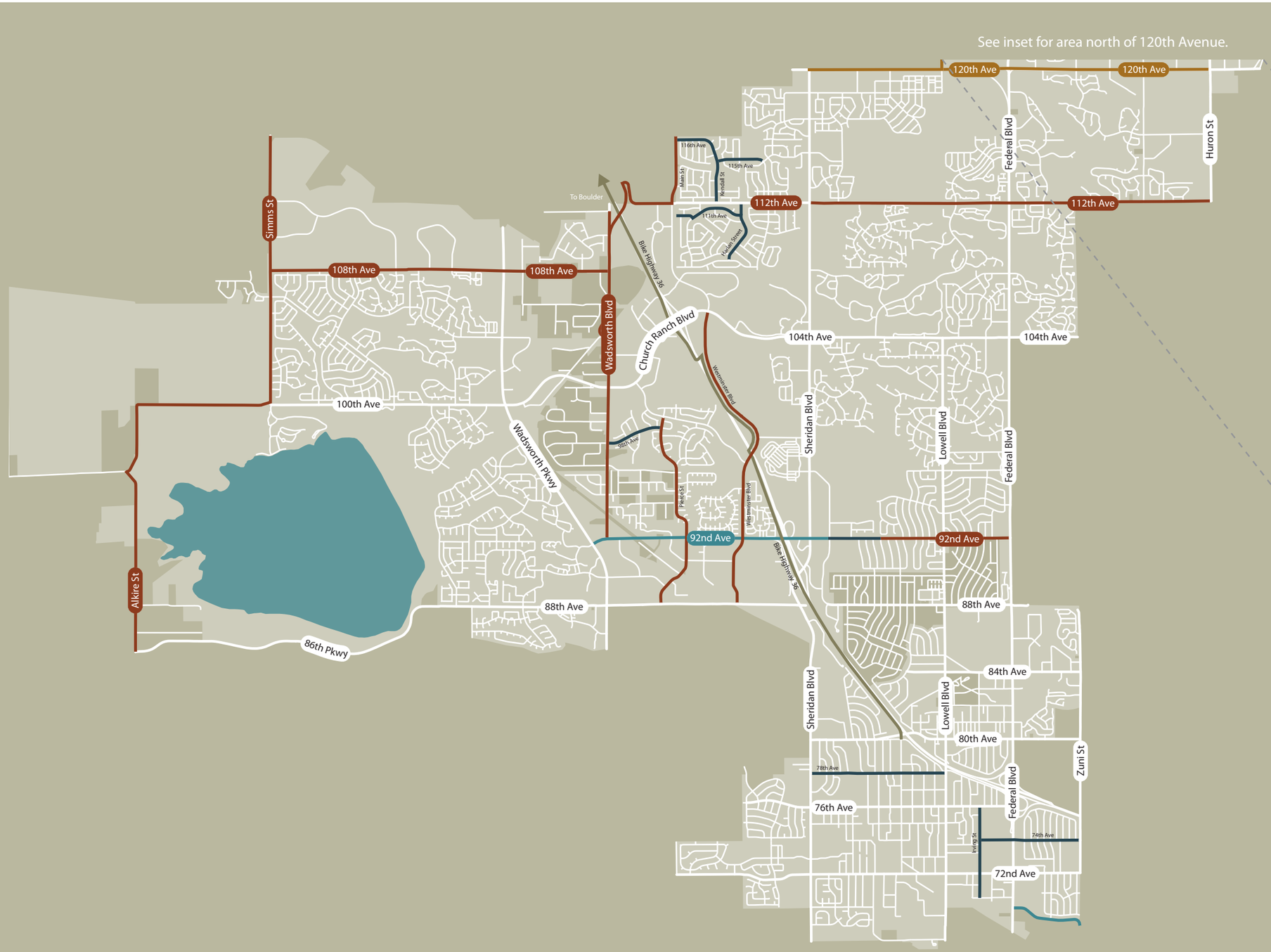
- Proposed Sidepath
- Proposed Bicycle Lane
- Proposed Signed Bicycle Route
- Proposed Shared Use Lane Markings
- Unincorporated Areas



ON-STREET BIKEWAY NETWORK PLAN

LONG-TERM BIKEWAY PRIORITIES

- Proposed Sidepath
- Proposed Bicycle Lane
- Proposed Highway 36 Bike Route
- Proposed Signed Bicycle Route
- Proposed Shared Use Lane Markings
- Unincorporated Areas

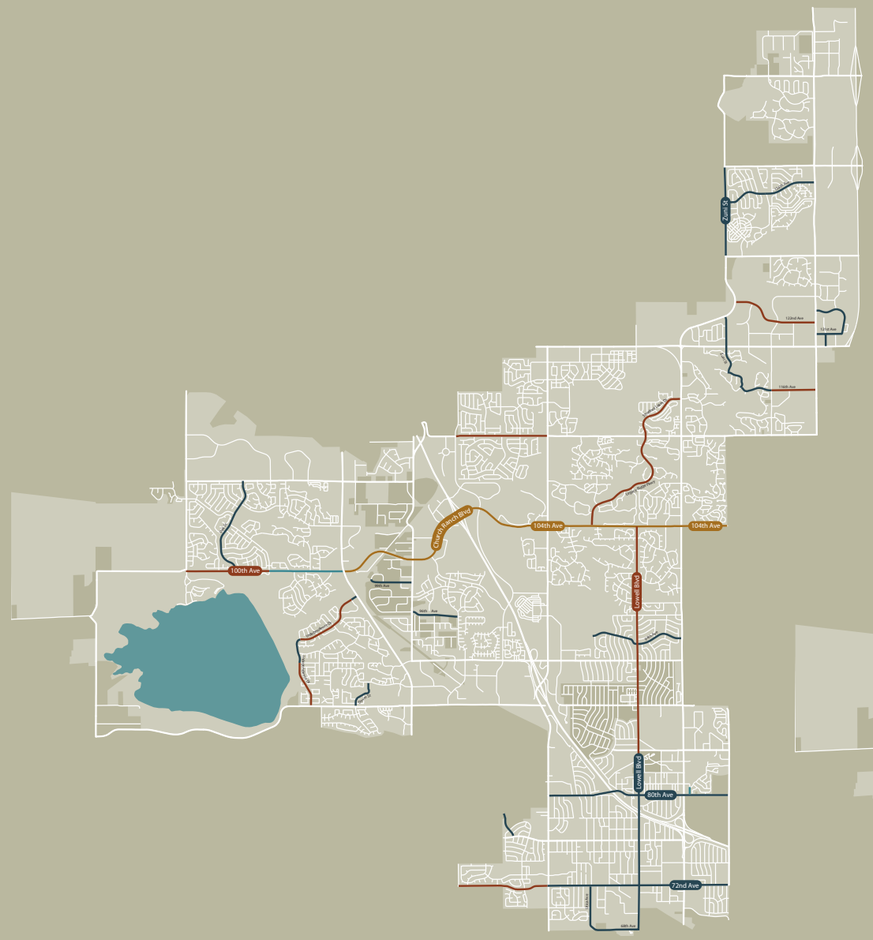


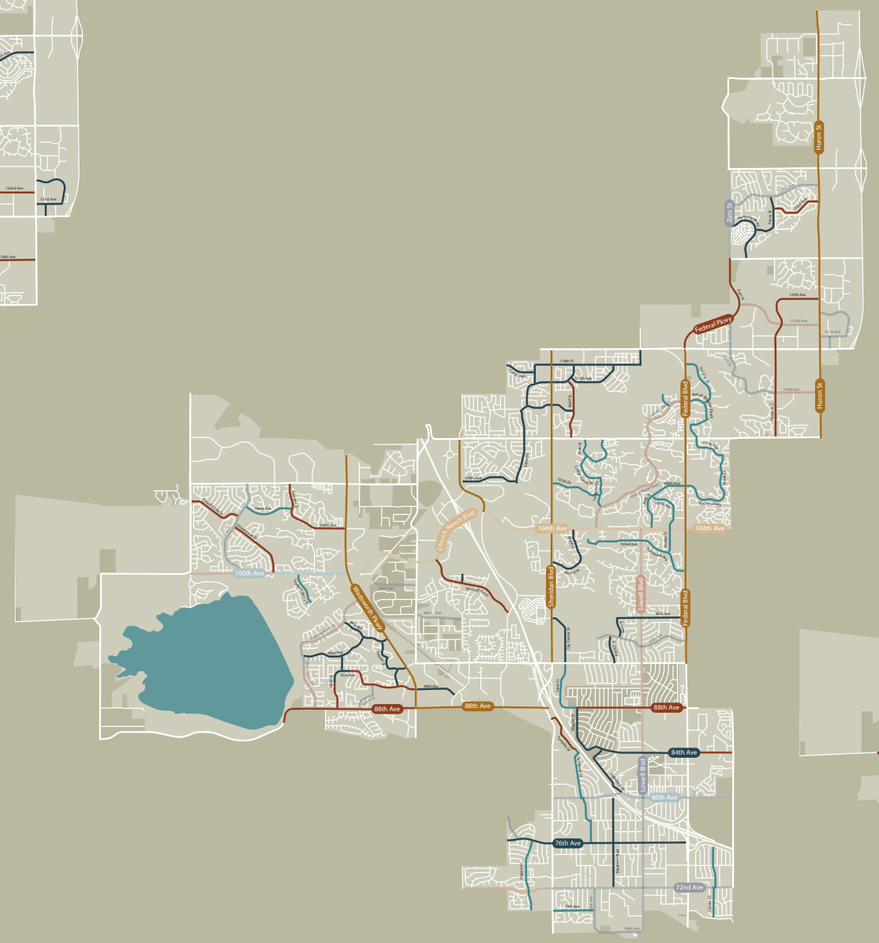
Area north of 120th Avenue.

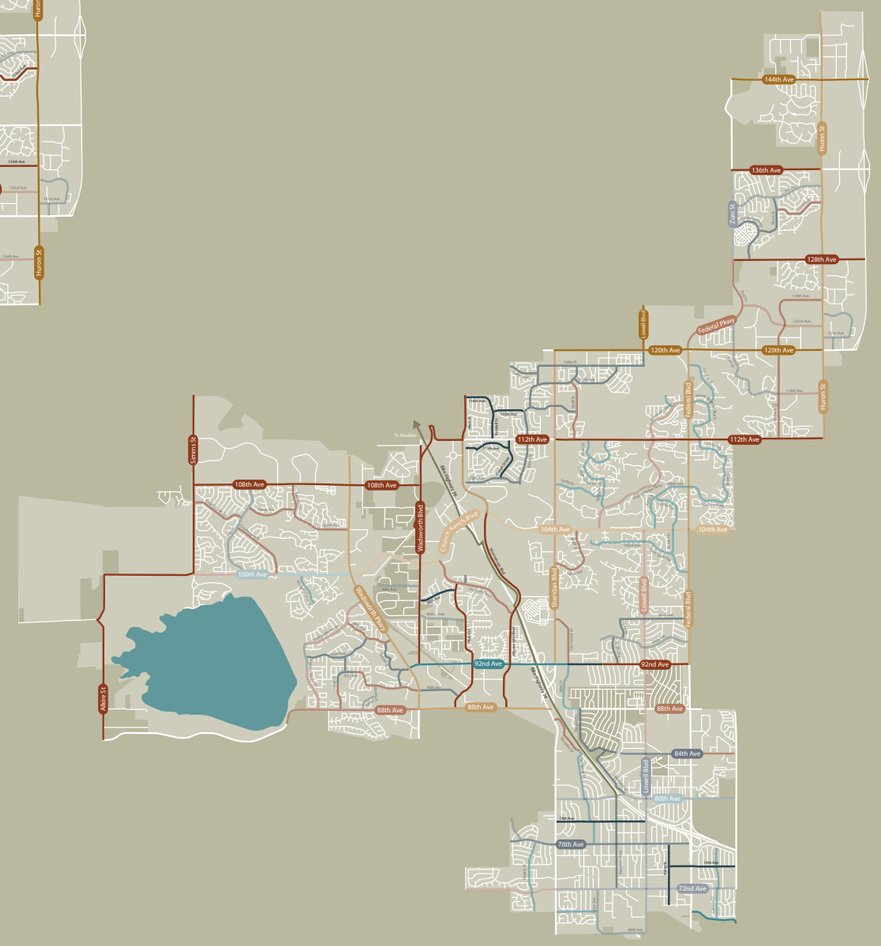
ON-STREET BIKEWAY NETWORK PLAN

HOW THE NETWORK BUILDS UPON ITSELF

- Proposed Sidepath
- Proposed Bicycle Lane
- Proposed Highway 36 Bike Route
- Proposed Signed Bicycle Route
- Proposed Shared Use Lane Markings
- Unincorporated Areas







WHAT THE NETWORK WILL LOOK LIKE IN THE...

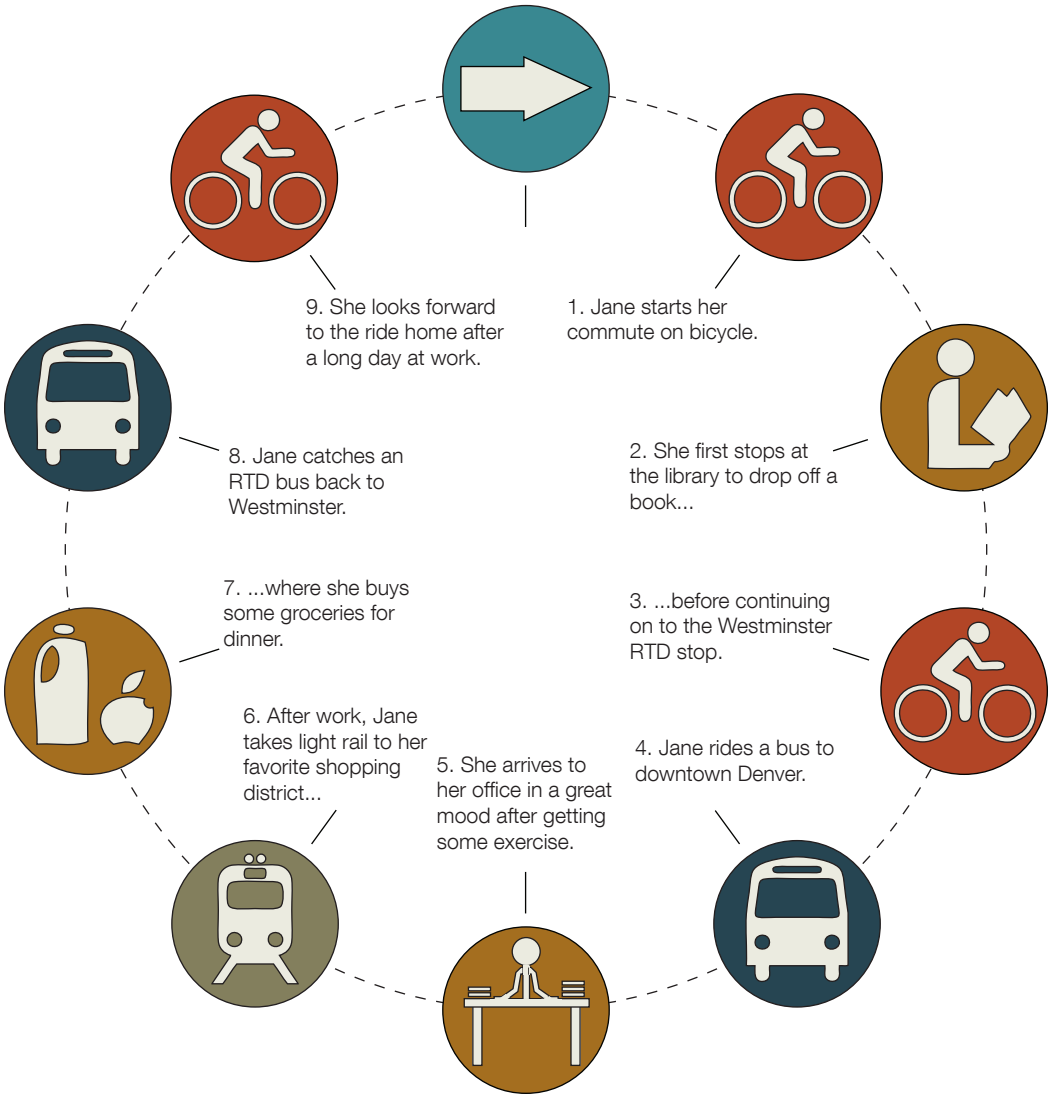
SHORT-TERM → MEDIUM-TERM → LONG-TERM

3.7 INTEGRATING THE BIKEWAY AND TRANSIT NETWORK

Regional Transportation District (RTD) provides regional bus and rail transit throughout the Denver region. According to the agency's 2007 Bike-on-Bus Survey, more than 682,000 trips utilized the system's bike racks.[iii] The same survey also noted that more than 11,000 passengers were involuntarily forced to take a later bus because bike rack capacity was maximized. Clearly, the presence of these bus racks, as well as the numerous bicycle parking facilities maintained at RTD stations, promotes bicycling throughout the region.

While Westminster's current Park N' Ride Centers and local bus RTD stations offer local and regional transit service, the city will soon have more intensive regional rail service. The arrival of RTD's FasTracks Northwest corridor line will greatly enhance the viability of transit in the region, especially for commuter trips. As this infrastructure is built, the City of Westminster should work closely with RTD to plan for changing land use patterns that will not only promote transit, but also walking and bicycling. The early Westminster Mall redevelopment plans exemplify how a completely integrated approach to land use, urban design, transportation, and street network planning can generate new tax revenue, offer a more sustainable urban lifestyle, and support the needs of those who would like to walk or bike to RTDs local and regional transit service.

This workflow diagram demonstrates how bicycling can be easily integrated into the larger transportation network. For this hypothetical commuter, the bicycle plays an essential role in the last first and last legs of her commute.



3.7.1 THE BICYCLE SHED

The type and quality of transit service aside, planners generally accept that the average person will walk up to half a mile to transit if the environment is safe, convenient, and interesting. This radial distance is most often referred to as the "pedestrian shed." After this approximate radial limit is reached, however, it is assumed that transit's ability to attract ridership decreases as distance from the station increases.

Yet, if one considers that the average bicyclist can travel three times faster than the average pedestrian, the formulation of nuanced "bicycle sheds" can greatly expand transit station catchment areas, while also improving the extent and utility of the regional bikeway network. Indeed, just as a 5- or 10-minute walk should be convenient and enjoyable for the pedestrian, so too should it be for the average bicyclist, who is able to cover much more ground—one to three miles easily—with an equal outlay of time.

While the bicycle shed is an important conceptual planning tool, it is meaningless without the physical development of bicycle infrastructure that further supports bicycling. Each "bicycle shed" should not be conceived in isolation, but as part of a regional bikeway network. This network should be designed to connect people to important destinations—schools, neighborhood and regional employment centers, open space, and of course, local and regional transit systems.

The following bike/transit shed maps demonstrate the reach of the existing and proposed public transportation options for Westminster residents who choose to walk or bike.

The one mile transit shed map (*see*: pages 64 and 65) illustrates that Highway 36 is the backbone of Westminster's transportation network. Most areas around the highway are within acceptable walking distance—and certainly easy biking distance—of existing and planned transit stops. Moreover, the proposed bikeway network would create many routes to and from transit, with 43 proposed bicycle facilities within one mile of existing and planned transit stops. More than 40 percent of the proposed network's 102 bike projects would run less than a mile from transit. However, because of Westminster's separation of land uses, these one mile sheds serve many more commercial districts, such as Westminster Mall, than residential areas.

Expanding the shed to just three miles—which is the approximate distance that bicyclists will travel to reach rail stations, bus stops, and carpooling lots as part of a multi-modal journey—puts the majority of Westminster's street grid within bicycling distance of transit. The three mile transit shed map (*see*: pages 66 and 67) highlights just how many Westminster residents could potentially be encouraged to bike to transit. Only a handful of areas within the city boundaries—those west of Simms Street and north of West 142nd Circle—are not within three miles of a transit stop. All of the bicycle infrastructure proposed by the Westminster 2030 Bicycle Master Plan is within three miles of transit, with the exception of a bicycle lane on Alkire Street and a Sidepath on 144th Avenue. Ninety-eight percent of Westminster's proposed bicycle network will be within three miles of the existing and proposed transit routes.

3.7.2 PARKING AT THE STATION

In general, the integration of bicycles with public transit—often called "bicycle transfers"—should be made easy. Quite simply, this means that what ones does with a bicycle upon arrival is as important as being able to get there safely on two wheels in the first place.

In the context of transit-oriented bikeways, bicycle parking enriches the viability of multimodal journeys, effectively adding to the economic, social, and public health benefits already associated with transit. Yet, most existing bus stops do not offer sufficient bicycle parking facilities; the importance of ensuring the proper supply, location, and type during the planning and design process is commonly underestimated.

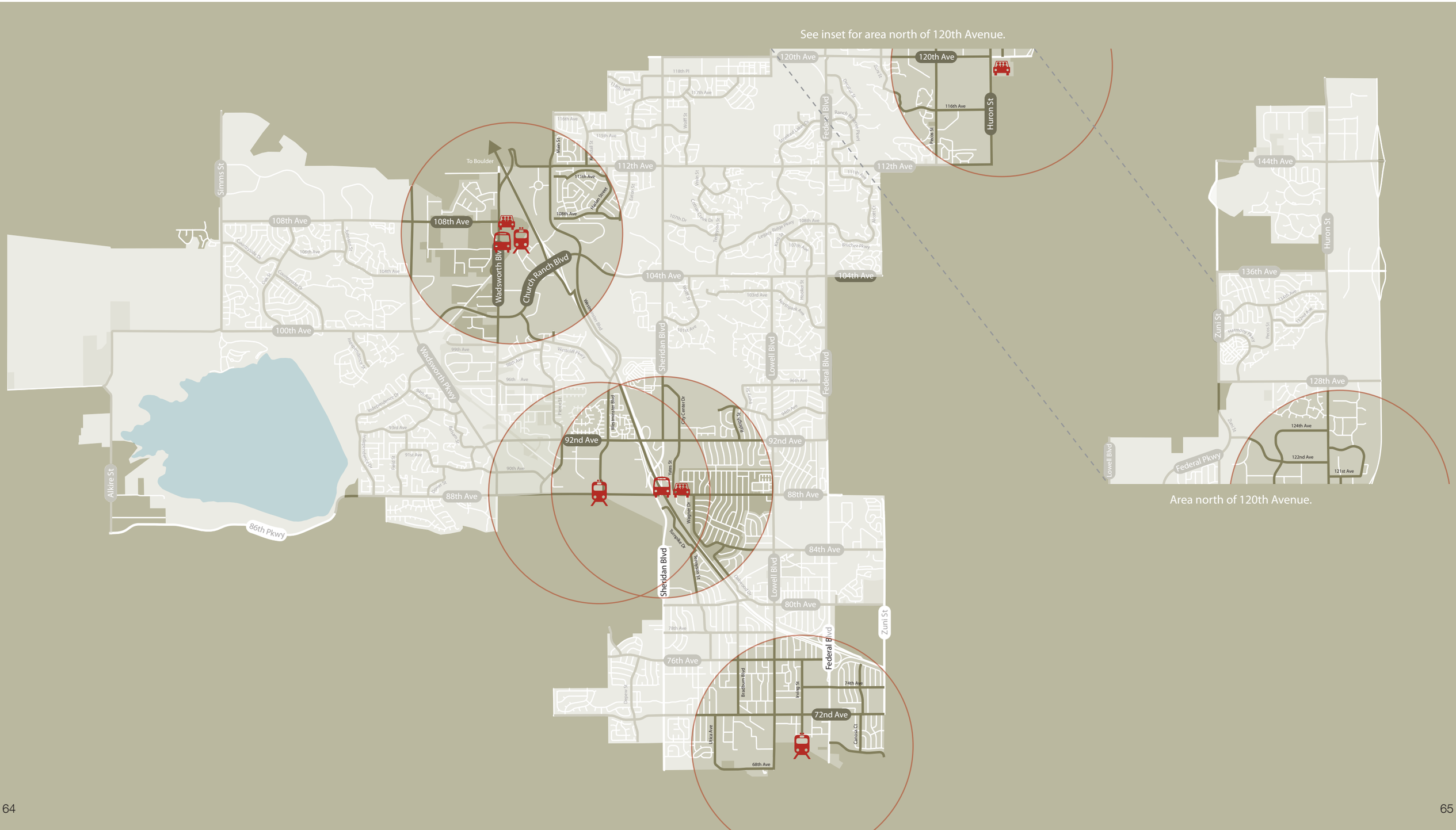
To be sure, RTD has done much to accommodate bicycle parking (*see* Section 5: Bicycle Parking Plan). As bicycles are parked for an extended period of time, normally the duration of the workday, safety and theft prevention is vital. The best long-term parking facilities should provide changing rooms, lockers, and showers. Such provisions are especially important in making bicycle

ON-STREET BIKEWAY NETWORK PLAN

BICYCLE/TRANSIT SHED (1 MILE)

Proposed RTD Rail Station
Existing RTD Park & Ride Stop
Existing RTD Bus Stop

Proposed Bicycle Network
Unincorporated Areas



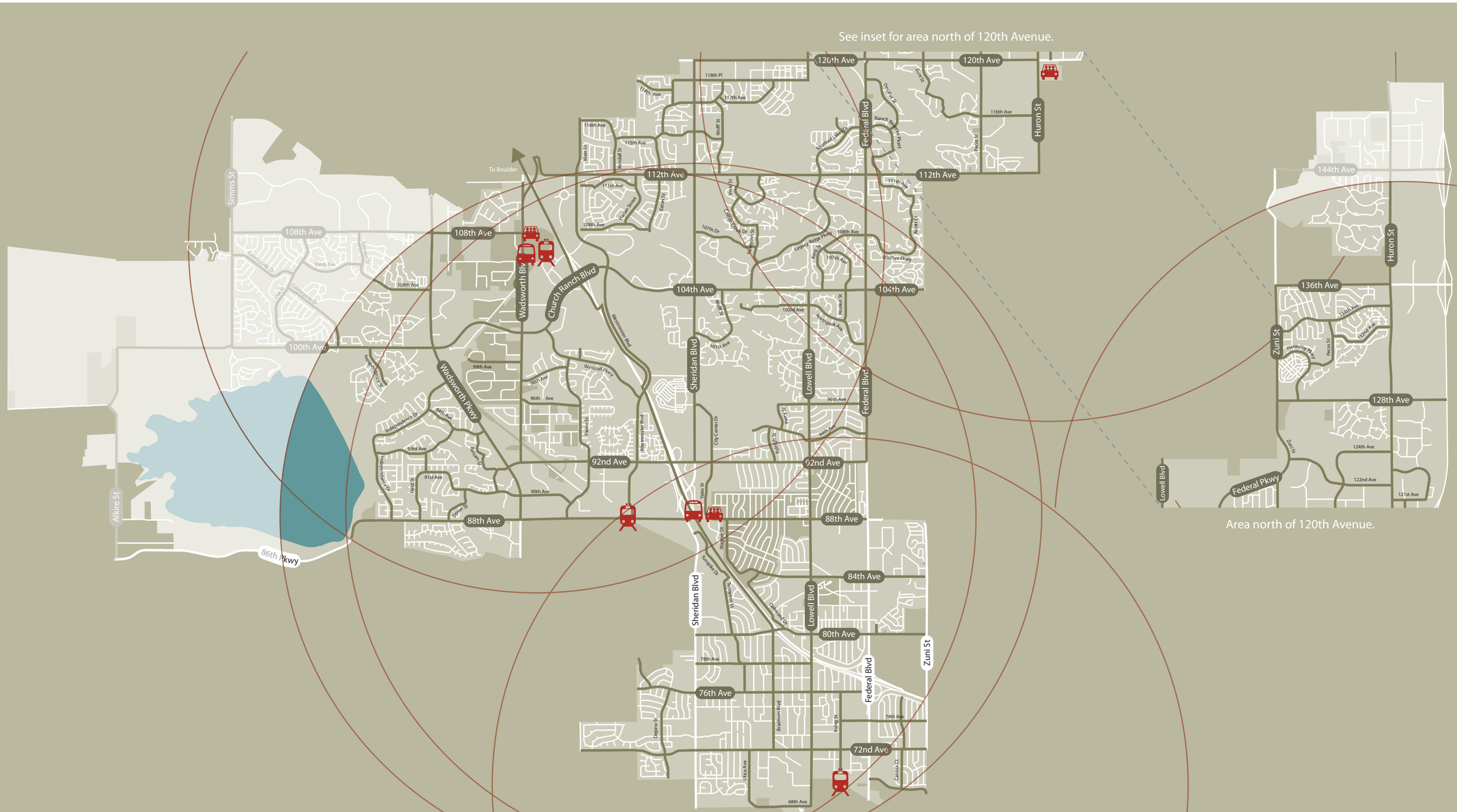
Area north of 120th Avenue.

ON-STREET BIKEWAY NETWORK PLAN

BICYCLE/TRANSIT SHED (3 MILES)

Proposed RTD Rail Station
Existing RTD Park & Ride Stop
Existing RTD Bus Stop

Proposed Bicycle Network
Unincorporated Areas



Area north of 120th Avenue.

commuting possible. They are also a good fit for major transportation hubs and the center of regional districts. Such facilities may not be immediately feasible in Westminster, but nonetheless should be considered alongside RTD in the build-out of the Northwest Corridor line. Alternatively, nearby fitness centers/gyms may be contracted to allow use of their existing changing rooms, lockers, and showers.

As the transit-oriented bicycle shed is enriched with safer and more visible bikeways (the so-called safe routes to transit approach), more bicycle parking may be needed. While well-designed and located parking facilities go a long way towards meeting bicyclists needs, overcoming a collection of less obvious, detailed design, policy, and management challenges still remain.

3.7.3 OTHER DESIGN CONSIDERATIONS

While bicycle access to transit stations is critical, so too is access within the station to the train. Stairs, platforms, turnstyles, etc. are not only physical barriers for bicyclists, but mental barriers as well. Quite simply, nobody wants to publicly struggle with a bicycle in a crowded transit station. Thus, all stairways leading to and from transit platforms and fare boxes should be designed to include accommodations for bicyclists, such as bicycle-specific ramps.

While not immediately obvious, the placement and design of rail infrastructure is essential to maintaining bicyclist safety, as bicycle wheels are easily caught in the flange gap between the rails, which causes crashes and injuries. During the investigation of this all-too-common problem, Alta Planning + Design developed Bicycle Interactions And Streetcars: Lessons Learned and Recommendations,[iv] which provides ways to best integrate rail infrastructure with bicycle facilities so that both are mutually supportive. StreetFilms recently illuminated the proper way to navigate inlaid train tracks, demonstrating that bikeway design can further alleviate the risk of crashing.[v]

Finally, research authored by Norman Garrick, who heads the University of Connecticut's Center for Transport and Urban Planning, reveals that urban form plays a critical role in encouraging bicycling.[vi] By his account, more people bicycle, and bicycle safely, as density and land use intensity increases. Interconnected street grids—common within dense places—place more destinations within bicycling distance, provide opportunities for safe alternative routes, and help make bicycling the most efficient mode of urban transport. While somewhat obvious, this helps explain why cities attract more bicyclists than suburban or rural areas.

On page 69:

Top Left: RTD's Regional Bus Service facilitates intermodal travel.

Top Right: Bicycle Lockers and Racks satisfy short term and long term parking needs at RTD's Westminster Center Park N' Ride.

Bottom Left: Small design decisions, like implementing bicycle stair ramps, improve the convenience of multi-modal travel.

Bottom Right: This railroad crossing in Westminster was designed to include a safe perpendicular sidewalk crossing for bicyclists.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4. BIKEWAY NETWORK WAYFINDING & SIGNING PLAN

"Mental mapping" is the way that individuals navigate through space using routing and landmark-recognition. This map overlays a mental map with the physical streetscape map, showing the similarities and differences between the two. Wayfinding and signage help people construct "mental maps."

Wayfinding is the process of using spatial information to determine one's location, one's destination, and a route of travel between the two. When navigating through physical space, people construct a "mental map" that allows them to better understand what they can't immediately see. A proper wayfinding system is essential to the process of understanding how to best navigate between one's location and destination.

Individuals navigate through a location or roadway network through two distinct methods: routing and landmark-recognition. Routing is a process wherein individuals create a mental route from origin to destination by chaining together a series of individual steps and particular directions. An example of routing is: "after making a right on Main Street, go down the block and make a left on Broadway." By contrast, landmark-recognition relies on immediate surroundings and the built environment to act as mental cues for the individual who is developing a route. An example of landmark-recognition is: "after making a right after the gas station, go down the block and make a left at the church." When navigating through a new or even familiar space, people tend to use both routing and landmark recognition.

Signing is an essential element of any street or shared use path network. Signs help users navigate between their origin and destination, as well as communicate valuable safety and regulation information. Other information about amenities or local attractions at various destinations can also be highlighted in wayfinding signs. Maps can be integrated into signing schemes, thereby providing another valuable tool for wayfinding and route planning. Other indicators, such as recognizable pavement markings, can also be used for wayfinding.

All public streets in the United States utilize a standardized wayfinding and signing system based on the Federal Highway Administration's MUTCD. This manual defines the color, size and placement of all roadway signs. Standards on bicycle-related signs can be found in Chapter 9 of the guide, and are featured on page 73, as well as in Appendix F: Bicycle Signage Index.

CDOT has its own additional set of sign design guidelines, as outlined in the CDOT Sign Design Manual.[i] There is a CDOT Sign Library available on their website, which supplements the

standard MUTCD.[ii] These signs are in the spirit of the MUTCD, but are tailored to the visual language, laws, and character of Colorado.

Signing systems on shared use path networks are not regulated by any federal codes, allowing greater variation and enhanced visual elements that reflect the local character of a particular community. However, any shared use path wayfinding scheme should use a similar language and visual elements to "plug-into" MUTCD regulated roadway signs, promoting clear understanding and comprehension by users as they navigate on- and off-street networks.

The content of bicycle-specific signs can be broken down into four broad categories:

- Navigation: Serves as the prime bikeway identifier. It can also be used to offer valuable navigational information such as route destination and direction, and distances to important intersecting streets.
- Caution: Conveys warning messages to people driving and people bicycling. Since caution message need to be understood quickly and from a distance, they are the largest and most basic of signs.
- Connections: Highlight intersections with other bikeways or public transportation hubs. Their goal is to integrate individual bikeways into a broader transportation network.
- Points of Interest: Highlight points on or near the route of relevance to bicyclists. By drawing attention to these locations, Point of Interest signs can help make bikeways more attractive recreational routes for cyclists.

The content of bicycle-specific signs can be broken down into four broad categories:
Navigation
Caution
Connections
Points of Interest

◀ Navigation

Portland, OR has a robust bicycle wayfinding system. These navigation signs identify destination direction, distance and estimated time to arrival. (Photo Credit: Flickr user 'The Impression That I Get')

▶ Caution

This caution sign from Boulder, CO alerts cyclists to potentially adverse riding conditions.

▶ Connections

Signs in Boulder, CO direct off-street trail users onto on-street bicycle lanes.
(Photo Credit: Bicycle Coalition of Greater Philadelphia)

◀ Points of Interest

Even simple signs, such as this standard MUTCD sign in Philadelphia, PA, can assist cyclists in reaching their destination.

4.1 SUMMARY OF BICYCLE WAYFINDING, SIGN TYPES, & BEST PRACTICES

4.1.1 ON-STREET DIRECTIONAL SIGNS (MUTCD)

Chapter 9 of the MUTCD is dedicated to bicycle signs and their placement within street right-of-ways. Bikeway wayfinding signs are most often distinguished by their green color and white text. The use of a consistent color scheme for directional and distance information, allows bicyclists to clearly see and understand the information contained therein. In the same way that Interstate Highway signs are always red and blue, or state highways are black and white, the use of a consistent visual language allows the cyclist to distinguish the signs from others posted along the road.

The most common bicycle wayfinding signs encountered by roadway users is the standard 'Bike Route' signs (D11-1) that are installed in intervals along Class III routes and typically paired with directional arrows in wayfinding systems. These signs serve the dual purpose of alerting motorists to the presence of bicyclists and assisting cyclists navigate the larger bikeway network. These signs can be paired with directional arrows and the name of a destination, which is very helpful to users navigating the street network.

4.1.2 BICYCLIST CAUTION AND AWARENESS SIGNS (MUTCD)

Beyond wayfinding, signs should be used to alert people bicycling to potential hazards, and remind people driving to engage in safe behavior. Caution signs should alert bicyclists to such hazards as railroad crossings, driveway entrances, and steep elevation grades, among others. Motorist-targeted awareness signs should remind drivers of state laws; for example that cyclists may use the full lane or that motorists must give bicyclists a full three feet when passing. Both bicyclist- and motorist-targeted signs ultimately raise awareness and indicate a community's commitment to supporting bicycling.

4.1.3 ON-STREET PAVEMENT MARKINGS

While Peg-a-Tracking is generally considered to be a safety countermeasure (*see* Section 3.5: Countermeasure Treatment Summary), it also indicates the continuation of a bikeways through intersections. Peg-a-Tracking therefore plays an intuitive wayfinding role, particularly for gaps or transitions within the bikeway network. Rather than consulting a roadway sign at a key decision-making point, a bicyclist can instead follow the pavement markings. Peg-a-Tracking is particularly effective when navigating through triangular or "T" intersections and where one-way streets are present.

4.1.4 SHARED USE PATH MARKERS

In their most basic form, shared use path markers are posts or signs placed at trail entrances that identify the name of the path for the user. More elaborate markers can include information about park regulations (if the path is in a public park or open space preserve), the length of the shared use path, and time/distance to destination(s) information.

Since shared use path markers are considered to be part of an off-street system, they are not beholden to any federal or state design standards. This allows the local municipality to design and implement path markers that reflect local character. Such markers frequently feature the colors and/or logos of the city in which they are installed. Shared use path systems that traverse multiple municipal boundaries should maintain the same visual language to ensure that users know they are continuing along the same system.


BIKE ROUTE
TO
BEGIN
END
SALEM 6
SALEM 6
8TH AVE
PARKING
SHARE THE ROAD
HILL
13
23
AHEAD
ENDS
BIKE LANE
NO PARKING
BIKE LANE

WAYFINDING & SIGNAGE OVERVIEW

◀ 4.1.4: Directional and distance signage is commonly found at National Parks. (Photo Credit: voyageunbound.com)

▶ 4.1.2: This sign (W7-5), shown in context, alerts cyclists to steep grade conditions.

▼ 4.1.4: This sign identifies the beginning of the Farmers' High Line Canal Trail.

▲ 4.1.1: The standard Bike Route sign (D11-1) can be combined with any directional arrow to communicate important navigation information to cyclists.

▶ 4.1.3: Peg-a-Tracking in New York, NY. This treatment directs cyclists through an irregular intersection to continue along a designated bicycle facility. In this particular case, the Peg-a-Tracking is complimented with a bicycle-specific wayfinding sign which indicates the same information.
(Photo Credit: Google Earth)

▲ 4.1.4: Arvada designed unique trail markers that draw attention to entrances that intersect roadways and make it easy for cyclists to locate them.

▼ 4.1.5 & 4.1.6: Directional signs in Seattle, WA inform riders what destinations are served by trail spurs. Note how distance is also included, to further aid the trail user.
(Photo Credit: Blake Trask)

4.1.5 SHARED USE PATH DIRECTIONAL SIGNING

Directional and distance to destination(s) signs are an important and useful wayfinding element for any off-street path system. At a minimum, these signs should be strategically placed wherever an off-street path system interfaces with the street network, and wherever path segments diverge/converge. These strategic points can include path intersections, spurs, or detours onto the street or sidewalk. Arrow, labels, and symbols should distinguish route options and identify the destination served by each path. Signs should be placed 25 to 75 feet before any decision-making point.

Because the information on each sign is particular to its location, most directional signs are site specific and reflect the geometry the pathway segments in which they are placed. In order to maximize legibility for bicyclists, directional arrows and text should be large enough so that all pertinent information is capably read from a distance of approximately 30 feet while traveling 12 miles per hour. Thus, text should be no less than 2.25 inches in height, and it is recommended that all signs be written in FHWA C Series Font, or a comparable sans serif typeface. Directional arrows should be at least three inches wide and 2.25 inches high.

4.1.6 SHARED USE PATH DISTANCE SIGNING

Distance to destination(s) signs and mileage markers provide needed wayfinding elements to any shared use path network. Such signs should communicate known distances to connecting paths, general points of interest, and path exists/entrances, among other key points.

Estimated time to destination information is also helpful, as many path users prefer to know approximately how long it will take to arrive at a given destination. Distance signs or mileage markers, should also be placed soon after key decision-marking points because they serve as a confirmation to path users that they have selected the correct route. The text height should be the same as above.

Directional and distance signs frequently contain path system maps. These maps help users better understand their location within the trail network, as well as assist with trip planning. In order to make the maps easier to read, these maps should generally identify the location of the map (and viewer). These maps can also contain information about the adjacent street or overall bikeway network, in addition to popular destinations or cultural institutions.

4.2 WESTMINSTER'S EXISTING WAYFINDING SYSTEM

The City of Westminster has included a limited number of wayfinding signs within its off-street shared use path network. As the on-street bikeway network is almost non-existent, there are only a few on-street bicycle signs sprinkled throughout the city's street network. All of Westminster's existing on-street signage is directed to drivers, alerting them to the presence of bicyclists.

4.2.1 OFF-STREET SIGNING (SHARED USE PATH SYSTEM)

Westminster's robust shared use path network features a comparatively sparse and incomplete wayfinding system. While path markers are present, the greater system is inconsistent, often leaving large gaps that diminish the value of the existing signs.

There are two versions of wayfinding signs located at various points throughout the system. The older of the two include blue, purple and grey signs that feature white typography. The signs are approximately three feet tall and two feet wide. There are two types of signs within this system: path markers and directional signs. Installed on a single post, sign height varies from approximately two to three feet.

The most recent wayfinding signs are red and brown, with white text. They are smaller than the previous signs, approximately two feet tall and eighteen inches wide. Similar to its predecessor,

WESTMINSTER OBSERVATIONS

▲ 4.2.1: Westminster's older shared use path signing design features a large type face and a high contrast color palette.

◀ 4.2.2: This is one of the few on-street bicycle signs, spotted near the Farmers' High Line Canal Trail. There is no directional signing located throughout the entire city.

▼ 4.2.1: The older design is easy to notice and read from a distance.

▲ 4.2.1: The newer design, by contrast, is smaller in size and lower contrast, making it difficult to notice and read at bicycling speeds.

▶ 4.2.1: The diminutive stature of the newer design makes it difficult to read unless the bicyclist comes to a complete stop.

the system includes directional and distance signs. The signs are all encased in a wood frame, which include the two legs supporting the sign.

Generally, the older design is more effective at communicating information to people bicycling than the most recent design. The newer signs' smaller size is difficult to read at any distance, particularly when traveling at normal bicycle speed. In contrast, the older design, which features higher contrast colors and larger fonts is far easier to read at bicycling speed.

Another issue with the new design is the directional arrows. There is one universal placement for the arrows, regardless of the path's geometry. In this case, the arrows are always pointing to two and ten o'clock. At certain intersections, deciding which arrow is related to which trail is not immediately clear, further exacerbating the issue of legibility for people riding a bicycle. One positive aspect of the new design is that they contain distance information and overall system maps. However, because of their small size, it is not immediately apparent that these signs contain maps, even though they are quite useful.

4.2.2 ON-STREET SIGNING

There are very few on-street bicycle related signs in Westminster. Those signs that do exist are located at sporadic points throughout the city, typically where the off-street shared use path system crosses or adjoins the street network. There appears to be no consistent standard as to when bicycle signs will be installed, as there are numerous possible instances of on-street/off-street interactions where signs are not present.

4.3 WAYFINDING & SIGNING RECOMMENDATIONS

Action #1: Develop an on-street bicycle wayfinding system and standards to complement and enhance the future bikeway network.

Based on the standards laid out in the MUTCD, the City of Westminster should work with CDOT to install bicycle directional and confirmation wayfinding signs along every on-street bikeway facility. At the very least, the signs should consist of a "Bike Route" sign (D11-1) accompanied by an appropriate directional arrow (M7-1:7). These signs should be installed at every key-decision making point or where the bikeway intersects with another. Additionally, a wayfinding plan should be developed and include supplemental plaque signs (D1-1b or D1-1) that identify destination direction, name, distance and estimated time to arrival. The location and content of these signs should be established by the plan.

Action #2: Install bicyclist warning signs along with new bikeway facilities.

Because bicycling is not a mainstream mode of transportation for most Americans, it is important to alert people driving to expect people bicycling on the roadway. The MUTCD includes such warning signs, namely W11-1, W16-1 and W16-7p, which should be installed at regular intervals along any on-street bikeway facility.

In addition, warning signs for bicyclists, alerting them to conditions such as steep grades (W7-5) or narrowing bikeways (W5-4a) should be installed wherever roadway conditions require. Based on precedence in Arizona and other states, the City of Westminster should consider designing a new motorist-targeted sign, reminding drivers of the new requirement to give bicyclists three feet of space when passing (as mandated in Colorado's 2009 Bicycle Safety Act). Westminster should work with CDOT to create this sign, using the existing CDOT 'State Law' regulatory sign (R52-6e) as a template.

Action #3: Install bicycle appropriate regulatory, guide and warning signs wherever new bikeway facilities implemented.

Regulatory, guide and warning signs are essential to ensuring the educated and proper use of

◀ Lack of path markers makes it difficult to locate and identify path entrances.

▼ Another Westminster-designated trail which lacks any form of identification.

▲ Following precedence in Arizona, Westminster should work with CDOT to design a warning sign alerting motorists of the new three-foot passing law that went into effect in 2009.
(Photo Credit: Erik Ryberg)

◀ Some of the existing, older-design Westminster trail markers contain trail information. This should be expanded to include trail destination and distance.

bikeway facilities. The City of Westminster should work with CDOT to install appropriate bicycle signs, according to the standards set forth in Chapter 9 of the MUTCD, whenever appropriate for new bicycle facilities as listed below (*see* Appendix F: Bicycle Signage Index for more detail):

Class I - Sidepath

- 'Bicycle' (W11-1) and 'Arrow' (W16-7p) or 'Bike/Ped [Symbols] (CDOT W11-55) warning signs placed every quarter-mile along any sidepath route.

Class II - Bicycle Lane

- 'Bike Lane' (R3-17) and 'Ahead' (R3-17a) regulatory signs at the beginning of a bike lane.
- 'Bike Lane' (R3-17) and 'Ends' (R3-17b) regulatory signs at the end of a bike lane.
- 'Bike Lane' (R3-17) regulatory sign placed after every intersection along any bike lane route.

Class III - Signed Bike Route

- 'Bike Route' (D11-1) and 'Begin' (M4-11) guide signs at the beginning of a sharrow route.
- 'Bike Route' (D11-1) and 'End' (M4-11) guide signs at the termination of a bicycle signed/facility route.
- 'Bike Route' (D11-1) guide sign placed after every intersection along any bike lane route.
- 'Bicycle' (W11-1) and 'Share The Road' (W16-1) or 'Bicycle' (W11-1) and 'Arrow' (W16-7p) or 'Bike/Ped [Symbols] (CDOT W11-55) warning signs placed every quarter-mile along any signed route.

Class III - Signed Route Bike Route with Shared Use Lane Marking

- 'Bike Route' (D11-1) and 'Begin' (M4-11) guide signs at the beginning of a sharrow route.
- 'Bike Route' (D11-1) and 'End' (M4-11) guide signs at the termination of a bicycle sharrow/facility route.
- 'Bike Route' (D11-1) guide sign placed after every intersection along any sharrow route.
- 'Bicycle' (W11-1) and 'Share The Road' (W16-1) or 'Bicycle' (W11-1) and 'Arrow' (W16-7p) or 'Bike/Ped [Symbols] (CDOT W11-55) warning signs placed every quarter-mile along any sharrow route.

Action #4: Design path entrance markers to reflect and complement on-street bicycle wayfinding signs.

Shared use path entrance markers should contain the path name, and/or information highlighting the overall path distance, and all key destinations along the way. The design of the signs should be visible and easily distinguishable from other installed signs. In addition, the design should complement the future on-street bicycle signs, to ensure easy recognition by bicyclists. The City of Westminster Department of Parks, Recreation, and Libraries should also develop the path entrance marker design.

▲ The new trail marker signs are difficult to read at bicycling speeds. The design of the sign is also indirect and cluttered. Users must frequently stop in order to decipher sign content.

◀ The City of Arvada installs trail markers near trail intersections with roadways. They are easy to read and clearly identify where the trailhead is located.

▶ An entrance sign on this City-designated shared use path states "Pedestrians Only," implying that bicycle usage is not permitted. (Found on West 98th Avenue between Teller Ct. and Reed St.)

▼ An all too common sight in Westminster. What are these trails? Where do they go? (Existing sign states "No Horses Beyond This Point.")

Action #5: Install trail markers at the entrance of every off-street trail.

In order to fully integrate the on-street and off-street bicycle networks, it is essential that all shared use path entrances are highly visible and easily located by users. Path markers should be easily seen from adjoining roadway, particularly where there are any natural site line constraints. The City of Westminster should survey and identify every path entrance that adjoins a roadway. A phasing plan should then identify potential funding sources to implement the path markers.

Action #6: Install directional signs at every key decision making point within the off-street network.

Directional signs are non-existent at numerous key decision-making points throughout the path system. This makes the path system very difficult to navigate, particularly at path intersections, spurs, and roadway system traverses. The City of Westminster should survey the path network to determine the key decision-making points, and install directional signs that indicate the destination served by intersecting paths and their individual spurs. The City should also coordinate with the Department of Parks, Recreation, and Libraries to install directional signs wherever a path connects to a roadway or abutting sidewalk.

Action #7: Redesign the existing off-street directional and distance signs to ensure legibility at typical bicycling speeds.

A new shared use path signing design scheme should be implemented, one that features large text, and site-specific indicator arrows, to maximize legibility and user comprehension.

Action #8: Remove confusing signs on designated paths that forbid bicycle use.

The City of Westminster should ensure that no signs on bicycle-designated paths imply that bicycle use is forbidden. For example, on West 98th Avenue between Reed Street and Teller Court, an entrance sign to a shared use off street path maintained by the West Cliff community reads "Pedestrians Only. No motorized vehicles or horses." Though cyclists use this path, the sign implies that bicycle use is not allowed.

5. BICYCLE PARKING PLAN

Above: In Pittsburgh, Pennsylvania, old shipping containers have been transformed into a bicycle parking, locker, and changing facility.

Below: While highly visible, the provision of too much bicycle parking, like here at Westminster's City Park Recreational Center, wastes space and resources.

While bikeways are the most visible element within a bicycle network, cyclists must also have safe and convenient places to store their bicycles. Providing bicycle parking and other "end-of-trip" facilities is critically important to supporting bicycling as a viable mode of transportation. Solutions range from the basic bicycle rack to semi-enclosed bicycle shelters, to full bicycle "stations" that may offer bicycle storage and repair facilities, showers, lockers, changing rooms, rentals, and even café/social gathering spaces.

No matter the type, bicycle parking is commonly excluded or insufficiently addressed in the planning, urban design, and development processes. As a result, accessible, attractive, and safe parking options for both short and long-term use are often under- or oversupplied, and poorly sited.

5.1 WESTMINSTER BICYCLE PARKING

The gradual implementation of Westminster's bicycle parking standards (Westminster Site Design Guidelines: Section 11-7-4, E1-E2) has successfully created more bicycle parking facilities throughout the City. However, functional and aesthetic outcomes could be greatly improved by meeting the additional standards set forth in this document. Likewise, formulating a coherent implementation plan will ensure that appropriate storage types and locations are selected; will prevent overbuilding and the waste of City resources; and that bicycle parking facilities are implemented to maximize safety and accessibility.

The Bicycle Parking Plan contained herein is intended to provide all stewards of the Westminster 2030 Bicycle Master Plan with the information needed to improve bicycle parking conditions, and by extension, the city's bikeway network.

5.2 BICYCLE PARKING TYPES

While countless bicycle parking designs and configurations exist, there are only two basic types—short- and long-term bicycle parking—that include six basic sub-types. Short-term parking facilities consist of bicycle racks, self-service bicycle sharing systems, and temporary event "valet" parking. Long-term parking facilities include semi-enclosed bicycle shelters, fully enclosed bicycle lockers, and fully enclosed bicycle stations/storage rooms.

Matching each of these types and the available configurations to the right context is not difficult, but requires an understanding of the following:

- Intended bicycle user group
- Length for which bicycles are likely to be parked
- Type(s) of trips to be accommodated (long/short term)
- Proposed location and the surrounding land uses

Bicycle Parking Infrastructure can be grouped into one of two categories, with six sub-types:

Short-Term Parking Facilities

- Bicycle racks
- Self-service bicycle sharing systems
- Temporary event "valet" parking

Long Term Parking Facilities

- Semi-enclosed bicycle shelters
- Fully enclosed bicycle lockers
- Fully enclosed bicycle stations/storage rooms

- Local climate considerations (rain, snow, etc.)
- Ability of the proposed facility to provide orderly, safe, and attractive bicycle parking
- Basic performance standards and parking site guidelines

5.3 SHORT-TERM BICYCLE PARKING

The majority of bicycle parking facilities are intended for short-term use, generally less than two hours. Short-term bicycle parking is generally associated with commercial/retail, civic, and/or recreational land uses, where short trips are common. As a result, proximity to destination is prioritized over protection from weather and guaranteed security. Beyond the use of a lock and the quality of the bicycle parking design, passive surveillance—otherwise known as "eyes on the street"—is the only security provided.

5.3.1 BICYCLE RACKS

Bicycle racks allow for the temporary storage of bicycles in a safe and organized manner. While a great variety of designs and configurations are available, the most effective are those which are easy to identify, efficient in the their ability to accommodate the intended amount of bicycles, allow for easy bicycle maneuverability in and out of the designated bicycle parking space, and enable the bicycle to be secured properly.

Two simple and recommended forms that meet these standards are the inverted "U" Rack and the "Post and Ring" (*see* "Short Term Bicycle Parking" on page 82). Each rack may be implemented singularly—one rack provides two bicycle parking spaces—or configured in groups where demand exists. One such application, the on-street bicycle corral, makes use of several racks to replace a motor vehicle parking space where bicycle parking demand is high and sidewalk space is either limited or duly accommodates high volumes of pedestrian traffic. Depending on the configuration, a single motor vehicle parking space may yield between six and 12 bicycle parking spaces.

5.3.1.1 Standard Bicycle Rack Recommendation

While "Inverted U" and "Post and Ring" racks both offer excellent short-term bicycle parking solutions for most bicyclists, Westminster should designate a version of the "Inverted U" rack to become the standard city bicycle rack. Selecting a single rack design type will improve user recognition and also streamline the City's purchasing and implementation process. That said, certain contexts may allow or dictate a different parking facility or design type, as described below.

5.3.1.2 Public Art Racks

Bicycle parking does not have to be unattractive. If done well, bicycle parking solutions add an attractive and unique element to any street- or cityscape. In general, visibility and function remain the most important elements. See image 5.3.1.2 on page 82 or "Recommended Bicycle Park Designs" on page 88 for examples of artistic rack designs. See Appendix G: Public Art Bike Racks (page 134) for additional examples of unique and visually-compelling bicycle racks.

Neighborhood, civic, district, non-profit, institutional, or business groups within the City of Westminster should be encouraged to pursue bicycle parking facilities that reinforce an existing cultural, historical, social or social character. In such instances, custom or public art bicycle racks should creatively address bicycle parking needs while simultaneously enhancing the profile of bicycling and the destination such racks are intended to serve. However, many art rack designs unintentionally undermine the intended function, often resulting in inefficient, unrecognizable, and undesirable bicycle

SHORT-TERM BICYCLE PARKING

◀ 5.3.1.1: Inverted U-Racks can efficiently park two bicycles each.

▶ 5.3.1.2: Art racks should be allowed to creatively address bicycle parking needs.

▲ 5.3.3: During events, bicycle valet parking is a wonderful service that highlights the many benefits of cycling.
(Photo credit: Etienne Frossard)

▲ 5.3.1: Bicycle corrals replace curbside automobile parking with many times the number of bicycle parking spaces.

◀ 5.3.1.1: Post & Ring racks can be added to existing street furniture poles, including signs and parking meters.

▼ 5.3.2: Bicycle sharing, like the Denver B-Cycles system, are revolutionizing urban transportation options.

▼ 5.3.1.3: All bicycle racks should support the bicycle in at least two locations.

parking facilities. Therefore, the provision of art racks should meet or surpass the guidelines and performance standards set forth in this Bicycle Parking Plan.

While custom bicycle racks do cost more than off-the-shelf racks, they raise the profile and visibility of bicycling in general, and improve the public perception regarding city or organizational values. They also bring positive attention to bicyclists for making sustainable and healthy transportation choices.

5.3.1.3 Bicycle Rack Safety and Performance Standards

To prevent theft and to ensure public safety, all bicycle racks should meet the performance standards set forth in Section 11-7-4, E1-E2 of the City of Westminster Site Design Guidelines. Additionally, all bicycle racks should:

- Support the frame of the bicycle in at least two locations
- Allow the frame and one wheel to be locked to the rack element when both wheels are left on the bike
- Allow the frame and both wheels to be locked to the rack if the bicyclist decides to remove the front wheel
- Allow the use of cable, chain, and U-shaped locks
- Be securely anchored to the ground
- Be usable by bicycles with bottle cages, panniers, etc.
- Be usable by a variety of bicycle sizes and types (children's bicycles, tricycles, step-through frames, etc.)
- Keep both wheels on the ground

In addition, all bicycle racks should not be capably compromised by hand tools, especially those that are easily concealed such as wire cutters, screw drivers, etc. Bicycle racks and the bicycles secured to them should not create a tripping hazard or barrier for pedestrians and the visually impaired. Finally, all outdoor bicycle racks and any related facilities should be well-lit and highly visible at night so that users feel safe.

5.3.2 BICYCLE SHARING SYSTEMS

Bicycle Sharing Systems provide an easy-to-use and inexpensive form of public transportation. Each "station" includes multiple bicycles that can be rented from an electronic kiosk designed for visibility and ease of use. Stations are typically located within the public sidewalk, but may also replace an existing on-street parking space where sidewalk space is at a premium. Bicycle stations may also be located within a public park, plaza, or at transit stops.

Like the bicycle station concept, bike share systems are ideal for the most urban environments, such as central business districts and high-density mixed-use neighborhoods. American cities such as Denver, Washington DC, and Minneapolis have successfully implemented bicycle sharing system thus far.

While it is conceivable that Westminster could provide a small bicycle sharing system, it is recommended that the City first focus on improving the bicycle network as well as education and encouragement efforts.

5.3.3 BICYCLE VALET PARKING

The San Francisco Bicycle Coalition describes valet parking as a coat check for bicycles. Indeed, cyclists are issued claim checks in exchange for their bikes. Volunteers park the bicycles within a temporary corral and keep an eye on them for the duration of an event. When attendees are ready to leave, they simply return the claim check for their bicycle.

Bicycle valet parking is a cheap and effective way to reduce parking needs at large events and helps raise awareness for the myriad benefits associated with cycling. It can also save event attendees time and effort.

5.4 LONG-TERM BICYCLE PARKING

Long-term bicycle parking facilities are intended for use that generally exceeds two hours. Long-term bicycle parking is associated with residential, workplace, and transit-related land uses where parking for long durations is common. As a result, proximity to destination is a lower priority than protection from the elements and guaranteed security.

5.4.1 BICYCLE SHELTERS

Bicycle shelters provide highly visible, semi-enclosed protection from the elements. Bicycle shelters should be placed at highly frequented bicycle destinations where users tend to park for short and long-term periods. Such places include, but are not limited to, employment centers, transit stops, fitness gyms, civic buildings, parks, schools, and other educational institutions.

Bicycle shelters provide an opportunity to display safety information, a map of the regional and local bicycle network, and/or any other relevant bicycle or local information. The spacing between individual bicycle racks and/or other streetscape elements must be taken into account and should follow the general bicycle parking performance and location standards contained within this Bicycle Parking Guide. Likewise, bicycle shelters should be easily identifiable, well lit at night, and sufficiently protect bicycles from the elements.

The City of Westminster may consider pursuing the implementation of bicycle shelters in strategic locations. Doing so will raise the profile of bicycling and provide a parking amenity that provides shelter for longer parking stints. Additionally, Colorado's climate makes the provision of bicycle shelters particularly relevant.

5.4.1.2 Bicycle Shelter Safety and Performance Standards

To ensure public safety and high performance, all bicycle shelters should:

- Include bicycle racks that support the frame of the bicycle in at least two locations and meet all other bicycle rack performance standards as discussed in this Bicycle Parking Plan.
- Include a roof span of at least eight feet in width to ensure adequate bicycle coverage, and preferably enclosed on three sides for protection from the elements
- Be located to ensure a minimum of five feet of pedestrian sidewalk clearance, as measured from the edge of the broadside of the shelter's entrance.
- Be located to maintain adequate visibility clearance at intersections (fifteen minimum, as measured from the onset of the curb radius
- Comply with local building code requirements
- Provide adequate illumination for night time use

5.4.2 BICYCLE LOCKERS

Bicycle lockers not only offer additional security and protection from the elements, but also provide an appropriate solution for long-term bicycle parking needs. Bicycle lockers may be placed conspicuously at transit stops, park 'n ride locations, civic buildings, large residential apartment buildings, office towers, and within higher educational institutions. While such facilities offer a higher level of security and comfort, they must be made of high quality materials and be well maintained to ensure that use continues without compromise.

Additionally, bicycle lockers need to be located so that they are highly visible, accessible and convenient to any/all adjacent land uses, destinations, and intermodal transportation options. Because bicycle lockers are intended for long-term use, safe lighting is also a critical element to making the lockers feel safe and to prevent vandalism/graffiti. Areas of higher crime may justify the use of closed-circuit television (CCTV) security devices to monitor the lockers and the surrounding areas.

▲ 5.4.3: Bike Stations, like this one in Long Beach, CA provide a high level of service for commuter bicyclists.

▼ 5.4.1: This Wolff Run Park port-a-potty shelter could also include bicycle parking.

▲ 5.4.2: These bicycle lockers at Zillmere train station in Queensland, Australia have been painted by local school children to make them more attractive.
(Photo Credit: Flickr user Bandido of Oz)

▼ 5.4.1: Bicycle Shelters provide protection from the elements and offer the chance to display bikeway network information.

▲ 5.4.2: RTD's Bicycle Lockers provide increased security and protection from the elements.

While some RTD bicycle lockers and racks are leased out, the City should work to raise the awareness of their availability.

TABLE 1: RTD BICYCLE LOCKERS & RACKS

RTD Location	*Bike Rack Capacity*	*Bicycle Locker Capacity*
US 36 & Church Ranch Park 'N Ride	6	6 (0 leased)
Wagon Road Park 'N Ride	10	10 (7 leased)
Westminster Center Park 'N Ride	27	26 (6 leased)

At present, RTD maintains 52 bicycle lockers, spread out over three locations within the City of Westminster (see Table 1). At present, only 25 percent of these are leased to users.

It is recommended that the City work with RTD to raise public awareness and encourage the use of the lockers by Westminster residents and/or those who commute to jobs within the City. It is also recommended that the City work with RTD to ensure high quality bicycle lockers are included at future RTD stations within the city's borders.

For the latest information regarding bicycle locker rental fees and locations please visit RTD's Bike N' Ride website.

5.4.2.1 Bicycle Locker Safety and Performance Standards

To ensure public safety and high performance, all bicycle lockers should:

- Be manufactured of high quality, non-flammable materials that prevent door sag, lock cutting, panel prying, and other types of vandalism
- Make use of digital "smart" access and reservation technology wherever possible
- Be clearly labeled as bicycle parking
- Include designs that may be incorporated wherever possible into building design or street furniture, as approved by the City
- Include rental information and directions for use should be posted on or near the locker facilities, as well as on the web
- Allow maximum flexibility in grouping and placement
- Ensure that locker doors open to at least 90 degrees to ensure loading and unloading;
- Ensure adequate end and side clearance for users to maneuver their bicycles within the bicycle parking area
- Ensure aisle space between rows of lockers allow for simultaneous maneuvering/use
- Ensure vertically stacked lockers include wheel track guides to help guide bicycles into locker

5.4.3 BICYCLE STATIONS

Bicycle stations are intended to serve as a regional hub for metropolitan bicycling activity. They may offer a wide variety of services, such as secure and attended parking facilities; bicycle rentals; showers, lockers and changing facilities; repair services or facilities; and cafe/social space.

The combination of these facilities provides the highest level of bicycle parking service for both medium and long-term use, and elevates the visibility and viability of bicycling across the region.

Bicycle stations are most appropriate in the urban core, central business district locations, and at transit hubs where bicycle commuters and tourists may maximize the services offered. Cities such as Chicago, IL, Seattle, WA, Berkeley, CA and Long Beach, CA all provide working models.

Due to existing land use patterns, density, and lack of built bicycle infrastructure within the City of Westminster, it is not recommended that the City pursue bicycle stations until adequate bicycle infrastructure and user demand is in place.

5.5 BICYCLE PARKING LOCATION & PERFORMANCE STANDARDS

The location of bicycle parking and other end-of-trip facilities can be crucial to their success. Similar to motorists, bicyclists desire to park as close and as conveniently to their destination(s) as possible. However, the degree of proximity may vary by the type of facility being provided and the type of trip/user it is intended to serve.

Short-term parking facilities, like bicycle racks and shelters, should be located as close as possible to the destination(s) they serve. This is especially important for streets served by concentrations of retail where any prolonged effort to find adequate bicycle parking is as frustrating for the bicyclist as circling the block is for the motorist.

Long-term parking, such as bicycle lockers, should also be as convenient as possible. However, the protection from inclement weather and the enhanced level of safety/service that such facilities provide often compensates for location inefficiency. Similarly, shower, changing rooms, and locker facilities need not be located inside the destination they serve, but should provide enough proximity and convenience so that commuting by bicycle is as easy as possible. Indeed, many employers unable to provide such facilities often contract with nearby fitness gyms to rent out space for their bicycling employees.

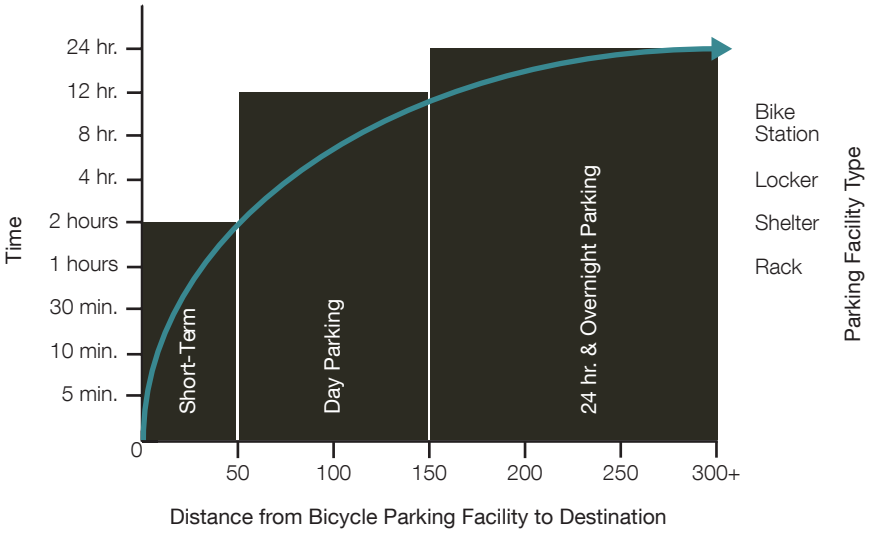


Figure 7: General Bicycle Parking Location Standards
When implementing bicycle parking, proximity can be exchanged for an increased level of service. (Graph Adapted from the Danish Cyclists Federation.)

Short- and long-term bicycle parking facilities should adhere to the following location and standards. In general, safe bicycle rack locations should:

- Maximize visibility and minimize opportunities for vandalism by being located in locations within easy view of pedestrian traffic, windows, doors, and/or well-lit areas
- Protect bicycles from inclement weather, as long as the facilities meet or exceed visibility, spacing, and performance standards
- Locate bicycles a safe distance away from automobiles parked on-street, in lots, or in structures so that bicycles will not be damaged by opening doors or errant driving behavior
- Not obstruct pedestrian traffic in any way
- Place the rack(s) between the primary road/path used by bicyclists and the entrance to the destination(s) they serve
- Not be located on or near stairs, walls, berms, or within handicap accessible ramps
- Provide enough space for bicycles of all types to maximize the bicycle parking capacity of a given facility

RECOMMENDED BICYCLE PARKING DESIGNS

◀ A New York City design competition produced a variant on the U-Rack design for city streets.
(Photo Credit: NYC DOT)

▶ Denver's *B-Cycles* share provides convenient parking locations to registered users.

◀ David Byrne's artistic bike racks do not sacrifice usability for aesthetics.

▶ Post & Ring Racks in Ottawa, Canada

▼ Bike Lockers provide security for bike-to-transit commuters.

▲ These U-Racks are in front of Westminster's West View Recreation Center.

▼ Washington, DC's BikeStation offers security and commuter-desired benefits to cyclists.

▲ Denver's "A Taste of Colorado" event utilized valet bike parking to accommodate cyclists.

◀ Portland, OR recently installed a number of bike parking shelters on city sidewalks.

INEFFICIENT BICYCLE PARKING DESIGNS

◀ These racks do not provide the level of security or stability desired by most cyclists.

▶ This wave rack does not have enough clearance to keep bicycles from both blocking the sidewalk and crushing the landscaping.

▲ Inadequate bicycle parking forces cyclists to lock "creatively."

◀ These racks are designed to hold one wheel, but do not allow the frame to be secured with a U-lock.

▼ Racks with a single contact point, like this one below, allow bicycles to turn over.

▲ Wave racks only provide one locking point, and are not intuitive to users—many cyclists incorrectly lock parallel to the racks, reducing capacity.

▶ The use of this comb style rack, photographed in Westminster, should be discontinued.

▼ Campus style bike racks are not user-friendly.

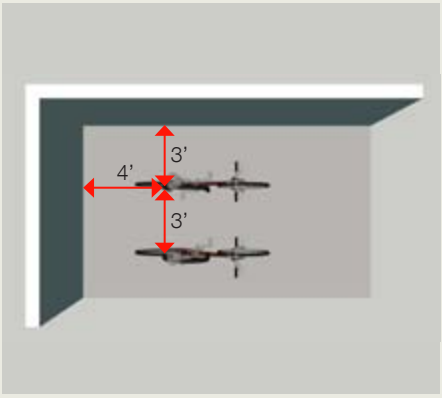
▲ Comb style racks only have one contact point, allowing bicycles to fall into disarray.

◀ Too much bicycle parking wastes valuable resources.

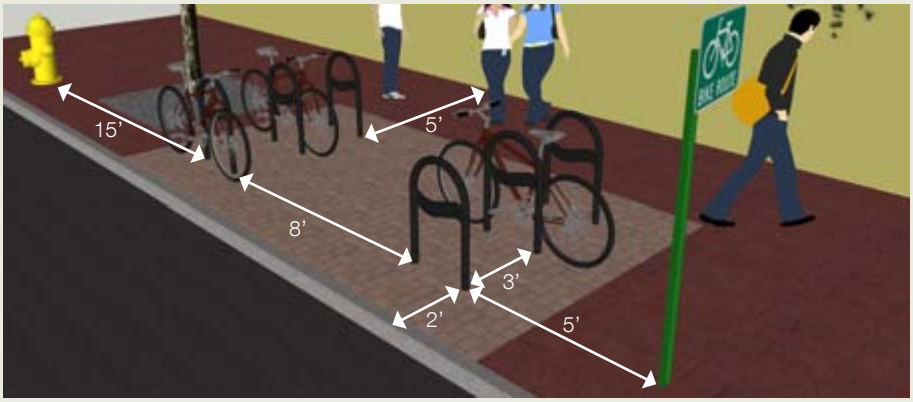
OBSERVATIONS IN WESTMINSTER AND BEYOND

▲ 5.5.4: In their end-to-end configuration, these bicycle racks lose capacity because they are placed too close together.

◀ 5.5.3: The bicycle rack at left, located along Lowell Boulevard, is too close to the curb, which will force the bicycle wheel into the vehicular right-of-way.



▼ 5.5.8: When locating bicycle racks, proper distances should be maintained.



▲ 5.5.8: When placed near walls, bicycle racks must maintain adequate spacing.

▼ 5.7: If used heavily, bicycle racks should be re-surfaced periodically.

▶ 5.7: At this Depew Street apartment complex, abandoned bicycles and poorly maintained bicycle racks create a dysfunctional and unsafe public realm.

Specifically, bicycle racks for short-term parking should be located within 30 feet of the entrance(s) they serve. If impossible, racks should be no more than a 30-second walk, approximately 120 feet, away or at least as close as the nearest automobile parking space.

Bicycle racks should be clearly visible from the approach to a destination's most actively used entrance. If located along a sidewalk, within the public right-of-way, bicycle parking should be visible from the street for which the sidewalk serves. Additionally, entire urban blocks should not be served by a large, single bicycle rack cluster. Rather, it is preferable to place several smaller rack clusters, or even single bicycle racks in multiple, convenient locations.

When considering the implementation of bicycle parking facilities in the City of Westminster, the following location guidelines should be followed.

5.5.1 Signs

If a bicycle parking facility is unable to be sited visibly in front of the destination it serves, or another conspicuous location, then attractive signs should be provided at all primary entrances to direct bicyclists to the nearest bicycle parking location. See Section 4: Bikeway Network Wayfinding and Signing Plan: Manual of Uniform Traffic Control Devices (MUTCD) Signing on page 73 for an example of an appropriate bicycle parking sign.

5.5.2 Clear Path

With few exceptions, bicycle racks, shelters, lockers, and rental stations must allow a minimum clear path of five feet in width from the nearest vertical element so that pedestrians may move without obstruction.

5.5.3 Curb Clearance

If located parallel to the roadway, all bicycle racks must be placed at least 24 inches from the curb. Those placed perpendicular to the curb, however, must locate the nearest vertical component of the rack at a minimum of 48 inches from the curb's edge. Both dimension requirements will help prevent bicycles from being struck by car doors or moving motor vehicles.

5.5.4 Distance Between Racks

Bicycle racks aligned parallel to each other must be at least 36 inches apart, as measured from the two closest vertical rack elements. This includes racks that are sold as multiple rack units, which may be attached. Racks that are aligned end-to-end should be at least 96 inches apart, as measured from the two closest vertical rack elements.

5.5.6 Distance From Walls

To ensure safe maneuvering and circulation, bicycle racks placed perpendicular to a wall must be at least four feet from the wall to the nearest vertical component of the rack. Bicycle racks placed parallel to a wall must be at least three feet from the wall.

5.5.7 Distance From Pedestrian Aisle

For indoor racks placed in groups, an adequate pedestrian aisle must be provided so that bicyclists can access and maneuver their bicycles in and out of the parking position. Bicycle racks placed perpendicular to a pedestrian aisle must be at least four feet from the aisle. Pedestrian aisles should be at least five feet wide wherever possible.

5.5.8 Other Recommended Site Distances

To ensure safety and convenience, bicycle racks should be located:

- 15 feet from fire hydrants, bus stops, taxi stands, hotel loading zones, subway/ transit station entrances, newspaper kiosks, etc.
- 10 feet from intersections/driveways/curb cuts
- Six feet from a wall fire hydrant
- Five feet from any standpipes, or above–ground vertical structures like signs, meters,

lights, mailboxes, planters, public bathrooms, pay phones, etc.
- Three feet from tree pit edges, grates, utility covers, etc.

See images marked 5.5.8 on page 90 for an example of placement that meets these criteria.

5.6 IMPLEMENTATION

It is the intent of this entire Bicycle Parking Plan to encourage the City of Westminster to work with the city's businesses and neighborhoods to support and foster bicycling as a viable, safe, and sustainable form of recreation and transportation. Implementing bicycle parking and other end-of-trip facilities plays a key role in realizing this goal.

This Westminster Bicycle Parking Plan is conceived at the scale of the whole city, but should be implemented with sensitivity at the block and building scale. Specific site analysis should be undertaken so that bicycle parking remains convenient, visible, and located properly in relation to the destinations and bicyclists it serves.

Like the overall Westminster 2030 Bicycle Master Plan, the Bicycle Parking Plan must be implemented in cooperation with a number of inter-related city, county, and state entities that have jurisdiction over the governance and physical development of Westminster and its public right-of-ways.

Many municipalities have created bicycle parking programs that encourage public and private partnerships that reduce the cost of purchasing and installing bike racks while simultaneously expanding the supply. For example, 50-50 match bicycle parking implementation programs encourage businesses to partner with the municipality. Such programs are worth researching and potentially adapting to the City of Westminster.

5.7 MAINTENANCE

Once implemented, bicycle parking facilities of all types must be well maintained. All facilities should be kept clean, orderly, free of abandoned bicycles, bicycle locks, and other debris. These steps will help ensure that bicycle parking remains attractive and is used frequently.

To remain attractive and functional, areas around the bicycle parking facility -whether it be a rack, locker or otherwise- must remain well-paved, mown, plowed, or otherwise tended and cared for so that bicyclists are not deterred from using the facility. Public works and snow removal maintenance crews may need to be educated to avoid rendering bicycle parking unusable. The security of bicycle racks and other long term parking facilities should be checked periodically so that each remains free from vandalism. This includes checking the function of moving parts, lighting, enclosure conditions, and changing key codes or key fittings after facility use turnover.

Failing to meet basic maintenance standards will deter use and create additional opportunities for theft. The responsibility for maintenance and rack type selection should be conferred upon the sponsoring entity (City of Westminster, RTD, Business Improvement District, individual property owner, etc.) or agreed upon between mutual public/private parties and/or multi-jurisdictional interests. This will help ensure that bicycle parking remains viable, safe, and attractive.

5.8 BICYCLE PARKING RATIOS

Westminster's existing bicycle parking guidelines[i] currently allocate bicycle parking ratios throughout the city. While these standards have expanded the supply of parking, in some instances they have created an oversupply, or more rarely, an undersupply of bicycle parking facilities. Contrary to the City's current site development standards, bicycle parking ratios should *not* be coupled with

TABLE 2: RECOMMENDED BIKE PARKING RATIOS

	TYPE OF ACTIVITY	LONG-TERM BIKE PARKING REQUIREMENT	SHORT-TERM BIKE PARKING REQUIREMENT
Residential	Single-Family Dwelling	No spaces required.	No spaces required.
	Multifamily Dwelling		
	a) w/ private garage for each unit	No spaces required.	0.05 spaces/bedroom.*
	b) w/o private garage for each unit	0.5 spaces/bedroom.*	0.05 spaces/bedroom.*
	c) senior housing	0.5 spaces/bedroom.*	0.05 spaces/bedroom.*
Civic: Cultural/recreational	Non-cultural assembly (library, gov't buildings, etc).	1 space/10 employees.*	1 space/12 persons of allowed capacity.*
	Assembly (church, theaters, stadiums, parks, beaches, recreational facilities etc)	1 space/20 employees.*	1 space/12 persons of allowed capacity.*
	Healthcare/hospitals	1 space/20 employees, OR 1 space/70,000 s.f. of floor area, whichever is greater.*	1 space/20,000 s.f. of floor area.*
	Education		
	a) public, parochial, and private day-care centers for 15 or more children	1 space/20 employees.*	1 space/20 students of planned capacity.*
	b) public parochial, private nursery schools, kindergartens, elementary schools (1-3)	1 space/10 employees.*	1 space/20 students of planned capacity.*
	c) public parochial, elementary (4-6), junior high, and high schools	1 space/10 employees, AND 1 space/20 students of planned capacity.*	1 space/20 students of planned capacity.*
	d) colleges and universities	1 space/10 employees AND 1 space/10 students of planned capacity, OR 1 space/20,000 s.f. of floor area, whichever is greater.	1 space/10 students of planned capacity.*
	Transit: rail/bus terminals and stations/ airports	Spaces for 5% of projected a.m. peak period daily ridership.	Spaces for 1.5% of a.m. peak period daily ridership.
Commercial	Retail		
	a) general food sales or groceries	1 space/12,000 s.f. of floor area.*	1 space for each 2,000 s.f. of floor area.*
	b) general retail	1 space for each 12,000 s.f. of floor area.*	1 space for each 5,000 s.f. of floor area.*
	Office	1 space for each 10,000 s.f. of floor area.*	1 space for each 20,000 s.f. of floor area.*
	Auto-Related		
	a) automotive sales, rental, and delivery; automotive servicing, automotive repair and cleaning	1 space for each 12,000 s.f. of floor area.*	1 space for each 20,000 s.f. of floor area.*
	b) off-streetparking lots/garages available to the general public, with or without fees	1 space for each 20 automobile spaces.* Unattended surface parking lots excepted.	Minimum of 6 spaces or 1 per 20 auto spaces. Unattended surface parking lots excepted.
Industrial	Manufacturing and production	1 space/15,000 s.f. of floor area.*	Spaces determined by the Director of City Planning. Consider minimum of 2 spaces at each public building entrance.

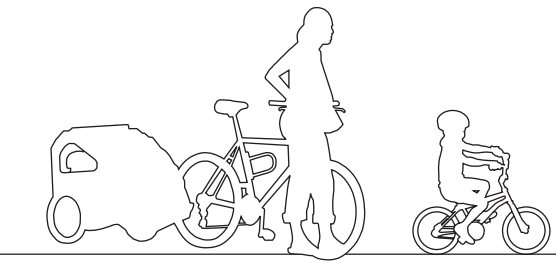
*Minimum requirement is 2 spaces. If less than 2 spaces are calculated as necessary, then requirement is waived.

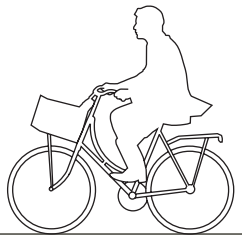
automobile parking requirements because supply and demand for motor vehicle parking are not an adequate indicator of actual bicycle parking need. Indeed, if a municipality adopts automobile parking maximums, or later reduces such parking requirements, the amount of bicycle parking would also be reduced when the opposite may be necessary. Therefore, bicycle parking ratios should be based on land use/building function—a gym needs more bicycle parking than a lumberyard—and quantifiable indicators like unit count, employee count, or building square footages.

Table 2 (*see* page 93), provided by the Association of Pedestrian and Bicycle Professionals, coordinates these elements with common land use types. As bicycle parking is implemented alongside the city's shifting land use patterns, Table 2 should be re-calibrated to match the city's needs. Most importantly, Table 2 makes a distinction between short- and long-term parking types, a key distinction when allocating bicycle parking facility types.

Because bicycling is not yet a popular mode of transportation in most North American contexts, Table 2 is geared towards cities with a bicycle mode share of 5 percent or less. (By comparison, as of late 2009, Copenhagen had a 37 percent bicycle mode share for commuting.) In places demonstrating a higher mode share, bicycle parking ratios may be elevated as needed. Such ratios should be reviewed in conjunction with each bicycle master plan update, or at least every five years, to ensure that supply continues to meet demand.

6. EDUCATION, ENCOURAGEMENT, ENFORCEMENT, & EVALUATION PLAN





Bicycling should appeal to different types of Westminster residents, from mothers and children to professionals and retirees.

Beyond engineering a network of safe and bikeways with attractive bicycle parking options, education, encouragement, enforcement, and evaluation efforts must play a critical role in making Westminster more bicycle-friendly. Indeed, expanding the appeal of cycling in Westminster will require the utilization of numerous strategies. These include, but are not limited to, organizing bicycling skills courses, launching motorist and bicyclist safety campaigns, promoting the benefits of bicycling, supporting local bicycle-centric events, enforcing existing motor vehicle-bicyclist laws, and utilizing communication strategies that position bicycling as a viable option for people who are interested in bicycling, but concerned about safety.

When education, encouragement, and enforcement campaigns are crafted, great care should be taken to appeal to cyclists and non-cyclists alike. Too often such campaigns unintentionally reinforce the widely held belief that bicycling is, and will always be, a marginal activity reserved for children and athletic, risk-adverse men. By contrast, truly successful efforts position cycling as a normal mode of transportation that does not require expensive bicycles, extreme travel patterns, and/or spandex outfits.

While the City of Westminster should take the lead on local bicycle safety issues, most education, encouragement, and enforcement campaigns require regional cooperation. Brochures, and other media messages, for example, may be produced in greater quantities and at a lower unit cost when done in partnership with neighboring municipalities or regional governmental agencies, such as CDOT and the Denver Regional Council of Governments (DRCOG).

Seventeen basic actions for advancing education, encouragement, enforcement, and evaluation efforts are outlined below. In time, much more could be integrated into Westminster's efforts to promote bicycling. However, for the forseeable future, the City's current fiscal and staff resources greatly limit its ability to do so.

6.1 EDUCATION

The following six education actions items should be pursued as part of the Westminster 2030 Bicycle Master Plan implementation process:

Action #1: Educate motorists and bicyclists about mutual rights and responsibilities.

Utilize the City of Westminster Getting Around webpage to provide bicyclist and motorist safety information. Bicycle Colorado and CDOT Bicycle and Pedestrian Program provide great examples of successful websites. Additional publications, brochures, public service announcements (PSAs), and social media resources should be used to connect the general public to bicycle and motorist safety information.

Action #2: Educate Westminster motorists and bicyclists about new facility types.

Use all of the methods listed in Action #1 to educate Westminster motorists and bicyclists about new bikeway network facility and countermeasure types as they are implemented. These include, but are not limited to shared use lane markings, sidepaths, bicycle lanes, bike boxes, bicycle signal detections systems, etc.

Action #3: Expand Safe Routes to Schools Partnerships.

Pursue funding to expand Safe Routes to School programs throughout the city. Leverage recent CDOT grants awarded to the Adams 12 Five Star School District to further collaborate with Adams and Jefferson County, public health organizations, parent-teacher associations, and local/state advocacy groups like Bicycle Colorado to continually expand Safe Routes to School programs in Westminster. Provide municipal support to help schools dovetail their Safe Routes to School efforts with any other existing school- and City-related safety programs, including, but limited not to, bicycle rodeos, helmet giveaways, and bicycle safety training.

Action #4: Encourage City of Westminster employees/residents to become League of American Bicyclists League Certified Instructor (LCI) on an annual basis.

Encourage employees and residents to seek LCI training. Work with a growing number of LCIs and bicycle advocacy organizations, like Bicycle Colorado, to host at least two public adult bicycle skills courses per year in the City of Westminster.

Action #5: Relay local bicycle information, safety tips, and news through official City communication channels.

Periodically convey bicycle-related news, such as the striping of a new bicycle lane or the confirmation of a newly certified LCI (*see* Education Action #4) via the City's Facebook page and the City Edition newsletter.

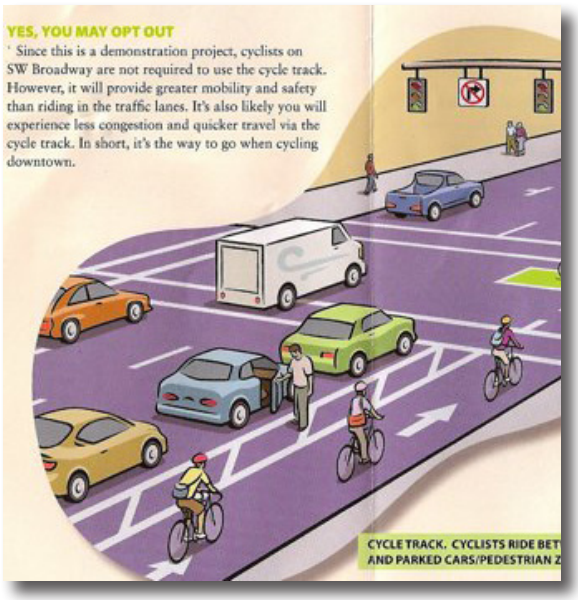
Action #6: Fund Education initiatives.

Work with Jefferson and Adams Counties, CDOT, DRCOG, and any other local, regional, state, and national entities to obtain funding for bicycle education programs.

Top Left: This mural, in Brooklyn, NY, reminds people to travel safely by respecting all roadway users.

Top Right: The City of Portland, OR distributes information, such as brochures, when new bikeway facility types are implemented.

Below: The Bikes Belong People for Bikes campaign underscores that cycling is for everyone.



peopleforbikes.org

We all ride. Now we can ride as one.

Millions of Americans ride bicycles and recognize the economic, social and physical benefits. But, only a fraction of those who ride have stood up to help advance the cause of bicycling in America.

The goal of peopleforbikes.org is to gather a million names of support, to speak with one powerful voice — to let policy makers, the media and the public know that bicycling is important and should be promoted.

Whether you're a commuter, a roadie, a mountain biker or just a casual rider, by uniting your voice with a million others, you can help build a national movement to improve bicycling in our country.

Together we can make bicycling better.

Imagine a place where one bike lane leads to the next. Where trails, bridges and underpasses lead safely to exactly where you want to go. And regardless of your bicycling experience or fitness, you can pedal smoothly across the street, across town or even across the country. We believe this can be a reality and that, by uniting, we can make our world a better place to ride.

Bikes make us better.

- Nearly 50 percent of trips Americans make are less than three miles — why not ride your bike?
- Bicycling just three hours a week can reduce the risk of heart disease and stroke by 50 percent.
- Every mile pedaled rather than driven cuts one pound of CO_2 pollution.
- On a round-trip commute of 10 miles, a bicyclist saves about $10 daily.

Unite for bikes.

Bikes keep us healthy, carry us from point A to point B, save us from high gas prices, make our air cleaner and our roads less congested. They fill our lives with adventure and excitement, relaxing our minds and energizing our souls. Become part of the movement to make our world a better place to ride at peopleforbikes.org.

peopleforbikes.org

Uniting a million voices to improve the future of biking.

An initiative brought to you by Bikes Belong.

fold

fold

6.2 ENCOURAGEMENT

Through the provision of secure bicycle parking, end-of-trip shower/changing facilities, and the recent sponsoring of a Bike-to-Work Week program, the City of Westminster encourages bicycle use. While these initiatives demonstrate momentum, additional resources will be needed to expand the City's support for active transportation. While such resources are presently limited, the following seven encouragement actions items should be pursued as part of the Westminster 2030 Bicycle Master Plan implementation process.

Action #1: Expand Bike-to-Work Week activities.

Partner with employers, DRCOG, 36 Commuting Solutions, and other organizations to promote Bike-to-Work Week.

Action #2: Raise the profile of National Bike Month.

Support and collaborate with other municipalities, government agencies, businesses, and non-profit organizations to promote National Bike Month.

Action #3: Help employers encourage and promote bicycle commuting.

Work alongside DRCOG, 36 Commuting Solutions, and private employers within the City of Westminster to develop programs, disseminate information, create incentives, and implement end-of-trip facilities that support bicycle commuting.

Action #4: Add Bicycling Information the Getting Around Westminster Webpage.

Update the City's existing Getting Around webpage with bicycling information. This should include the latest Westminster Bikeway Map (*see* Encouragement Action #6), and link to the other regional bikeway information resources.

Action #5: Continue working with RTD and DRCOG to promote bicycling as part of multi-modal and transportation demand management (TDM) services.

To enhance multi-modal transportation, continue working with RTD, CDOT, and DRCOG to provide bicycle mobility enhancements and end-of-trip facilities. This will prove particularly important when RTD's FasTracks commuter rail service arrives in Westminster.

Action #6: Create and update bikeway map.

As the on-street bikeway network is built out, create and maintain a map displaying all on- and off-street bikeways. This map should include basic traffic safety information, the location of significant destinations, and be distributed in portable print and online formats. Update and re-distribute the map on an annual basis. Finally, share all new bikeway segment information on a regular basis so that Jefferson and Adams County, DRCOG, CDOT, and 36 Commuting Solutions can keep their maps and data current.

Action #7: Fund encouragement initiatives.

Work with Jefferson and Adams Counties, CDOT, DRCOG, and other local, regional, and national organizations to identify and obtain funding for bicycle encouragement programs and initiatives.

◀ The City of Westminster's "Getting Around" web page does not currently include information about bicycle transportation.

▼ Denver's Ride On campaign highlights the benefits of cycling to encourage greater ridership.
(Photo Credit: Bike Denver)

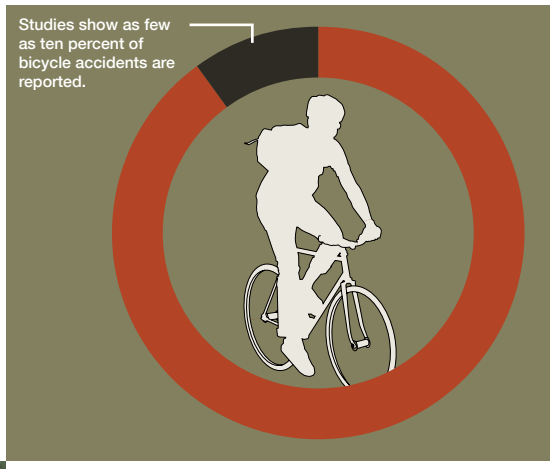
▲ Monthly police-escorted rides, like Bike Miami Rides, encourage beginner and intermediate bicyclists to become more comfortable with the City's bikeway network.

▶ Campaigns that encourage people to bike their daily commute instead of driving it can provide an easy way for individuals to test the waters of cycling with little commitment.

ENFORCEMENT

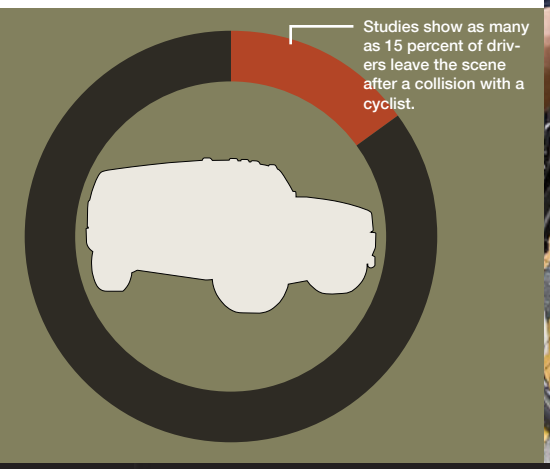
◀ Bicyclists and law enforcement officials should take unsafe behavior seriously.
(Photo Credit: Bike Denver)

▶ A 2004 District of Columbia, Department of Transportation study found that collisions involving cyclists are severely underreported: sometimes as few as one in ten incidents is reported.[i]



◀ Law enforcement can suffer when police officers aren't familiar with the laws, or understand the challenges to bicycling along existing streets.

▼ A 2007 study by Michael Klobucar, and Jon D. Fricker found that motorists fled the scene of accident in nearly 15 percent of bicycle related crashes.[ii]



▲ Aggressive driving needs to be kept in check.
(Photo Credit: *The Brooklyn Paper*)

◀ Colorado's recently adopted law, SB 148, requires people driving to give at least 3 feet of space when overtaking people bicycling.

6.3 ENFORCEMENT

To create a bicycle-friendly city, law enforcement departments should encourage officer education regarding applicable local and state bicycling laws. This will help address the safety concerns of those who choose to drive and those who choose to bicycle. The following five enforcement actions should be encouraged as part of the Westminster 2030 Bicycle Master Plan implementation process.

Action #1: Encourage enforcement of unsafe and unlawful bicyclist and motorist behavior.

The Westminster Police Department should encourage the enforcing of laws that reduce bicycle/motor vehicle crashes and increase mutual respect between all roadway users, such as the State's recently adopted three-foot law (SB 148).

Action #2: Train officers about traffic laws.

When possible, in service training should be utilized to update officers on current and changing traffic laws concerning the use of bicycles on Colorado roadways and the common cause of most bicycle crashes and cyclits injuries. Such training should cover the Colorado three-foot law, the 'dynamics' of the door-zone and right-hook collision-conflicts (where motorists turn right and bicyclists are traveling straight through an intersection), and methods for reducing conflicts between bicyclists and motorists.

Action #3: Where possible, improve traffic safety and education outreach material.

The Westminster Police Department should work with other related City departments to ensure that any traffic safety related material include bicycle safety information.

Action #4: Encourage officers to watch for and when possible, contact motorists involved in the following unsafe driving behaviors:

- Turning in front of bicyclists without properly using turn signals
- Overtaking bicyclists without at least three feet of horizontal clearance
- Parking or traveling in bicycle lanes, bicycle paths, or other facilities designated for the exclusive use of bicyclists
- Opening the doors of parked vehicles in the path of bicyclists—"dooring"
- Rolling through stop signs or disobeying traffic control devices
- Harassing or assaulting bicyclists
- Driving while under the influence of drugs or alcohol
- Speeding

Action #5: Encourage officers to watch for and when possible, contact bicyclists involved in the following unsafe bicycling behaviors.

- Ignoring traffic control devices
- Bicycling against the flow of traffic, except in those instances where contra-flow facilities are provided
- Bicycling without lights at night
- Minors bicycling without helmets
- Bicycling on sidewalks
- Failing to yield to pedestrians
- Bicycling while under the influence of drugs or alcohol

6.4 EVALUATION

The collection, evaluation, and publishing of bicycle related data should play an integral role in furthering community awareness about the City's effort to improve bicycle conditions. The following four actions are recommended for the City of Westminster to evaluate and implement the 2030 Bicycle Master Plan:

Action #1: Continue to publish a public map displaying all existing and proposed bikeway network facilities.

Taking a regular inventory of bikeway type, length, and segment location for all current and planned bikeways will help the City and the general public track the Westminster 2030 Bicycle Master Plan implementation process. The bikeways map should be updated annually and be available for print and download on the City's existing Getting Around webpage.

Action #2: Track all upcoming roadway improvement projects at the City, County and State level.

Coordinate with City, County and State departments, as well as Westminster City Council members, to ensure the inclusion of bicycle infrastructure within capital improvement and County/ State public works projects.

Action #3: Evaluate where bicycle facility maintenance is needed.

Integrate restriping, pothole filling, storm grate replacing, sign replacing, etc. into City, County, and State capital improvement and maintenance plans.

Action #4: Measure the percentage of Bikeway Network completed each year.

Such efforts will measure progress toward completing the entire recommended 132-mile Bikeway Network by 2030. This exercise should be broken out into the percentage of network miles completed per facility type as well (bicycle lanes, shared use lane markings, share use paths, etc.). The City should make the data available on the existing City of Westminster Getting Around webpage.

A. ACKNOWLEDGEMENTS

The Street Plans Collaborative and BICI Planning & Design acknowledge that the Westminster 2030 Bicycle Master Plan was created with the assistance of numerous Westminster municipal employees, citizen-advocates, and neighboring municipal and regional bicycle and pedestrian professionals. Thanks!

Westminster City Council
Nancy McNally, Mayor
Chris Dittman, Mayor Pro Tem
Bob Briggs, Councilor
Mark L. Kaiser, Councilor
Mary Lindsey, Councilor
Scott Major, Councilor
Faith Winter, Councilor

City of Westminster
Brent McFall, City Manager
Dave Downing, City Engineer
Mike Normandin, Transportation Engineer
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Jana Easley, Principal Planner
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Brian Potts, Planning Technician
Dave Murray, GIS Coordinator
Sandy Malesky, GIS Specialist
Joe Simpson, GIS Technician
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Sarah Washburn, Landscape Architect II
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Becky Nelson, Economic Development Specialist
John Hall, Business Development Officer
Joe Reid, Senior Public Information Specialist
Hillary Calavitta, Volunteer
Heather Cronenberg, Open Space Coordinator
Nicki Leo, Wellness Coordinator
Eric Knopinski, Police Bicycle Patrol
Paul Newton, Police Bicycle Patrol

Colorado Department of Transportation
Betsy Jacobsen

Adams County
Marc Pedrucci

Jefferson County
Will Kearns

City of Arvada
Anne Tulley

City and County of Broomfield
Kristan Pritz

City of Thornton
Gene Putman

City of North Glenn
Jim Mueller

36 Commuting Solutions
Audrey DeBarros

Advocates
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Edward McAuliffe
Teresa Penbrooke
Terrance Ramirez
Mark Walker
Jesse Williams

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BICI Planning & Design
Emily Allen
Mark Simpson

The planning team would also like to thank the hundreds of people in Westminster who contributed to this plan through the bicyclist and employer survey, BikePlanner tool, informal web comments, two public Bicycle Summits, and throughout the Handlebar Survey process. Ride Safe.

B. BIKEWAY PROJECT DESCRIPTIONS

The City of Westminster 2030 Bikeway Network is comprised of 102 project segments. Each project is described below and organized generally from south to north, moving from east to west. The projects have been grouped into their priority phases. The short-term priorty projects can be found on pages 104 through 107, the medium-term priority projects begin on page 107, and the long-term projects start on page 117.

1. SHORT-TERM PRIORITY PROJECTS

Project 1: 68th Avenue/Utica Street
Segment: Between Lowell Boulevard and 72nd Avenue
Class/Type: Class III - Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: Provides an important connection between bikeways planned for Lowell Boulevard (Project 5) and 72nd Avenue (Project 2), and Westminster High School.

Project 2: 70th Avenue
Segment: Between Utica Avenue and Sheridan Boulevard
Class/Type: Class III - Signed Bike Route
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: Provides an important connection between Sheridan Boulevard and Westminster High School, located adjacent to a proposed bikeway along 68th Avenue/Utica Street (Project 1).

Project 3: 72nd Avenue
Segment: Between and Zuni Street and Sheridan Boulevard
Class/Type: Class III - Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: Provides a critical regional east-west on-street bikeway connection in south Westminster. It will connect with proposed bikeways along Canosa Court (Project 19), Irving Street (Project 77), Bradburn Boulevard (Project 21), and Utica Street (Project 1).

Project 4: 72nd Avenue
Segment: Between and Sheridan Boulevard and Pierce Street.
Class/Type: Class II – Curbside Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment will require narrowing motor vehicle travel lane widths, which may be accomplished when the thoroughfare is re-paved. It will link with an existing bicycle lane in Arvada at Pierce Street and at a proposed signed bike route along Depew Street (Project 21).

Project 5: North Harlan Street
Segment: Between 76th Avenue and 78th Place.
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment will link with an existing bicycle lane in Arvada and the Little Dry Creek Trail. It will also improve bicycle access to Thompson Elementary School and connect to a proposed bikeway along 76th Avenue (Project 23).

Project 6: Lowell Boulevard
Segment: Between 68th Avenue and 82nd Avenue

Class/Type: Class III - Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This corridor provides a critical north-south connection through the City of Westminster. It currently intersects with the Little Dry Creek Trail, and will connect to proposed bikeways along 72nd Avenue (Project 2), 76th Avenue (Project 23), 78th Avenue (Project 79), and 80th Avenue (Project 8). This segment will also connect to a planned RTD commuter rail station. Requiring nothing but signs and sharrow pavement markings, this project segment should be built as soon as possible.

Project 7: Lowell Boulevard
Segment: Between 82nd Avenue and 104th Avenue
Class/Type: Class II – Bicycle Lane
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This corridor provides a critical north-south connection through the City of Westminster, which connect numerous schools and parks. At present, the segment between 82nd Avenue and 88th Avenue will have to be widened to include space for bicycle lanes. Between 88th Avenue and 92nd Avenue, the removal of the two-way center turn-lane will have to occur. The angled parking at 90th Place may stay in place. Between 96th Avenue and 104th Avenue, 15' travel lanes should be reduced to 10' to allow for north-south curbside bicycle lanes.

Project 8: 80th Avenue
Segment: Between Zuni Street and Sheridan Boulevard
Class/Type: Class III – Signed Bicycle Route with Sharrows
Countermeasure(s): n/a
Notes: This four-lane corridor provides an important east-west connection through south Westminster, which connects to an existing bicycle lane in Arvada. It will connect to four other planned bikeways, including the southeastern terminus of the US 36 Bike Trail (Project 81).

Project 9: 94th Avenue
Segment: Between Federal Boulevard and Utica Street
Class/Type: Class III – Signed Bicycle Route with Sharrows
Countermeasure(s): n/a
Notes: This segment connects Sunset Ridge Elementary School, at Hooker Street, with Carroll Butts Park.

Project 10: Independence Drive
Segment: Between 88th Avenue and Wadsworth Parkway
Class/Type: Class II – Curbside Bicycle Lanes, Class III - Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered for each intersection, including 88th Avenue, establishing a visual connection to Arvada's Independence Way bicycle lanes.
Notes: This segment will connect to a bicycle lane on Independence Way, south of 88th Avenue in Arvada, and intersect with several off-street shared use path segments. Sharrows should be implemented between 92nd Avenue and West 96th Drive, and again between the eastern intersection of Brentwood Drive and Independence Drive, and Wadsworth Parkway, as right-of-way constraints preclude bicycle lanes. If the segment between 92nd Avenue and 96th Avenue is to be widened to the typical 40' condition, then bicycle lanes should be striped.

Project 11: 99th Avenue
Segment: 99th Avenue, between Wadsworth Boulevard and the Big Dry Creek Trail
Class/Type: Class III - Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered for each intersection.

Notes: This important, but short on-street segment, which runs adjacent to Jefferson Academy Charter School, will connect to two segments of the Big Dry Creek Trail, and a proposed bicycle lane on Wadsworth Boulevard.

Project 12: 104th Avenue/Church Ranch Boulevard
Segment: Between Federal Boulevard and Wadsworth Parkway
Class/Type: Class I – Sidepath (retrofit)
Countermeasure(s): Warning signs, and striping/pavement markings may be appropriate for various intersections. In general, more intensive safety and design countermeasures will have to take place at the following intersections: Sheridan Boulevard, Westminster Boulevard, US-36, Wadsworth Boulevard, and Wadsworth Parkway.
Notes: This sidepath segment requires the retrofit of an existing 8' wide sidewalk to be more suitable for shared bicycle and pedestrian travel. Numerous design strategies that address safety concerns are available in section 3. This important east-west connection through the heart of Westminster connects numerous local and regional destinations. It also intersects with the Big Dry Creek Trail and other shared use paths in multiple locations.

Project 13: 100th Avenue
Segment: Between Wadsworth Parkway and Simms Street
Class/Type: Class II – Curbside Bicycle Lanes, Class III - Signed Bike with Sharrows,
Countermeasure(s): Peg-a-tracking may be considered for each intersection.
Notes: This east-west segment connects the Wadsworth Parkway Sidepath to Wayne Carle Middle School, and the Standley Lake Regional Park. Sharrows should be placed between Wadsworth Parkway and Countryside Drive and transition to bicycle lanes between Countryside Drive and Simms Street when 100th Avenue is widened.

Project 14: Oak Street
Segment: Between 100th Avenue and 108th Avenue
Class/Type: Class III - Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered for each intersection.
Notes: This north-south connection will improve connectivity between 100th Avenue/Standley Lake Regional Park, a planned bikeway on 108th Avenue, and numerous other planned bikeway segments in the Countryside and Walnut Grove neighborhoods.

Project 15: Legacy Ridge Parkway/Stratford Lakes Drive/King Street/114th Avenue
Segment: Between 104th Avenue and Federal Boulevard
Class/Type: Class II – Bicycle Lane, Class III – Signed Bicycle Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered for each intersection.
Notes: This north-south connection will improve connectivity between the 104th Avenue corridor and Federal Boulevard. It will also connect planned bikeways along 112th Avenue and Federal Boulevard.

With less than 5,000 motor vehicle trips per day, dedicated turn lanes may be removed between 104th Avenue and 112th Avenue. This will allow curbside bicycle lanes to fit with ease. Where the planted center median is present, 14' motor vehicle lanes should be shrunk to 10', which will allow the continuation of 4' curbside bicycle lanes (not including the gutter pan).

Between 112th Avenue and 112th Circle, sharrows should provide a transition between the intersection and bicycle lanes north of 112th Avenue Circle. Because no homes actually face Stratford Lake Drive/King Street/114th Avenue, on-street parallel parking should be replaced with buffered curbside bicycle lanes. With 36' of pavement width, the street should have two 10' travel lanes, and two bicycle lanes (5' bicycle lanes, 3' buffers). Between Grove Street and Federal Boulevard, sharrows should be implemented, as space for bicycle lanes does not exist.

Project 16: 116th Avenue/Country Club Loop/Zuni Street
Segment: Between Huron Street and Federal Parkway

Class/Type: Class II – Bicycle Lanes, Class III - Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: Bicycle lanes should be striped between Huron Street and Pecos Street. Sharows should be placed between Pecos Street and Federal.

Project 17: 122nd Avenue
Segment: Between Huron Street and Federal Parkway
Class/Type: Class II – Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.Notes: This segment provides needed connectivity between proposed bikeways on Huron Street and Pecos Street, and the Big Dry Creek Trail.

Project 18: Zuni Street
Segment: Between 128th Avenue and 136th Avenue
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment provides a needed north-south connection on the city's northwestern border. However, because this proposed bikeway type does little to change the current roadway design, it likely that only advanced bicyclists will feel safe cycling here.

Project 19: 134th Avenue
Segment: Between Huron Street and Zuni Street
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-Tracking may be considered through each intersection.
Notes: This segment provides a needed east-west neighborhood connection to north-south bikeways on Zuni Street, Pecos Street, and Huron Street.

MEDIUM-TERM PRIORITY PROJECTS

Project 20: Canosa Court
Segment: Between 70th Avenue and Skyline Drive
Class/Type: Class III – Bike Route
Countermeasure(s): Bicycle Turn Pocket may be placed along 72nd Avenue, where Canosa Court offsets. This will require narrowing the lanes for a short stretch along 72nd Avenue, from 12' to 11' or 10'.
Notes: This segment provides a needed north-south connection between the Park South and Skyline Vista neighborhoods. The Canosa Court signed bike route will connect to the proposed bikeway along 70th Avenue. Additionally, where Canosa Court and 72nd Avenue intersect, there is an opportunity to develop a shared use path spur between 70th Avenue and the Little Dry Creek Trail.

Project 21: Depew Street
Segment: Between 71st Avenue and 76th Avenue
Class/Type: Class III – Signed Bike Route
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment provides a needed north-south connection between the neighborhoods straddling 72nd Avenue, 76th Avenue, and Depew Street. The segment will also connect to two bikeways along 72nd and 76th Streets, as well as provide clear access to Tepper Fields/ Faversham Park.

Project 22: Bradburn Boulevard
Segment: Between 72nd Avenue and 80th Avenue
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: Already known as a good north-south cycling route, this planned connection will more formally provide a north-south connection between the Little Dry Creek Trail and existing sidepath along Turnpike Drive. It will also connect to two planned bikeways along 72nd Avenue (Project 3), 76th Avenue (Project 23), as well as England Park and Firemen's Park.

Project 23: 76th Avenue
Segment: Between Federal Boulevard and Ingalls Street
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment provides an excellent, more calm east-west connection through south Westminster. It also connects the Municipal Court and the Swim and Fitness Center on the east end with Torrii Square Park, Wolff Run Park, Little Dry Creek Trail, and an existing bicycle lane in Arvada on the west end.

Project 24: Stuart Street/Stuart Place/Tennyson Street/Turnpike Drive
Segment: Between 76th Avenue and Turnpike Drive
Class/Type: Class III – Signed Bike Route
Countermeasure(s): n/a
Notes: Provides a north-south connection through multiple neighborhoods. It passes by Sunset Park and connects to proposed bikeways along 76th Avenue (Project 23) and 80th Avenue (Project 8).

Project 25: Turnpike Drive
Segment: Between Tennyson Street and Sheridan Boulevard.
Class/Type: Class II – Curbside Bicycle Lane
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment continues the trajectory of project 24. An existing connection between the two cul-de-sacs of Turnpike Drive, just west of Tennyson Street, should be improved so the connection between the proposed bicycle lanes and signed bike route is clear.

Project 26: Oakwood Drive
Segment: Between 80th Avenue and Wagner Drive
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment connects planned bikeways along 80th Avenue (Project 8) and 84th Avenue/ Wagner Drive (Project 27) with Oakwood Park.

Project 27: Wagner Drive
Segment: Between 84th Avenue and 88th Avenue
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment extends the continuity of project 26 and project 28, clearly extending a north-south connection on the eastern side of the Highway 36 corridor.

Project 28: 84th Avenue
Segment: Between Zuni Street and Wagner Drive at Oakwood Drive
Class/Type: Class III – Signed Bike Route, Class II – Curbside Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: At the eastern limit of this project, at Zuni Street, this project connects with a proposed bikeway. Between Zuni Street and Federal Boulevard, the reducing the travel lanes and turn

lane width to 10' will allow two 5' curbside bicycle lanes to be striped into the existing right of way. Between Federal Boulevard and Oakwood Drive, Wagner Drive should include a signed bike route with sharrows. Where 84th Avenue terminates at a Circle Drive, a bicycle/pedestrian connection should be built to connect 84th Avenue and Wagner Drive. When 84th Avenue, between Federal Boulevard and Lowell Boulevard is widened, 5' bicycle lanes should be included.

Project 29: 88th Avenue
Segment: Between Federal Boulevard and Wagner Drive
Class/Type: Class II – Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This important east-west segment connects Shaw Heights Middle School with proposed bikeways along Lowell Boulevard (Project 7) and Wagner Drive/Yates Street (Project 27, 32).

Project 30: 88th Avenue (northside)
Segment: Between Sheridan Boulevard and Wadsworth Parkway
Class/Type: Class I– Sidepath (retrofit)
Countermeasure(s): Warning signs, and striping may be appropriate for various intersections. In general, more intensive safety and design countermeasures will have to take place at the following intersections: Sheridan Boulevard, North Harlan Street, Pierce Street, and Wadsworth Parkway.
Notes: This important east-west segment connects to RTD's Westmisnter Center park n' ride station at Highway 36 and Sheridan Boulevard. It also intersects with the proposed Westminster Mall redevelopment site, a future RTD commuter rail station, and proposed bikeways along Wadsworth Parkway (Project 53), Westminster Boulevard (Project 83), and Pierce Street (Project 84). This sidepath segment requires the retrofit of an existing 8' wide sidewalk to be more suitable for shared bicycle and pedestrian travel. Numerous design strategies that address safety concerns are available in section 3.

Project 31: 88th Avenue
Segment: Between Wadsworth Parkway and 86th Parkway
Class/Type: Class II – Curbside Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment connects to the proposed Sidepath noted in Project 29, and an existing bikeway on 86th Parkway. It also connects to proposed bikeways on Dover Street (Project 35), Field Street (Project 34), Independence Drive (Project 10), and an existing bicycle lane on Independence Way in Arvada.

Project 32: Yates Street
Segment: Between Yates Drive/88th Avenue and 92nd Avenue
Class/Type: Class III – Signed Bike Route
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment connects to 88th Avenue (Project 28) with proposed bikeways along 92nd Avenue (Project 82) and City Center Drive (Project 43). It also connects to a RTD's park n' ride/ regional bus station and Westminster City Hall.

Project 33: 90th Avenue
Segment: Between Pierce Street and Wadsworth Parkway
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment connects a proposed bicycle lane along Pierce Street (Project 84) with a Sidepath retrofit proposed for Wadsworth Parkway (Project 29), and with bicycle lanes along 90th Avenue (Project 34), west of Wadsworth Parkway.

Project 34: 90th Avenue/Cody Street/91st Avenue/Field Street
Segment: Between Wadsworth Parkway and 88th Avenue
Class/Type: Class II – Curbside Bicycle Lanes, Class III – Signed Bike Route with Sharrows.
Countermeasure(s): Peg-a-tracking should be considered through each intersection.
Notes: This important east-west segment connects proposed bikeways on Wadsworth Parkways with 88th Avenue. It connects to bikeways proposed for Yarrow Street, Everett Street, and an off-street shared use path linking Oakhurst Park with Dover Square Park. The segment also provides a connection to Zerger Elementary School, and an off-street shared use path linking King Mill Park with Somerset Park and Standley Lake Regional Park. Between Wadsworth Parkway and Dudley Street, existing striped shoulders may be converted to bicycle lanes. Due to needed on-street parking, the proposed bicycle lanes would transition to sharrrows between Dudley Street and 90th Court. Bicycle lanes should resume between 90th Court and 88th Avenue.

Project 35: Dover Street
Segment: Between 88th Avenue and 90th Avenue
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment connects a proposed bicycle lane along 88th Avenue (Project 30) with proposed bikeways along 90th Avenue (Project 33) and Wadsworth Parkway (Project 53). It also links Dover Square Park and Moore Middle School.

Project 36: Yarrow Street
Segment: Between 90th Avenue and 92nd Avenue/Ammons Street
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This short segment connects a proposed bicycle lane along 90th Avenue (Project 34) Avenue with a proposed bicycle lane along 92nd Avenue/Ammons Street/Balsam Way (Project 38).

Project 37: Everett Street
Segment: Between 90th Avenue and 93rd Avenue
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This short segment connects a proposed bikeway along 90th Avenue (Project 34) Avenue with a proposed bikeway along 93rd Avenue (Project 39).

Project 38: 92nd Avenue/Ammons Street/93rd Way/Balsam Street
Segment: Between Wadsworth Parkway and 94th Avenue
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This short segment connects a proposed sidepath retrofit with a proposed signed bike route (with sharrows) along Yarrow Street (Project 36) with proposed bicycle lanes along 94th Avenue (Project 40). This segment connects to Oakhurst Park and an existing off-street shared use path that reaches Standley Lake Regional Park.

Project 39: Lark Bunting Drive/93rd Avenue
Segment: Between 94th Avenue and Independence Drive
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This short segment connects a proposed bicycle lane along 94th Avenue (Project 40) with proposed bicycle lanes along Independence Drive (Project 10). It also bisects Oakhurst Park.

Project 40: 94th Avenue
Segment: Between Wadsworth Parkway and Independence Drive

Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This neighborhood segment connects a proposed sidepath retrofit along Wadsworth Parkway (Project 53) with a proposed bicycle lane along Independence Drive (Project 10).

Project 41: Raleigh Street
Segment: Between 92nd Avenue and 94th Avenue
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This short segment connects a proposed bikeway along 92nd Avenue (Project 82) with another proposed bikeway along 94th Avenue (Project 9), and the Carol Butts Athletic Center/ Park.

Project 42: Perry Street/96th Avenue
Segment: Between 94th Avenue and Federal Boulevard
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This short segment links a proposed bikeway along 94th Avenue (Project 8), proposed bicycle lanes along Lowell Boulevard (Project 5), and proposed sidepath retrofit along Federal Boulevard (Project 44).

Project 43: City Center Drive
Segment: Between 92nd Avenue and Sheridan Boulevard
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This north-south segment provides a more bicycle friendly approach to the Westminster Marketplace shopping complex. It links a proposed signed bike route with sharrows along Yates Avenue (Project 32) with a proposed sidepath retrofit along Sheridan Boulevard (Project 45). It also connects to City Center Park and a link to the Farmers' Highline Canal Trail.

Project 44: Federal Boulevard
Segment: Between 92nd Avenue and 120th Avenue
Class/Type: Class I – Sidepath (retrofit)
Countermeasure(s): Warning signs, and path striping/pavement markings may all be appropriate for various intersections. In general, more intensive safety and design countermeasures will have to take place at the following intersections: 104th Avenue, 112th Avenue, and 120th Avenue.
Notes: This critical north-south segment links proposed bikeways along the following thoroughfares: 92nd Avenue, 94th Avenue, 96th Avenue, North Park Avenue, 108th Avenue, 112th Avenue, Ranch Reserve Parkway, Decatur Street, and 120th Avenue. It also links with numerous shared use path spurs linking neighborhoods to the Big Dry Creek Trail.

Project 45: Sheridan Boulevard
Segment: Between 92nd Avenue and 120th Avenue
Class/Type: Class I – Sidepath (retrofit)
Countermeasure(s): Warning signs, and path striping/pavement markings may all be appropriate for various intersections. In general, more intensive safety and design countermeasures will have to take place at the following intersections: Center City Drive, 104th Avenue, 112th Avenue, and 120th Avenue.
Notes: This important north-south segment links proposed bikeways along the following thoroughfares: 92nd Avenue, Center City Drive, 101st Avenue, 108th Avenue, 115th Avenue, 117th Avenue, 118th Place, and 120th Avenue. It also links with City Park, Waverly Acres Park, and the Big Dry Creek Trail/numerous other shared use path spurs through Westminster's open space.

Project 46: Westcliff Parkway
Segment: Between Westminster Boulevard and Church Ranch Boulevard
Class/Type: Class II – Curbside Bicycle Lanes
Countermeasure(s): Peg-a-tracking should be used through all intersections.
Notes: With ADT volumes between 3,000 and 7,000, Westcliff Parkway is overbuilt. If volumes remain relatively low in the coming years, the segment is a prime candidate for a classic "road diet," which should remove two through lanes. In their place should be two through lanes, two bicycle lanes, and a center turn lane. This configuration will still allow for an ADT volume of nearly 20,000, while also providing improved bicycle access.

Project 47: Otis Street
Segment: Between Westcliff Parkway and terminus of Otis Street at Big Dry Creek Trail neighborhood spur.
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): n/a
Notes: This short on-street bike route links Westcliff Parkway (Project 46) with a Big Dry Creek neighborhood spur at the terminus of Otis Street.

Project 48: Independence Street
Segment: Between 97th Avenue and 100th Avenue
Class/Type: Class III – Signed Bike Route
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This neighborhood route will link a proposed bike route along 100th Avenue (Project 13) with Lucas Elementary School and Westbrook Park, where an existing Big Dry Creek spur is already in place.

Project 49: Countryside Drive
Segment: Between 100thth Avenue and Oak Street
Class/Type: Class II – Curbside Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment will require narrowing wide vehicular lanes and re-allocating "dead space" to make way for bicycle lanes. When complete, it will link Wayne Carle Middle School with the neighborhoods to the north, including existing off-street paths around Ketner Lake and a proposed bikeway along Oak Street (Project 14).

Project 50: Countryside Drive
Segment: Between Oak Street and Simms Street
Class/Type: Class II – Curbside Bicycle Lanes
Countermeasure(s): Peg-a-tracking may considered through each intersection.
Notes: This segment will link Countryside Park with the neighborhoods to the west, including a proposed bikeway along Oak Street (Project 14) and Simms Street (Project 90).

Project 51: 106th Avenue
Segment: Between Johnson Street and Oak Street
Class/Type: Class III – Signed Bike Route
Countermeasure(s): n/a
Notes: This segment will link proposed bicycle lanes along 104th Avenue/Johnson Street (Project 52), Oak Street (Project 14), and Countryside Park, with its numerous shared use paths.

Project 52: 104th Avenue/Johnson Street
Segment: Between Wadsworth Parkway and 108th Avenue
Class/Type: Class II – Curbside Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be used through each intersection.
Notes: This segment will require narrowing two existing vehicular lanes to make way for two bicycle

lanes. It will link a proposed sidepath along Wadsworth Parkway (Project 53), and proposed bicycle lanes along 106th Avenue (Project 51) and 108th Avenue (Project 91).

Project 53: Wadsworth Parkway
Segment: Between 88th Avenue and northern City border with Broomfield (112th Ave.)
Class/Type: Class I – Sidepath (retrofit)
Countermeasure(s): Warning signs, path striping, and various pavement markings may be appropriate for various intersections. In general, more intensive safety and design countermeasures will have to take place at the following intersections: 88th Avenue, 92nd Avenue, 100th Avenue/Church Ranch Boulevard, and 108th Avenue
Notes: This important north-south segment links proposed bikeways along the following thoroughfares: 90th Avenue, 92nd Avenue, 94th Avenue, 100th Avenue/Church Ranch Boulevard, 104th Avenue, and 108th Avenue. At the Westminster/Broomfield border (112th Avenue), the segment connects with a sidepath in Broomfield. It also links directly with the Big Dry Creek Trail between Independence Drive and 100th Avenue/Church Ranch Boulevard, the Walnut Creek Trail at 106th Avenue, and the Farmers' Highline Canal Trail at 92nd Avenue.

Project 54: 100th Avenue/Northpark Avenue/103rd Avenue/Tennyson Court
Segment: Between Federal Boulevard and terminus of Tennyson Court
Class/Type: Class III – Signed Bike Route
Countermeasure(s): n/a
Notes: This inter-neighborhood bike route connects several neighborhoods to the primary north-south bikeways proposed for Federal Boulevard (Project 44) and Lowell Boulevard (Project 7).

Project 55: 101st Avenue/Wolff Street
Segment: Between Sheridan Boulevard and 104th Avenue
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be used through each intersection.
Notes: This bikeway connects a proposed sidepath along Sheridan Boulevard (Project 44) with the proposed 104th Avenue sidepath retrofit (Project 12). It also links to Hampshire Park and an existing inter-neighborhood shared use path.

Project 56: Hooker Street/Grove Street/107th Avenue
Segment: Between Northpark Avenue and King Street
Class/Type: Class III – Signed Bike Route
Countermeasure(s): n/a
Notes: This inter-neighborhood segment provides a north-south connection for those neighborhoods straddling either side of 104th Avenue. It also connects a proposed bike route along Northpark Avenue (project 54), a proposed sidepath along 104th Avenue (project 12), and a proposed bike route along King Street (Project 57). Additionally, the route terminates at shared use paths that wind through Windsor Park, which connect to proposed bicycle lanes along Legacy Ranch Parkway (Project 15).

Project 57: 101st/Hooker Street/108th Avenue/Bruchez Parkway/Alcott Court/111th Avenue/Clay Street/Ranch Reserve Parkway/ Decatur Street
Segment: Between 104th Avenue and Federal Boulevard
Class/Type: Class III – Signed Bike Route
Countermeasure(s): n/a
Notes: For people bicycling, this important inter-neighborhood provides one of the only north-south alternatives to Federal Boulevard. Because the route winds through numerous neighborhoods, wayfinding signs are imperative. The northern terminus of this route includes two legs: Stratford Lakes Drive at 114th Avenue and 119th Decatur Street/ 119th Avenue. The route connects to Windsor Park and numerous shared use paths spurs through the Northglenn open space and Vogel Pond Open Space preserves.

Project 58: Irving Street
Segment: Between 114th Avenue and the northern terminus of Irving Street at a Big Dry Creek neighborhood path spur.
Class/Type: Class III – Signed Bike Route
Countermeasure(s): n/a
Notes: This short link will connect the proposed King Street/Stratford Lakes Drive/114th Avenue bicycle lanes (Project 15) with the Big Dry Creek Trail.

Project 59: Stuart Street/Tennyson Street/Cotton Creek Drive/ Vrain Street/Stuart Street
Segment: Between Legacy Ridge Parkway and 112th Avenue
Class/Type: Class III – Signed Bike Route
Countermeasure(s): n/a
Notes: This north-south segment connects proposed bicycle lanes along Legacy Ridge Parkway (Project 14) with a bike route slated for 107th Drive (Project 60), and bicycle lanes along 112th Avenue (Project 92). As this route is very curvilinear, and splits into two branches at Vrain/Stuart Streets, wayfinding signs are paramount.

Project 60: 107th Drive
Segment: Between Tennyson Street and Sheridan Boulevard
Class/Type: Class III – Signed Bike Route
Countermeasure(s): n/a
Notes: This east-west segment connects a proposed bike route along Tennyson Street (Project 59) with a proposed sidepath along Sheridan Boulevard (Project 45).

Project 61: Westminster Boulevard
Segment: Between 104th Avenue and 112th Avenue
Class/Type: Class I – Sidepath
Countermeasure(s): Warning signs, path striping, and various pavement markings may be appropriate for various intersections. In general, more intensive safety and design countermeasures will have to take place at Church Ranch Boulevard and 112th Avenue.
Notes: This north-south segment connects a proposed sidepath along Church Ranch Boulevard (Project 12) The Westminster Promenade shopping center, with an existing bicycle lane north of 112th Avenue in Broomfield. It also connects to a proposed signed bike route with sharrows along 108th Avenue (Project 62). Bicyclists should be asked to dismount and walk their bicycles at the plaza located between the Ice Centre and Westminster Boulevard.

Project 62: 108th Avenue
Segment: Between Westminster Boulevard and Eaton Street
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): n/a
Notes: This east-west segment connects a proposed sidepath along Westminster Boulevard with (Project 61) with a proposed north-south bicycle lane along Eaton Street (Project 63). It also connects to a proposed north-south segment along Harlan Street (Project 93).

Project 63: Eaton Street
Segment: Between 108th Avenue and 112th Avenue
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This north-south segment connects a bikeway proposed for 108th Avenue (Project 62) to a Big Dry Creek neighborhood spur and a proposed bicycle lane along 112th Avenue (Project 92). The bicycle lane should transition to sharrows briefly as the right and left turn lanes appear at the 112th Avenue intersection.

Project 64: 115th Avenue
Segment: Between Eaton Street and Wolff Street
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be used through each intersection.
Notes: This east-west segment connects a proposed bikeway along Eaton Street (Project 63) with a proposed bikeway along Wolff Street (Project 65). It also connects to a proposed sidepath along Sheridan Boulevard (Project 45) and an additional bikeway along Depew Way (Project 66).

Project 65: Wolff Street
Segment: Between 112th Avenue and 117th Avenue
Class/Type: Class II – Curbside Bicycle Lane
Countermeasure(s): Peg-a-tracking should be used through every intersection.
Notes: This north-south segment connects a proposed bike lane along 112th Avenue (Project 92) with a proposed signed bike route along 117th Avenue/Wolff Street (Project 61). It also connects to Westfield Village Park, with spurs connecting to the Big Dry Creek Trail, and Life Christian Academy.

Project 66: Depew Court/117th Avenue/Wolff Street
Segment: Between 115th Avenue and 118th Place
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection. Notes: This segment provides neighborhood connections to proposed bikeways along 115th Avenue (Project 68), Chase Street/118th Place (Project 67), Sheridan Boulevard (Project 45), and Wolff Street (Project 65).

Project 67: 118th Avenue
Segment: Between Chase Street and Greenway Drive (Broomfield).
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment provides a neighborhood connection to an existing north-south neighborhood shared use path in Broomfield.

Project 68: Chase Street/118th Place/Lowell Boulevard
Segment: Between 115th Avenue and 120th Avenue.
Class/Type: Class III - Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment provides an east-west connection between neighborhoods on either side of Sheridan Boulevard, including Bradburn. The segment connects the Primrose School, a major commercial shopping center, Hope Montessori School, Bradburn Boulevard's retail shops, and the Academy of Charter Schools. This segment also connects to numerous proposed bikeways, including Sheridan Boulevard (Project 45), 115th Avenue (Project 64), 117th Avenue/Wolff Street (Project 66), 118th Avenue (Project 67), a Big Dry Creek Trail spur, and at Lowell Boulevard, a proposed sidepath along 120th Avenue (Project 96).

Project 69: 117th Avenue/Quitman Street
Segment: Between Wolff Street and 118th Place
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment provides a neighborhood connection between proposed bikeways along Wolff Street (Project 66) and 118th Place (Project 68).

Project 70: Huron Street
Segment: 112th Avenue and the northern Westminster/Broomfield border
Class/Type: Class I – Sidepath (retrofit)

Countermeasure(s): Warning signs, striping, and various pavement markings may be appropriate for various intersections. In general, more intensive safety and design countermeasures will have to take place at the following intersections: 112th Avenue, 120th Avenue, 128th Avenue, 136th Avenue, and 144th Avenue.
Notes: This segment provides needed direct north-south connection through the northeast quadrant of Westminster. It connects to numerous proposed bikeways, including 116th Avenue (Project 16), 120th Avenue (Project 96), 124th Avenue (Project 71), 132nd Avenue (Project 75), 134th Avenue (Project 19), 136th Avenue (Project 99), and 144th Avenue (Project 100). It also connects to the Big Dry Creek Trail, Quail's Crossing Park, and the Silver Hills Middle School and Mountain Range High School. Finally, it connects to RTD's Wagon Road park n' ride.

Project 71: Pecos Street/124th Avenue
Segment: Between 112th Avenue and Huron Street
Class/Type: Class II – Curbside Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection. Notes: This segment provides a north-south alternative to Huron Street, and links several neighborhoods, commercial shopping areas, and major employment centers. It connects to numerous proposed bikeways, including 116th Avenue (Project 16), 120th Avenue (Project 96), 122nd Avenue (Project 17), and Huron Street (Project 66). Finally, it connects to The Ranch Open Space preserve.

Project 72: Federal Parkway
Segment: Between 120th Avenue and 128th Avenue
Class/Type: Class II – Curbside Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: When this roadway is widened, it should accommodate bicycle lanes. When complete, it will provide a north-south link between the proposed 120th Avenue sidepath (Project 96) and the proposed 128th Avenue bicycle lane. It will also connect to proposed bikeways along Zuni Street (Project 16), 122nd Avenue (Project 17), and the existing Big Dry Creek Trail. The existing bridge over the Big Dry Creek Trail should be improved to foster safe bicycle access, which it does not currently provide.

Project 73: Harmony Parkway
Segment: Between 128th Avenue and Zuni Street
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: When complete, this segment will provide a north-south link between the proposed 128th Avenue bicycle lanes (Project 96) and the proposed Zuni Street signed bike route with sharrows (Project 17). It will also connect to an existing shared use path segment that terminates at the Arapahoe Ridge Elementary School.

Project 74: Pecos Street
Segment: Between Harmony Parkway and 134th Avenue.
Class/Type: Class III – Signed Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment will provide a north-south link between a proposed Harmony Parkway bikeway (Project 73) and the proposed bikeway on 134th Avenue (Project 19). It will also link to Arapahoe Ridge Elementary School and proposed bikeway along 132nd Avenue (Project 75).

Project 75: 132nd Avenue
Segment: Between Pecos Street and Huron Street
Class/Type: Class II – Curbside Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment will provide an east-west link between Arapahoe Ridge Elementary School and

a proposed signed bike route with sharrows along Pecos Street (Project 74) and the proposed sidepath along Huron Street (Project 71).

LONG-TERM PRIORITY PROJECTS

Project 76: 70th Avenue
Segment: Between Federal Boulevard and 68th Avenue
Class/Type: Class III – Signed Bike Route
Countermeasure(s): n/a
Notes: This segment will provide an east-west link between Federal Boulevard and proposed connections with the Twin Lakes neighborhood along 68th Avenue and an off-street shared use path spur connecting with the Little Dry Creek Trail. It also connects with a proposed signed bike route along Canosa Court (Project 19).

Project 77: Irving Street
Segment: Between 71st Avenue and 76th Avenue
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This short segment will provide an important north-south link between the industrial park area/RTD commuter rail station at 71st Avenue and the existing civic corridor along Irving Street, which includes the Municipal Court, Irving Street Library/Park, Westminster Elementary School, and the Westminster Swim and Fitness Center. This segment will also connect proposed bikeways along 72nd Avenue (Project 2), 74th Avenue (Project 78, and 76th Avenue (Project 23).

Project 78: 74th Avenue
Segment: Between Zuni Street and Irving Street
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection. Notes: This segment will provide an east-west link between the Skyline Vista neighborhood and the commercial shopping area straddling Federal Boulevard and the civic corridor along Irving Street. This segment will connect to proposed bikeways along Canosa Court (Project 20) and Irving Street (Project 77). This segment will terminate on the eastern end at a proposed on-street bikeway connection with Twin Lakes, a census-designated place (CDP) in Adams County.

Project 79: 78th Avenue
Segment: Between Lowell Boulevard and the terminus of 78th Avenue at Sunset Park.
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment will provide an east-west link between the proposed Lowell Boulevard (Project 6) signed bike route with sharrows and Sunset Park/Wolff Run Park. It will also connect with the proposed north-south signed bike route with sharrows along Bradburn Boulevard (Project 22) and a signed bike route along Tennyson Street (Project 24). To better facilitate a bicycle connection with Wolff Run Park/Little Dry Creek, and the disconnected segment of 78th Avenue on the west side of the railroad tracks, a bicycle and pedestrian underpass should be evaluated for consideration.

Project 80: 78th Avenue
Segment: Between Wolff Court/Wolff Run Park and Sheridan Boulevard.
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment will provide an east-west link between Sheridan Boulevard and Wolff Run Park,

which includes a Little Dry Creek spur, and proposed bikeway along 78th Avenue (Project 79).

Project 81: US 36 Bike Trail
Segment: Between Turnpike Drive, at Bradburn Boulevard, and the northern border of Westminster, along Highway 36, between 112th Avenue and Wadsworth Boulevard
Class/Type: Class I – Shared Use Path
Countermeasure(s): Warning signs, striping, and various pavement markings may be appropriate for the few intersections where the proposed shared use path crosses thoroughfare right of ways. In general, underpasses or overpasses would be preferred.
Notes: This segment will provide a regional link between the City of Westminster and the City of Boulder to the northwest, and link and the City of Denver to the south. Wayfinding and signing are a key element in branding this route as a regional connection between Denver and Boulder. It will also connect 8 RTD stations along its regional route. In Westminster, it will connect numerous bikeways and key destinations.

Project 82: 92nd Avenue
Segment: Between Federal Boulevard and Wadsworth Parkway
Class/Type: Class II – Curbside Bicycle Lane, Class IIII – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment will provide a needed east-west connection along a very busy arterial thoroughfare. This segment is comprised of a curbside bicycle lane between Federal Boulevard and Utica Court. A signed bicycle route with sharrows between Utica Court and Wadsworth Parkway is also proposed.
As proposed, this segment will connect to bikeways along the following thoroughfares: Federal Boulevard (Project 44), Lowell Boulevard (Project 7), Yates Street (Project 32), Center City Drive (Project 43), Sheridan Boulevard (Project 45), Bike Highway 36 (Project 81), Westminster Boulevard (Project 83), Pierce Street (Project 84), The Farmers' High Line Canal Trail, Wadsworth Boulevard (Project 87), Wadsworth Parkway (Project 53), and 92nd Avenue, west of Wadsworth Parkway (Project 37). The two segments will also link major commercial/employment centers like the Westminster Mall redevelopment site, Westminster City Hall, and City Center Park.

Project 83: Harlan Street/Westminster Boulevard
Segment: Between 88th Avenue and Church Ranch Boulevard
Class/Type: Class II – Curbside Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment will provide north-south link between the Westminster Mall redevelopment site and the Promenade/City Park area. It will link to the Farmers High Line Canal Trail, proposed bikeways along 88th Avenue (Project 29) and Westcliff Parkway (Project 46), as well as the Waterpointe-Bellio Open Space, the Big Dry Creek Trail, and a proposed sidepath along Church Ranch Boulevard (Project 12). This project requires that those segments already widened to be re-configured to accommodate bicycle lanes, while those not yet widened should include bicycle lanes when they are.

Project 84: Pierce Street
Segment: Between 88th Avenue and Westcliff Parkway
Class/Type: Class II – Curbside Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment will provide north-south link between the proposed 88th Avenue sidepath retrofit, 92nd Avenue (Project 82), the Farmers High Line Canal Trail, 98th Avenue (Project 86), and Westcliff Parkway (Project 46). It will also connect numerous shopping areas and Mandalay Middle School.

Project 85: 96th Avenue
Segment: Between Pierce Street and Wadsworth Boulevard

Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This short east-west segment connects two important proposed north-south bikeways along Pierce Street (Project 84) and Wadsworth Boulevard (Project 87), and connects Mandalay Middle School and Semper Elementary School.

Project 86: 98th Avenue
Segment: Between Pierce Street and Wadsworth Boulevard
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment will provide a short east-west link between the proposed bicycle lanes on Pierce Street (Project 84) and Wadsworth Boulevard (Project 87). It will also connect Mandalay Middle School and Semper Elementary School.

Project 87: Wadsworth Boulevard
Segment: Between 92nd Avenue and the Westminster/Broomfield border near 112th Avenue
Class/Type: Class II – Bicycle Lane
Countermeasure(s): Peg-a-tracking may be considered through each intersection. Notes: Once the thoroughfare is widened, this segment will provide a north-south link between 92nd Avenue (Project 82), 96th Avenue (Project 85), 98th Avenue (Project 86), 99th Avenue (Project 11), Church Ranch Boulevard (Project 12), 108th Avenue (Project 90), and the US 36 Bike Trail (Project 81). This segment will also connect Semper Elementary School and the Big Dry Creek Trail.

Project 88: Alkire Street
Segment: Between 86th Parkway and 100th Avenue
Class/Type: Class II – Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment, which overlooks Standley Lake, is already well used by recreational bicyclists. Upon widening, so that it may include bicycle lanes, it will connect an existing bikeway along 86th Parkway in Arvada and a proposed bicycle lane along 100th Avenue in Westminster (Project 89).

Project 89: 100th Avenue
Segment: Between Wadsworth Parkway and Alkire Street
Class/Type: Class II - Bicycle Lanes
Countermeasure(s): Peg-a-tracking should be used through every intersection.
Notes: This segment should include a Signed Bike Route with Sharrows between Wadsworth Parkway and Countryside Drive. Between Countryside and Alkire, Bicycle Lanes should be included alongside the City's plan to widen 100th Avenue. When complete, this segment will connect to proposed bikeways along Wadsworth Parkway (Project 53), Independence Street (Project 48), Countryside Drive (Project 49), Oak Street (Project 13), and Simms Street (Project 90). It will also link Wayne Carle Middle School with Standley Lake Regional Park, and spurs that connect to the Big Dry Creek Trail.

Project 90: Simms Street
Segment: Between 100th Avenue and the Westminster/Broomfield Border
Class/Type: Class II - Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment will require the widening of Simms Street. When complete, this segment will connect to proposed bikeways along 100th Avenue (Project 89) Countryside Drive (Project 50), and 108th Avenue (Project 91). This segment will also connect to a few large office parks and a proposed bicycle lane north of the Westminster/Broomfield border.

Project 91: 108th Avenue
Segment: Between Wadsworth Boulevard and Simms Street
Class/Type: Class II - Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: When complete, this segment will connect proposed bikeways along Wadsworth Boulevard (Project 87), Wadsworth Parkway (Project 53), Johnson Street (Project 52), Oak Street (Project 14), and Simms Street (Project 90). In order to better connect the western edge of the Green Knolls subdivision to this bikeway, a north-south street or shared use path may be considered between 108th Avenue and the western terminus of 108th Place.

Project 92: 112th Avenue
Segment: Between Huron Street and the Westminster/Broomfield border near Highway 36.
Class/Type: Class II - Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: 112th Avenue is a long and complex roadway, with numerous challenging intersections and varying right of way widths. For bicycle lanes to be implemented, the corridor will have to be re-organized, including adding pavement width in some sections. If completed, it will connect to numerous proposed and existing bikeways including: Huron Street (Project 70), Pecos Street (Project 71), Federal Boulevard (Project 44) Ranch Reserve Parkway (Project 57), King Street/ Stafford Lakes Drive (Project 14), Stuart Street/Vrain Street (Project 59), Wolff Street (Project 65), Sheridan Boulevard (Project 45), Eaton Street (Project 63), Harlan Street (Project 93) Kendall Street (Project 94), and Main Street (Project 96). It also connects to the Big Dry Creek Trail, Northwest Open Space, Sheridan Green Park, the Front Range Community College and numerous employment and commercial destinations.

Project 93: Harlan Street
Segment: Between 108th Avenue and 112th Avenue
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment provides a needed north-south interior neighborhood connection. When complete, it will link to proposed bikeways along 108th Avenue (Project 62), 111th Avenue (Project 94), and 112th Avenue (Project 90). It will also connect to Sheridan Green Elementary School and Stratford Park.

Project 94: 111th Avenue
Segment: Between Harlan Street and Westminster Boulevard path connection
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment provides a short east-west neighborhood connection between 112th Avenue/ Harlan Street (Project 92, Project 93) and a proposed north-south sidepath along Westminster Boulevard (Project 61).

Project 95: Kendall Street/116th Avenue
Segment: Between 112th Avenue and Main Street
Class/Type: Class III – Signed Bike Route with Sharrows
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment provides a north-south neighborhood connection. When complete it will link to proposed bikeways along 112th Avenue (Project 92), 115th Avenue (Project 96), and existing bicycle lanes along Main Street in Broomfield. It also connects to existing shared use paths through Sheridan Green Park, which link to the Big Dry Creek Trail.

Project 96: 115th Avenue/Eaton Street
Segment: Between Kendall Street and 112th Avenue
Class/Type: Class III – Signed Bike Route with Sharrows

Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This segment provides an east-west, and north-south neighborhood connection. When complete it will connect to Ryan Elementary, Ryan Park, and proposed bikeways along 112th Avenue (Project 92) Kendall Street (Project 95) and Eaton Street (Project 63).

Project 97: Main Street
Segment: Between 112th Avenue and Westminster/Broomfield Border
Class/Type: Class II – Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be used through each intersection.
Notes: This segment provides a north-south connection along the border of Westminster, which will link with existing bicycle lanes in Broomfield and an existing shared use path spur through the Sheridan Green neighborhood. It will also link to proposed bikeways along 112th Avenue (Project 92), and 116th Avenue (Project 95).

Project 98: 120th Avenue (southside)
Segment: Between Huron and Sheridan Boulevard
Class/Type: Class I – Sidepath (retrofit)
Countermeasure(s): Warning signs, striping, and other pavement markings may be appropriate for the few intersections where the proposed shared use path crosses thoroughfare rights of way. Bicycle/pedestrian underpasses may be appropriate in select locations. In general, more intensive safety and design countermeasures will have to take place at the following intersections: Huron Street, Pecos Street, Federal Boulevard, and Sheridan Boulevard.
Notes: This east-west segment provides better bicycle access through Westminster. It connects numerous proposed bikeways, including: Huron Street (Project 70), Pecos Street (Project 71), Zuni Street (Project 16), Federal Boulevard (Project 44), Federal Parkway (Project 72), Chase/118th Place/Lowell Boulevard (Project 68), Lowell Boulevard (Project 99) and Sheridan Boulevard (Project 45). This segment will also connect RTD's Wagon Road Park n' Ride, The Ranch Open Space, the Big Dry Creek Trail, and several commercial and employment centers.

Project 99: Lowell Boulevard
Segment: Between 120th Avenue and the Westminster/Broomfield border.
Class/Type: Class II – Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This short north-south segment links into an existing bikeway in Broomfield. It also connects to the proposed 120th Avenue bikeway.

Project 100: 128th Avenue
Segment: Between I-25 and Zuni Street.
Class/Type: Class II – Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This east-west segment will only be realized after the widening of the roadway to a more uniform four lanes. It will connect to the proposed bikeways along Huron Street (Project 70), Harmony Parkway (Project 73), and Zuni Street (Project 18). It will also link the Big Dry Creek Trail, Big Dry Creek Park, and a proposed connection in Thornton.

Project 101: 136th Avenue
Segment: Between Huron Street and Zuni Street.
Class/Type: Class II – Bicycle Lanes
Countermeasure(s): Peg-a-tracking may be considered through each intersection.
Notes: This east-west segment will require the current roadway configuration to be re-organized to be more amenable to bicycle lanes, including better use of the current 30 foot "dead zone" at Tejon Street. When built it will connect to proposed bikeways along Huron Street (Project 70), Zuni Street (Project 18). It will also link to the Quail Creek Trail, which connects to the Big Dry Creek Trail, and existing bicycle lanes in Broomfield.

Project 102: 144th Avenue
Segment: Between I-25 and Zuni Street
Class/Type: Class I – Sidepath
Countermeasure(s): Warning signs, striping, and other pavement markings may be appropriate for the few intersections where the proposed shared use path crosses thoroughfare rights of way. In general, more intensive safety and design countermeasures will have to take place at the following intersections: Delaware Street, Orchard Parkway, Huron Street, North Huntington Trails Parkway, and Zuni Street.
Notes: This east-west segment will connect to proposed bikeways along Huron Street (Project 70) and existing bicycle lanes in Broomfield along Zuni Street.

C. GENERAL COST ESTIMATES

The cost of installing bicycle facilities varies greatly. Proposed bikeway type, existing street/land use/geographical conditions, design details, and materials costs are all variables that influence the expenditure outlay for bikeway implementation. For that reason, there is no single source for cost range estimates used by the bicycle planning profession. However, according to the Pedestrian and Bicycle Information Center, conventional bicycle lanes may cost as little as $5,000 per mile, but may also cost as much as $50,000 per mile.[i] According to the Colorado Department of Transportation, bikeway implementation costs are generally lower in communities located in the eastern plains, than those in the Rocky Mountains where topography can greatly influence cost, especially for Class I facilities. Additionally, the recent Nevada County Bicycle Master Plan (CA) included the following base per mile base costs for bicycle facilities (see Table 3).[ii]

TABLE 3: BASE PER MILE COST ESTIMATES FOR BICYCLE FACILITIES

Class Type	*Description*	*Cost per mile*
Class I	10-foot Shared Use Path: Excavation, asphalt, signing, striping	$513,073
Class II	Bicycle Lane: Striping, pavement markings, signing, traffic control	$14,060
Class III	Signed Bike Route: Signing	$1,500
Class III	Signed Bike Route with Shared Use Lane Markings: pavement markings, signing, traffic control	$3,500

These estimated costs do not include design or contingency costs.

In general, it is almost always most cost efficient to dovetail the implementation of bikeways with other general street construction, reconstruction, or resurfacing projects.

D. GENERAL FUNDING SOURCES

Funding for bicycle infrastructure and/or programs is available from a wide variety of federal, state, local, private, and non-profit sources. The following appendix describes several potential funding sources for implementing the Westminster 2030 Bicycle Master Plan.

1. FEDERAL TRANSPORTATION FUNDS: SAFETEA-LU

The Safe, Accountable, Flexible, Efficient, and Transportation Equity Act: A Legacy of Users (SAFETEA-LU), created in 2005, authorizes hundreds of billions of dollars in Federal gas-tax revenue and other federal funds for all modes of surface transportation. Under SAFETEA-LU, pedestrian and bicycle programs are eligible to receive over half the available funds, however there are no funds dedicated solely to the proliferation of bicycle or pedestrian facilities and/or programs.

The original SAFETEA-LU expired on September 30, 2009. However, Congress has since approved five short-term extensions of the bill. The fifth such extension was set to expire on December 31st, 2010. Whether the bill will be extended further, or replaced with new legislation, is still unknown. However, the federal government, via state department's of transportation, remain a primary source for funding bicycle implementation programs.

2. TRANSPORTATION ENHANCEMENTS

In 1991, Congress passed the Intermodal Surface Transportation Efficiency Act (ISTEA) to promote balanced, multimodal transportation. The provision of Transportation Enhancements (TE) funds was a key feature. Subsequent transportation legislation has expanded the TE program to comprise a 10 percent set-aside of the Surface Transportation Program, which translated to more than $800 million in funding. TE funding may be used by local governments and non-profits with projects directly related to surface transportation. TE fund applicants can generally expect an 80 percent Federal share, with a 20 percent required match from various other sources. Since the program's creation, more than 24,000 projects have been funded.

3. RECREATIONAL TRAILS PROGRAM

The Recreational Trails Program (RTP) is a program of the US Department of Transportation's Federal Highway Administration (FHWA). Like TE funds, it was initially created under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). The program was since amended by the Transportation Equity Act for the 21st Century (TEA-21), which greatly increased trails funding.

RTP provides funds to develop and maintain recreational trails and trail related facilities. Funding can be used for both motorized (snowmobiles, four-wheel vehicles, all terrain vehicles, etc.) and non-motorized (pedestrian, bicycling, equestrian, skiing, etc.) recreational trail use.

Every State administers their own program and develops their own procedures for selecting projects that will receive funding. To assist with the RTP, each State has their own State Recreational Advisory Committee that can either select projects for funding or be solely advisory. The money provided to each state must be split between varying recreational trail projects–30 percent of funds must be allotted to motorized trail uses, 30 percent for non-motorized trail uses, and 40 percent for diverse trail users.

Similar to TE funds, the Federal government provides 80 percent of funding, however a Federal agency project sponsor may endow additional funds provided the Federal share does not

exceed 95 percent. As listed by FHWA, RTP funds may be used for:

- Maintenance and restoration of existing trails.
- Development and rehabilitation of trailside and trailhead facilities and trail linkages.
- Purchase and lease of trail construction and maintenance equipment.
- Construction of new trails (with restrictions for new trails on Federal lands).
- Acquisition of easements or property for trails.
- Assessment of trail conditions for accessibility and maintenance.
- Development and dissemination of publications and operation of educational programs to promote safety and environmental protection related to trails (including supporting non-law enforcement trail safety and trail use monitoring patrol programs, and providing trail-related training) (limited to five percent of a State's funds).
- State administrative costs related to this program (limited to seven percent of a State's funds).

4. ENERGY EFFICIENCY AND CONSERVATION BLOCK GRANT PROGRAM

As part of the American Recovery and Reinvestment Act of 2009, the Energy Efficiency and Conservation Block Grant program (EECBG) set aside $1.9 billion in grant funding for select cities and counties. These funds are available for bicycle and/or pedestrian projects which "reduce energy use and fossil fuel emissions" in an environmentally sustainable manner that will "maximize benefits for local and regional communities." For additional information, visit the EECBG program website at: http://www.eecbg.energy.gov/.

5. CONGESTION MITIGATION AND AIR QUALITY (CMAQ)

The Congestion Mitigation and Air Quality (CMAQ) Improvement Program was created in 1991 under the Intermodal Surface Transportation Efficiency Act (ISTEA) to fund transportation related projects that are designed to reduce traffic congestion and improve air quality. To date, bicycle and pedestrian projects comprise approximately 13 percent of all CMAQ projects.

CMAQ-funded bicycle/pedestrian projects include bike parking, pedestrian and bicycling promotion, sidewalk or pedestrian improvements and enhancements, bike maps and planning, and education efforts.

6. HUD COMMUNITY DEVELOPMENT BLOCK GRANTS

HUD Community Development Block Grants fund community-based projects. Examples of projects that qualify for the program include:

- Commercial district streetscape improvements
- Sidewalk improvements
- Safe routes to school
- Neighborhood-based bicycling and walking facilities that improve local transportation options or help revitalize neighborhoods

There is a wide range of other federal funds that can be used for bicycling and walking

facilities. Visit www.fhwa.dot.gov/environment/bikeped/bp-broch.thm#funding for a complete list of federal funding sources available for bicycle facilities/programs.

7. STATE TRANSPORTATION FUNDS

The State of Colorado raises funds for transportation infrastructure, including bicycle facilities, through a state motor-vehicle fuel tax. Much of the funding is available for local community-sponsored bicycle projects, especially those with a regional or statewide scope.

8. COLORADO & NATIONAL SAFE ROUTES TO SCHOOL FUNDING

Colorado's Safe Routes to School program is administered by the Colorado Department of Transportation. In an effort to encourage more students to safely walk and bicycle to school, federal funding has been made available to conduct educational or event driven programs at schools (non-infrastructure programs) or make improvements to streets, sidewalks, and paths near schools (infrastructure programs). In Colorado, these funds are awarded to K-8 schools that are chosen through a grant process. This process is conducted by the SRTS Advisory Committee, which includes educators, parents, bicyclists, pedestrians, law enforcement, and transportation planners. School districts, schools, cities, counties, state entities and tribal entities are eligible to apply. Nonprofits, such as Bicycle Colorado, are required to partner with a state subdivision or entity of the state in order to apply for funding.

8.1 COLORADO SAFE ROUTES TO SCHOOL FEDERAL FUNDING

Colorado's Safe Routes to School funding from Fiscal Years 2005 to 2009* totaled $8,713,500 and includes annual apportionments ranging from $1 million to nearly $2.7 million. Table 4 below details actual spending by year.

TABLE 4: ANNUAL FUNDING TO COLORADO SAFE ROUTES TO SCHOOL

Fiscal Year	*Funding Amount (Actual Unless Noted)*
2005	1,000,000.00
2006	1,254,403.00
2007	1,679,463.00
2008	2,119,802.00
2009	2,659,832.00
2010	2,659,832.00 (Estimated)

Colorado's SRTS program applications are available online beginning in August and have a mid-December deadline. Grant awards are announced in March, with final contracts as early as the following August.

There are separate applications for infrastructure and non-infrastructure projects. Minimum funding for infrastructure projects is set at $50,000 with maximum funding at $250,000. Minimum funding for non-infrastructure projects is set at $3,500.

*Funding for SRTS is being continued into FY2010 at FY2009 levels.

9. THE GREAT OUTDOORS COLORADO (GOCO)

A growing number of states are providing funds from non-transportation related revenue streams. Colorado's innovative GOCO program, for example, dedicates a portion of its lottery proceeds to projects that preserve, protect, and enhance Colorado's wildlife, parks, rivers, trails, and open spaces. Since it began awarding grants in 1994, GOCO has awarded almost $489 million for 2,100 projects throughout the state. GOCO receives 50 percent of the proceeds from the Colorado Lottery, its only source of funding.

10. THE CITY OF WESTMINSTER

As noted earlier in this Plan, Westminster's voters approved a sales tax specifically earmarked for the acquisition and maintenance of open space. Much of this open space is developed with a shared use path system that now exceeds 74 miles. If maintained, this local source of funding will continue to be instrumental in the development of Westminster's off-street bikeway network.

11. NON-PROFIT GRANTS AND FOUNDATIONS

While non-profit grants may be very difficult to come by, national foundations and organizations like Bike Belong, located in Boulder, Colorado, have increasingly funded bicycle facilities and programs across the county. The Bikes Belong Grant Program strives to put more people on bicycles more often by funding important and influential projects that leverage federal funding and build momentum for bicycling in communities across the U.S. These projects include bike paths, lanes, and routes, as well as bike parks, mountain bike trails, BMX facilities, and large-scale bicycle advocacy initiatives.

Since 1999, Bikes Belong has awarded 215 grants to municipalities and grassroots groups in 49 states and the District of Columbia, investing $1.7 million in community bicycling projects and leveraging close to $650 million in federal, state, and private funding.

Additionally, national health care companies are increasingly involved in supporting active transportation. In October 2010, Kaiser Permanente Colorado partnered with the Colorado Department of Transportation to provide six Colorado municipalities with in-pavement bicycle counters. The pursuit of such innovative public-private partnerships can be a win-win for all involved.

E. BICYCLE SIGNING INDEX

Regulatory, guide and warning signs are essential to ensuring the educated and proper use of bikeway facilities. The City of Westminster should work with CDOT to install appropriate bicycle signs, according to the standards set forth in Chapter 9 of the MUTCD, whenever appropriate for new bicycle facilities.

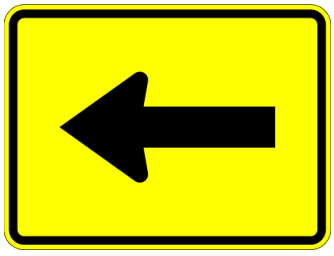
The following appendix includes visual references for all signs recommended in Section 4.3, Action 3 (page 78).

CLASS I - SIDEPATH

- 'Bicycle' (W11-1) and 'Arrow' (W16-7p) or 'Bike/Ped [Symbols]' (CDOT W11-55) warning signs placed every quarter-mile along any sidepath route.

'Bicycle' (W11-1)

'Bike/Ped [Symbols]' (CDOT W11-55)



'Arrow' (W16-7p)

CLASS II - BICYCLE LANE

- ‘Bike Lane’ (R3-17) and ‘Ahead’ (R3-17a) regulatory signs at the beginning of a bike lane.
- ‘Bike Lane’ (R3-17) and ‘Ends’ (R3-17b) regulatory signs at the end of a bike lane.
- ‘Bike Lane’ (R3-17) regulatory sign placed after every intersection along any bike lane route.

‘Bike Lane’ (R3-17)

‘Ahead’ (R3-17a)

‘Ends’ (R3-17b)

CLASS III - SIGNED BIKE ROUTE & CLASS III - SIGNED ROUTE BIKE ROUTE WITH SHARED USE LANE MARKING

- 'Bike Route' (D11-1) and 'Begin' (M4-11) guide signs at the beginning of a signed bike route or sharrow route.
- 'Bike Route' (D11-1) and 'End' (M4-11) guide signs at the termination of a bicycle signed/facility route or bicycle sharrow/facility route.
- 'Bike Route' (D11-1) guide sign placed after every intersection along any bike lane route or sharrow route.
- 'Bicycle' (W11-1) and 'Share The Road' (W16-1) or 'Bicycle' (W11-1) and 'Arrow' (W16-7p) or 'Bike/Ped [Symbols] (CDOT W11-55) warning signs placed every quarter-mile along any signed route or sharrow route (*see* Class I - Sidepath on page 131 for examples of W11-1, W16-7p and CDOT W11-55).

'Bike Route' (D11-1)

'Begin' (M4-11)

'End' (M4-11)

'Share The Road' (W16-1)

F. PUBLIC ART BICYCLE RACKS

Unique, artistic, or multi-purpose bicycle racks can enhance the streetscape environment.

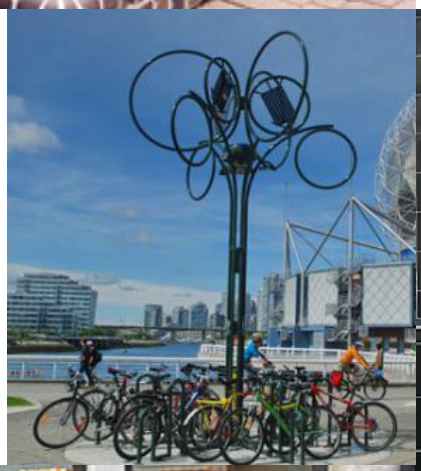
◀ This Louisville, KY bicycle rack is both function and whimsical. (Photo Credit: restaurantwidow.com)

▼ Artist Gadsby Creson designed this bike rack prototype as part of UrbanArt's exhibition series, Work in Progress, that highlights innovative urban design in the public realm. (Photo Credit: UrbanArt)

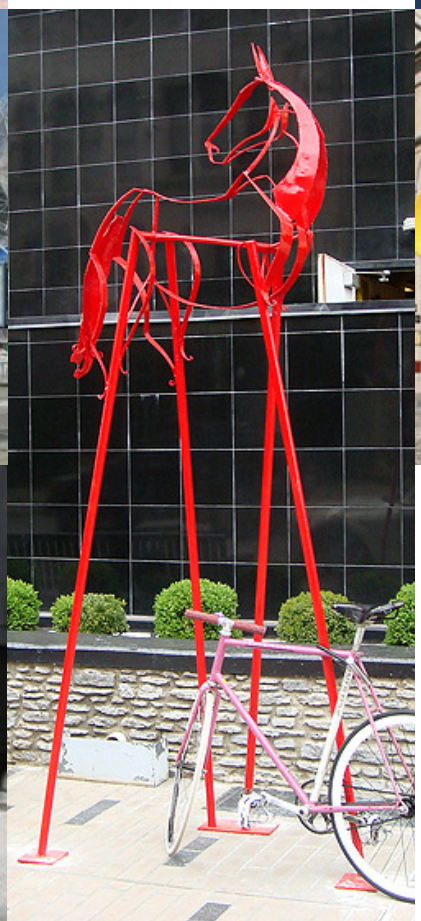
◀ This multi-purpose street furniture functions as a sculpture, fence, tree guard, bench and bicycle rack. (Photo Credit: environmentalartanddesign.com.au)

▼ The Louisville Downtown Management District sponsors a public art bicycle rack program, and has 22 sculptural racks in the downtown area. (Photo Credit: Broken Sidewalk)

▶ Vancouver's "Solar Bike Rack Tree" harnesses energy from the sun to power motion-sensor LED lights onto the bikes. (Photo Credit: Ken Ohrn)



▼ The City of Louisville, KY installs many public art bike racks, like this dragon-inspired one in front of the Actors Theatre of Louisville. (Photo Credit: USA Today)



▲ This rack features the functionality of the "Inverted U" rack, but is an iconic addition to the streetscape. (Photo Credit: Glenn Jackson Taylor of Core 77)

◀ The City of Columbus, IN created bike racks from its "C" tourism logo.
(Photo Credit: American Dirt, dirtamericana.blogspot.com)

▶ Outside of the Yellowstone Art Museum in Montana, street artists crocheted directly onto a standard wave rack.
(Photo Credit: Micro Fiber Militia)

▲ Multi-disciplinary artist David Byrne designed nine unique bicycle racks for the City of New York.
(Photo Credit: The Villager)

◀ This animal-inspired bicycle rack is located in North Carolina.

▼ Gadsby Creson designed this bike rack prototype as part of UrbanArt's Work in Progress series.
(Photo Credit: UrbanArt)

▲ Designed for a municipality with an annual jazz festival, this rack reflects the values of the community.
(Photo Credit: Creative Metalworks)

▶ Spanish artist SpY reassembled "Inverted U" racks to create a more whimsical streetscape.
(Photo Credit: SpY, spy.org.es)

◀ David Byrne's nine unique bicycle racks draw inspiration from New York's neighborhoods. This money rack is installed on Wall St.
(Photo Credit: selecticism.com)

▶ As part of an international design competition for the City of Fayetteville, AR, BICI Planning & Design constructed this combination bicycle rack and bench.
(Photo Credit: Blaine Davis)

◀ Artist Yvonne Bobo created two Ginkgo leaf inspired bike racks for the city of Memphis, TN. (Photo Credit: Alan Spearman)

▼ This bicycle rack, designed and fabricated by BICI Planning & Design, doubles as a wayfinding device; the "scales of justice" design is installed in front of a courthouse. (Photo Credit: Blaine Davis)

▲ Washington DC's bike rack design competition yielded this tongue-in-cheek design. (Photo Credit: Golden Triangle BID)

▶ "Clip Art" bike racks add humor to one of DC's office districts. (Photo Credit: Golden Triangle BID)

▼ The Council Tree Library in Fort Collins, CO has sculptural bicycle racks outside the building. (Photo Credit: Cassy Turner)

▲ Cleveland, OH has introduced artistic bike rack designs to their streetscape.

▶ This rack was submitted as part of New York City's 2009 CityRacks bicycle parking design competition. (Photo Credit: SF StreetsBlog)

◀ This bicycle rack is also part of Louisville, KY's artist bike rack program (Photo Credit: Broken Sidewalk)

▶ Bike racks in Cleveland, OH double as seats for pedestrians.

◀ Public Art Bicycle Racks in Ottawa, Ontario use a standard rack shape with laser cut images to create a sense of place.
(Photo Credit: Flickr User veganbackpacker)

▶ This Palisade, CO rack is modeled after a potato masher.
(Photo Credit: Flickr User h. wren)

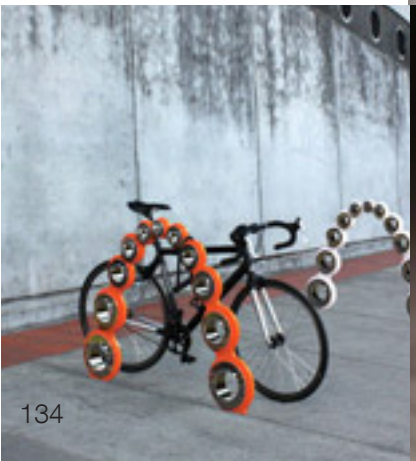
◀ This rack was created by Baroni Valeriani Architetti as part of the New York CityRacks Design Competition, which drew submissions from international artists and design firms.
(Photo Credit: Glenn Jackson Taylor of Core 77)

▼ Another CityRacks entry, by Francis Anthony Bitonti.
(Photo Credit: Michael Konrad)

▲ The Winnipeg Arts Council commissioned bike racks for the downtown area.
(Photo Credit: Winnipeg Arts Council)

▶ This Louisville, KY rack uses bicycles to create a sculptural parking structure.
(Photo Credit: Broken Sidewalk)

▼ Jones Chijoff's concept, *Derailled*, was created for the Powerhouse Museum.
(Photo Credit: Powerhouse Museum)



◀ This sculptural bicycle rack was designed by artist Mike Lesh.
(Photo Credit: Mike Lesh, mikeleshstudioart.com)

▶ In Ann Arbor, MI, these bicycle racks celebrate the city's art community, including the 100th anniversary of the Ann Arbor Art Center.
(Photo Credit: twofellswoops.com)

G. NOTES, CITATIONS, & RESOURCES

IN TEXT NOTES & CITATIONS

3. BICYCLE NETWORK PLAN

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ii. Geller, Roger, City of Portland Office of Transportation, "Four Types of Cyclists," 2009. http://www.portlandonline.com/transportation/index.cfm?a=237507&c=44671

iii. Regional Transportation District (RTD) provides regional bus and rail transit throughout the Denver region. According to the agency's 2007 Bike-on-Bus Survey, more than 682,000 trips utilized the system's bike racks

iv. Alta Planning + Design, Bicycle Interactions and Streetcars: Lessons Learned and Recommendations, 17 October 2008, available on the web at: http://www.altaplanning.com/App_Content/files/pres_stud_docs/Bicycle_Streetcar_Memo.pdf

v. Eckerson, Clarence, "How to Properly Cross Rail Tracks on Your Bike," 11 February 2010, available on the web at: http://www.streetfilms.org/how-to-properly-cross-rail-tracks-on-your-bike/

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4. WAYFINDING & SIGNAGE PLAN

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ii. Federal Highway Administration (FHWA), *Manual on Uniform Traffic Control Devices (MUTCD)*, available on the web at: http://mutcd.fhwa.dot.gov/kno_2009.htm

5. BICYCLE PARKING PLAN

i. The City of Westminster, Colorado, *Westminster Site Design Guidelines*, Section 11-7-4, E1-E2

6. EDUCATION, ENCOURAGEMENT, ENFORCEMENT & EVALUATION

i. A 2004 District of Columbia, Department of Transportation study

ii. Klobucar, Michael and Fricker, Jon D., "Feasibility Study for Bicycle Safety: Data Assessment and Network Evaluation," *Joint Transportation Research Program*. Paper 249. 2007. Available on the web at: http://docs.lib.purdue.edu/jtrp/249

C. GENERAL COST ESTIMATES

i. Pedestrian and Bicycle Information Center

ii. Nevada County Bicycle Master Plan (CA)

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American Association of State Highway and Transportation Officials, A Guide for the Development of Bicycle Facilities, 1999.

American Association of State Highway and Transportation Officials, A Policy on Geometric Design," 2009.

American Association of State Highway and Transportation Officials (AASHTO), *Provisional Standards, 2009 Edition,* 2009, available on the web at: http://www.knovel.com/web/portal/browse/display?_EXT_KNOVEL_DISPLAY_bookid=2670&VerticalID=0

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Pedestrian and Bicycle Information Center, BicyclingInfo.org. Bikeability Checklist. Accessed at: http://www.bicyclinginfo.org/cps/checklist.htm

Policy Statement on Bicycle and Pedestrian Accommodation - Regulations and Recommendations, 2010

Portland State University Bicycle Box Study

United States Department of Transportation Federal Highway Administration, *Manual on Uniform Traffic Control Devices*, Chapter 9: Traffic Control for Bicycle Facilities. 2009. 789 - 816. Available on the web at: http://mutcd.fhwa.dot.gov/pdfs/2009/pdf_index.htm

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THANK YOU!

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