

Appendix D

City of Fort Collins

Bicycle Wayfinding System Guidance

1 -- Introduction

A network of signed bicycle routes will contribute toward Fort Collins' three pillars of sustainability by increasing the comfort of new residents and visitors as they bicycle in the city, by reducing single occupancy vehicle trips, and by building community through neighborhood connectivity. The *interested but concerned* bicyclist is the primary untapped audience that will be served by features of this Bicycle Master Plan. Signed low-stress bicycle routes are among the key features that target and serve this group of cyclists. Specific objectives for development of a citywide network of signed bike routes are listed below.

1. Provide higher level of comfort for people choosing to travel by bike:
 - a. For those who are new to bicycling for transportation purposes.
 - b. For those who are new to Fort Collins.
 - c. For those who are unfamiliar with a neighborhood where they want to travel.
2. Aid the following user groups:
 - a. City residents and CSU faculty, staff and students making local trips.
 - b. New CSU students, faculty and staff.
 - c. Visitors to the City.
 - d. Bicycle commuters who come to Fort Collins from surrounding areas.
 - e. Recreational bicyclists.
3. Provide guidance along routes which are not intuitive or are different from those followed by motorists.
4. Provide navigational assistance (e.g. distances to destinations) for which bicyclists and trail users, in particular, need wayfinding guidance.
5. Support bicycle encouragement efforts by:
 - a. Providing a discrete element of bicycle infrastructure that can be promoted and marketed to new audiences;
6. Support bicycle safety by:
 - a. Helping cyclists find routes that are appropriate for their skill and comfort level.
 - b. Providing a widespread and systematic visual indicator for motorists that bicyclists should be expected on the streets of Fort Collins.

This Appendix provides guidance for establishing a comprehensive bicycle wayfinding system for on-street routes and shared use paths (trails) in Fort Collins. The guidance is based upon the protocols set forth in the Manual on Uniform Traffic Control Devices for bicycle wayfinding (MUTCD-Part 9), and draws from best practices employed by Toole Design Group in various communities, including Washington, DC; Arlington, Virginia; Montgomery County, Maryland and Seattle, Washington.

2 -- Policy and Regulatory Framework

The following national manuals provide guidance on specific aspects of bicycle wayfinding, but do not provide detailed information on how to design and implement a wayfinding system within a municipality. A summary of the guidance provided in each manual follows.

Manual on Uniform Traffic Control Devices (MUTCD) Guidelines

The Manual on Uniform Traffic Control Devices (MUTCD 2009 edition) includes standards for:

- Bicycle Route designation signs
- Sign panel design options for directional bicycle route signs, including colors and retro-reflectivity of sign faces.
- Standards for arrangement of arrows, legend, distance and other symbols.
- Standards for arrangement of multiple panels in an assembly.
- Guidance regarding sign panel sizes and font sizes.
- Protocols for font type, symbol graphics, distance measures and abbreviations.
- Sign installation standards such as minimum clearance height and horizontal placement from edge of the roadway or trail.

The AASHTO Guide for the Planning, Design and Operation of Bicycle Facilities

The American Association of State Highway and Transportation Officials (AASHTO) Guide provides supplemental information to the MUTCD. The guide explains the use and benefits of different sign types for bicycle wayfinding. It also provides general guidance on where to use signs: on what types of routes and how to place signs at intersections.

The National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide

The NACTO Urban Bikeway Design Guide provides guidance based on current best practices in large cities. It has short chapters on route planning, Bicycle Boulevards and bike route wayfinding.

3 -- Current National Practices

As of 2014, an increasing number of cities and urban counties are installing jurisdiction-wide signed route systems. Some are upgrading old sign systems dating to the 1970s, others are rolling out their first network of signed bicycle routes. The protocols and practices recommended for Fort Collins are drawn from the experiences of these cities, as well as the guidance provided in the national guidance documents.

Branding: Many cities start with the green and white BIKE ROUTE sign (D11-1) in the MUTCD, and customize its design to create a unique local brand. Other communities observe the national standards more strictly, making only technical modifications like varying the placement of the bicycle symbol or using an alternate bicycle symbol graphic.



Figure 1: Takoma Park, Maryland inserted the city seal into the front wheel of the bicycle.

based upon sign panel design options provided in the MUTCD. On all Fingerboards (D1 series signs), they decided to place the bicycle symbol on the right of the destination text, rather than on the left, as recommended in the MUTCD.

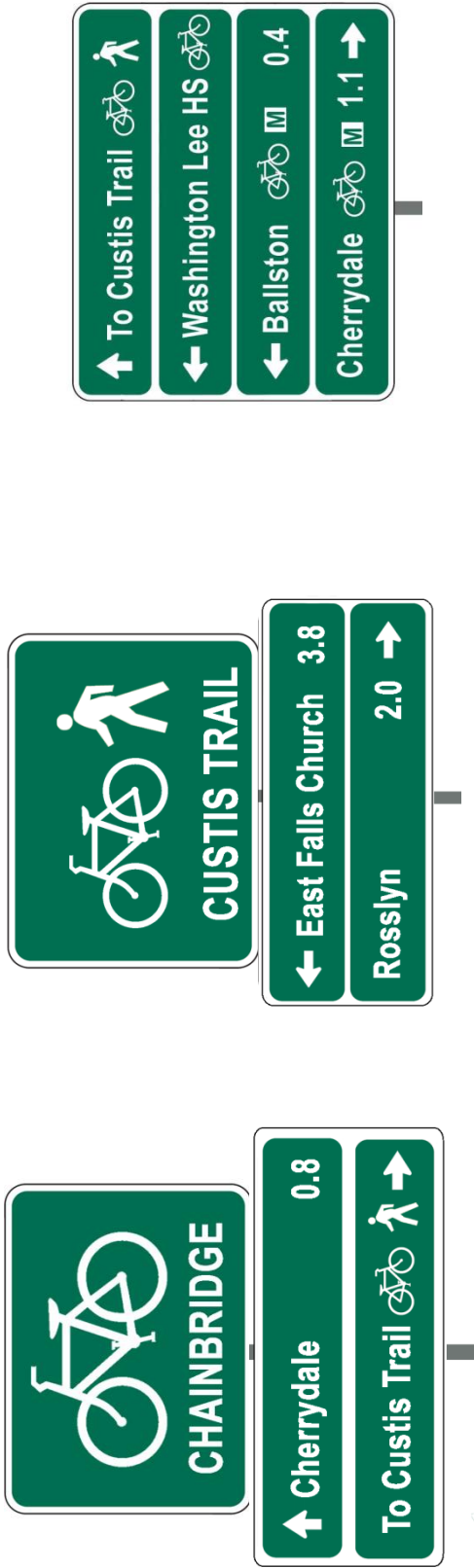
As noted, the MUTCD provides a set of acceptable bicycle route sign panels and a variety of supplemental panels, but does not go into detail about how to create a system of routes or establish a hierarchy of route classifications that is understandable and helpful for cyclists. For example, the MUTCD provides three sign types as options for standard bike route blazes, however local and state transportation agencies must select which option or set of options they want to use, and how to use them. Ultimately, every community must develop their own application of MUTDC signs to create a coherent system of routes.

Two examples of wayfinding sign systems for cyclists are described below--Arlington, Virginia and Seattle, Washington.

Arlington County has adopted an approach for signing bicycle routes that uses three primary sign styles (See Figures 2-4): A) the On-Road Blaze, B) the Trail Blaze, and C) the Fingerboards,

Arlington, Virginia

Figures 2-4



On-Road Blaze with Fingerboards

This blaze uses the MUTCD (D11-1c), a modification of the D11-1. The legend is customized for the direction of travel along the route by replacing the term BIKE ROUTE with a specific route destination; i.e. CHAINBRIDGE, ROSSLYN, BALLSTON, etc., based on the ultimate route ending point. Related destinations or additional information are subordinate to the primary destination and appear as Fingerboards as shown above.

Trail Blaze with Fingerboards

This blaze is a modification of the D11-1. It uses both the bicycle and pedestrian symbols, and includes a Trail Name, i.e. CUSTIS TRAIL, W&OD TRAIL, FOUR MILE RUN TRAIL, etc. This blaze is used primarily at every access point to the trail for users entering the trail system. Only two destinations (the trail endpoints) are provided at each entry point.

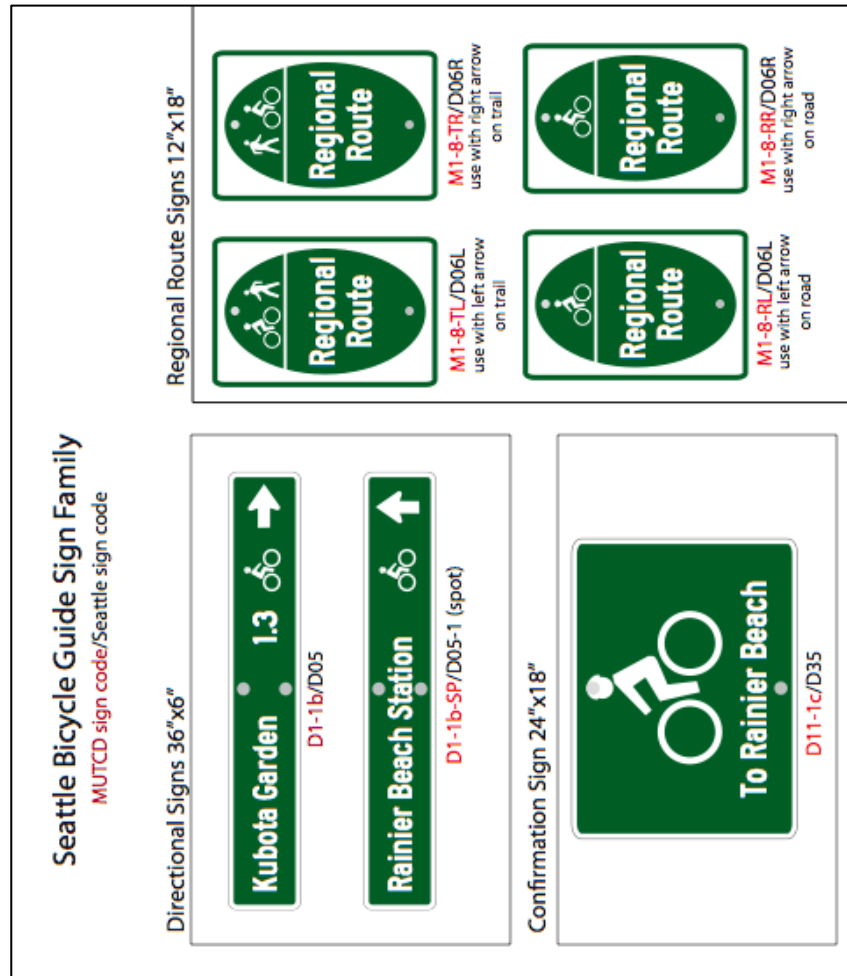
Fingerboard

Up to four fingerboards (D1 series) signs may be used on one sign assembly; a small bicycle symbol is used on each panel or set of panels. This approach to route blazing is effective in areas where many important destinations are clustered together and/or there are multiple possible routes to a destination, and one is not necessarily preferred over another.

Seattle, WA

The Seattle sign system uses three types of signs: 1) the D11-1c, 2) the D1-1 series, and 3) the M1-8 series, to help brand their regional routes and off-road trail (see Figure 5). In order to include the colloquial route name on the M1-8a sign, adjustments were made to the standard sign. The route number was replaced with route name within the main body of the sign. The space at the top of the sign, reserved for a logo, includes an image of a pedestrian and bicycle to indicate that the facility is a shared use path. Use of all three route signing options does create situations where the width of a single sign assembly will vary considerably (see Figure 6).

Figures 5 and 6



4 -- Wayfinding Framework for Fort Collins

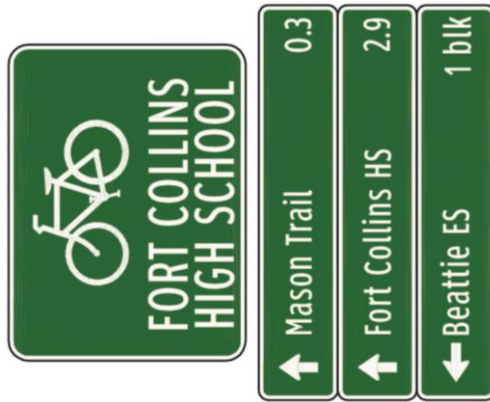
The Fort Collins Bicycle Master Plan recommends development of a bikeway network consisting of three primary bikeway classifications:

- **Low Stress Bikeways** (consisting of primarily collector and local streets (with low traffic volumes) with bike lanes and buffered bike lanes, shared lane markings, enhanced arterial crossings, and connector trails).
- **Shared Use Paths** (consisting of park trails and greenways, and other major off-road bikeways).
- **Arterial Road Routes** (consisting of bike lanes, shoulders, wide outside lanes, buffered bike lanes and protected bike lanes).

This network is designed to improve the comfort and safety of less-confident cyclists, including children and the elderly, to serve the broadest possible population with bicycle transportation infrastructure. This large subset of existing and potential cyclists is the same group for which signed bicycle routes are most helpful.

For this reason, a bicycle route sign system similar to Arlington, Virginia is recommended to provide continuous wayfinding throughout the bicycle network. This type of system is well-suited for bicyclists who maybe familiar with the city's landmarks and districts, but unfamiliar with what may be the low-stress route to their desired destination(s).

To serve all types of bicyclists, but with a strong orientation to the *Interested but concerned*, three slightly different sign designs are recommended for the three basic classes of bikeway (see Figures 7-9).



Named Route Sign Assembly for

Low Stress Bikeways

This design uses the MUTCD (D11-1c), a modification of the D11-1. The legend is customized for each direction of travel along the route by replacing the term BIKE ROUTE with a specific route destination. These routes are named in one of two ways:

- 1) using a landmark at the end of the route, or
- 2) where no obvious landmark exists, using the name of the most prominent street upon which the route runs.

Related destinations or additional information are subordinate to the primary destination and appear as D1-a series Fingerboards as shown above.

Named Trail Sign Assembly for

Shared Use Paths

This blaze is a modification of the D11-1. It uses both the bicycle and pedestrian symbols, and includes a Trail Name. It is used at trail access points at the actual point of entry.

Only two destinations (the trail endpoints) are provided at each entry point (D1-a series). These signs can be placed along the trail as well, if the trail system does not already have an adopted sign style or brand.

Destination, Distance and Direction (D³) Panels for

Arterial Road Routes

This approach uses the D1-c series which has a less prominent presence in the landscape. Reduced prominence underscores 1) cyclists using arterials are likely to be more experienced and less likely to need navigational aids; 2) arterials typically have existing guide signs for motorists that cyclists can also use, and. These signs can be used as well on short connecting routes and in other locations where spot wayfinding is needed independent of a major preferred route

Named Route Signs for Low Stress Bikeways

The Named Route panel is a modification of the MUTCD - D11-1 sign. It is customized for each route by replacing the term BIKE ROUTE with a specific route destination based on the route's ultimate end point. (i.e. DOWNTOWN, CSU MAIN CAMPUS, POUUDRE TRAIL, FOSSIL CK PK, etc.).

This style of sign is recommended on routes where the repeated use of the primary or ultimate destination provides highly recognized and unambiguous navigational guidance. Assigning a "name" for the route is useful because it provides more information than just BIKE ROUTE, i.e. "the POUUDRE TRAIL bike route will take me to the paved path along the Poudre River greenway." Typically, these routes are longer in distance, represent a preferred route to the destination that is appropriate for intermediate to beginner cyclists, and may have a number of turns which could easily be missed if signs are not provided.

Selecting a primary destination for each direction of travel on the Named Routes is an early step in the signed route implementation process. The 18" x 24" sign panel provides a large visual presence in a roadway or trail landscape. Use of the D11-1c panel is suggested on almost every sign assembly along a route, in order to regularly inform cyclists of the ultimate route destination.

A potential drawback to use of "named" routes is that the same route (line on the map) has different "names" depending on which direction the cyclist is going.

Sign Specs: Size: 18" x 24", white on green and retro-reflective. The legend should be in all caps, 2" high for best visibility. When destinations are long, the bicycle symbol can be reduced in size and two lines of text can be used, or letters can be reduced to 1.75" or 1.5" in height.

Sign Placement in the Right-of-Way:

1. In vegetated buffer strips between the curb and sidewalk, or in the sidewalk.
2. At decision points (i.e. turns or intersections with crossing routes).
3. 30'-50' after every stop-controlled or signalized intersection.
4. At transitional locations (such as trail-to-road and road-to-trail transitions) or in cases where bicyclists will be transitioning to/from sidewalks.
5. Every ¼ mile to ½ mile if criteria 2-4 create a gap in signage. Spacing will depend on the density of the street network, and layout of street geometry.

Confirmation

The D11-1c is also used as a confirmation sign on the route. A confirmation sign reassures the bicyclist that they are still on the correct route. The confirmation sign assembly is used in three ways:

1. Route Confirmation signs are placed on the far side of an intersection with an arterial or collector road. This acts as a confirmation to the cyclist already on the route that they

were not supposed to turn at the intersection, and it confirms to the cyclist entering the route at this intersection that they are on the right route.

2. Route Confirmation signs are also used after any turn that the route takes, to confirm that the bicyclist is still on the correct route.
3. Where the route makes a left turn, Route Confirmation signs can also be used on the left side of the intersection in conjunction with the advanced route turn sign provided before the turn on the right side of the road. Both of these assemblies would use the D11-1c with an arrow plaque from the M series.

As shown in Figures 10 and 11, route confirmation sign can include a subordinate plaque providing directional and/or distance information on a D1-1 or D1-1a panel.



Figure 10



Figure 11

Named Trail Signs

The Named Trail sign is used to mark trails, such as the Poudre Trail, the Spring Creek Trail, the Fossil Creek Trail, the Mason Trail, and other off-road shared use paths, as appropriate. This sign is a modification of the MUTCD D11-1 sign, as well. It includes the bicycle and pedestrian symbols, as well as the trail name. These signs are used almost exclusively at trail entrance points and along entrance/exit spurs. This sign should be used with D³ panels: either two D1-1a panels or the combined 2 destination panel (D1-2a) that indicate the ultimate trail destinations (end points) to the right and left.

A legend such as “To POU DRE TRAIL” and an arrow plaque can be used to guide trail users from an on-road route, along a spur trail to the actual named trail, which may be some distance away at the end of the spur. In conjunction with an arrow plaque, this sign can also be used at a “Y” or “T” in the trail, to highlight which way trail users should go in order to stay on the main path.

Because most trails in urban areas provide access to a large number of important destinations, providing guidance upon entry to only one destination to the right and one to the left is limiting. Use of the D1-2a and D1-3a (no bicycle symbol) is recommended for periodic use along the trail to provide supplemental destination and distance information. These sign types provide guidance regarding destinations, distances and direction of travel and will enable more effective use of the trail system for transportation. These signs are also used at junctions with spur trails and at the end of spur trails to inform exiting trail users of the key destinations that can be reached upon leaving the trail system.

Destination, Direction and Distance (D³) Fingerboards for Arterial Road Routes

D³ signs (D1-1c, D1-2c, D1-3c, see Figure 12 and 13) can be used in three ways:

- 1) Along arterial road routes that have bicycle facilities (bike lanes, protected bike lanes, consistent shoulders, etc.) and provide direct access to popular cycling destinations and major community assets. Due to the nature of Ft Collins' grid street system, as new residents and visitors get to know the city it becomes clear where most arterials go, and how they may be useful for direct travel by cyclists who are comfortable with the traffic speeds and volumes. Minimal signage is needed to further guide cyclists using these routes.
- 2) In areas where *Named Routes* overlap or provide access to the same destinations, such as the downtown area. Unlike the D³ signs that are placed under a Named Route panel or Named Trail panel, it is important for these signs to include the bicycle symbol, to clarify to all who may view them that the guidance is intended for cyclists.
- 3) As *spot signs* which provide guidance to a destination that is off of the signed route but none-the-less served by the route. To guide cyclists effectively, up to four *spot signs* may be needed. References such as "To" and "Via" can be used where necessary. Distances may not be needed or best expressed in blocks rather than miles. Spot signs may be used to provide guidance to signed bicycle routes from adjacent roadways, side paths etc., or access to important facilities such as a trail at a location where users tend to get lost or make wrong turns.



Figure 12



Figure 13

Sign Placement in the Right-of-Way: Where D³ signs inform cyclists of destinations to the right and/or left, they are installed on the approach to an intersection. Where located on wide multi-lane arterials these signs may also be used on the far left side of the intersection as a confirmation or second opportunity for the cyclist to be informed of a left turn in the route.

Place 50-150+ feet on the approach to a decision point or intersection of another signed bicycle route, based upon the speed of bicycle traffic and maneuvers that may be required to make a right or left turn. To allow for comfortable left turns, place the decision sign at the appropriate distance from the intersection based on the number of lanes that a bicyclist must merge across:

- No merge: 50 feet
- One lane merge: 100+ feet
- Two lane merge: 300+ feet

Where D³ signs are used to inform users of supplemental through destinations, they should be placed 200-400 feet after a major intersection, at a location where street trees and parked cars will not block their view and there are no or few potential conflicts such as vehicles entering the road from driveways or parking lots.

Sign Specs: “30 x 6”, 30” x 9”, 36” x 6”, or 36” x 9”, white on green, title case (capital, and retro-reflective).

Sign placement on post: Directional sign organization at a given decision point will be based on the following guidelines:

1. The number of destinations provided on a given post is not to exceed four (three is preferred). This allows for proper vertical clearance to be maintained. Four signs per post is the maximum amount of information that can be read by a passing bicyclist.
2. The number of signs on a given post that point in the same direction is not to exceed two. This guideline is based on the fact that D³ signs will be installed at intersecting bike routes, and there should be at least one sign indicating a destination in each direction.
3. The **through** destination(s) should go at the top of the assembly ordered (from top to bottom) by nearest to farthest. The **left** destination(s) follow, in the same order, nearest to farthest; the **right** destinations should be at the bottom, nearest to farthest.
4. When routes have merged or overlap, the legend(s) that were used on the D11-1c as the route names should appear on D³ panels, to provide continuity to the destination.

Sign Content (Legends): Destination, distance and directional information will be unique on most signs. Determining destinations is important to the function of the network. Distance information will be determined by the spacing of decision points and destination locations.

1. Identify and Rank Destinations:

- a. Develop a list of all destinations and rank them in a hierarchy. For example:
 - i. **Primary:** Trails, business districts, major and regional parks, major institutions
 - ii. **Secondary:** transit stations, community parks, neighborhoods, other municipalities
 - iii. **Tertiary:** schools, community centers, designated bicycle streets
 - b. The ranking will help determine how often the destination will appear on a sign on any given route. Primary destinations are typically used as controls and appear most often. Secondary destinations may appear 2-3 times; tertiary destinations may only appear once, possibly only at the location where the cyclist leaves the route to get to the destination.
1. Provide distance measurements in tenth of a mile increment such as 4.3 and 1.2. In areas such as downtown, use of X Blks (Blocks) may be more helpful for signs that are within one-

- third of a mile. If all mileages on a single assembly are whole numbers, inclusion of a “0” as a tenth mile placeholder is preferred.
2. If a bike route terminates at a location where there is no destination use the name of the perpendicular street at the end of the route as the destination.
 3. For all D³ signs, use upper case for the first letter of each word, then lower case letters.
 4. Use Clearview Series C font. This font is approved for use by the Federal Highway Administration. It strikes a balance between visibility and maximum characters per sign.
 5. Use two-inch high letters. This size is visible from approximately 80 feet away. Consider use of 2 ½ inch high letters on signs that are placed along 4-6 lane arterial roadways.
 6. For destination names that are too long to fit on one line, use two lines or intuitive abbreviations.
 7. Do not use periods in the abbreviations of destination names, unless the abbreviation might be read as a complete word.
 8. Use graffiti film on bicycle route signs that are lower to the ground, particularly on trails. This will increase the longevity of the signs.

Supplemental Signs

There are three important supplemental signs that will assist with navigation on Fort Collins bikeways, the Trail Name panel (D3-1), the Street Name panel (D3-1) and the guidance to parking panel (D4-3)

Trail Name and Street Name panels: In locations where streets and trails cross (both at-grade and grade separated crossings) the facilities should be identified on a sign by name (see Figure 14). At at-grade crossings road and trail users need to know the name of the facility they are crossing; the street and trail name should be indicated on perpendicular panels on a standard city street sign pole. At signalized crossings, trail name panels can also be mounted on overhead mast arms for better visibility. At grade separations, facility name signs can usually be mounted on the infrastructure itself. On road cyclists need to know the name of the trail system they are passing over, as well as how to connect from the road to the trail. On-trail cyclists need to know which road they may be passing over or under as a measure of progress, or to identify the cross street where they need to leave the trail system to find their destination.



Figure 14

Guidance to Bike Parking: The sign will be helpful on approaches to the various CSU campus entrances, and any other large institutions where bicycle parking may be difficult to locate. They can also be used to guide users from a bike parking location that may be full to a supplemental set of racks that are not visible from the first set. Word or symbol plaques can be added to indicate rack style or locker style parking, or if parking is covered.

Additional Supplemental Plaques

Supplemental sign panels (sometimes called plaques or subplates) provide additional information that can be added to D11-1 series signs, See Figure 15.



Figure 15: Page 800, MUTCD, 2009 Edition.

5 -- Roadway and Shared-Use Trail Sign Placement Guidelines

Guidance on signage placement is important to providing a legible sign system. Predictable and uniform placement of directional signs at signalized or stop-controlled intersections and at regular intervals helps to provide proper guidance, particularly if a turn in a route is to occur.

Trails

Horizontal, lateral and vertical installation of bicycle signs differs for shared-use trails and roadways. For trails, follow the MUTCD guidelines for lateral and vertical signs placed along shared-use trails (see Figure 16):

1. 8 foot minimum vertical clearance for overhead signs, 10-12 feet is preferred.
2. 2 foot clearance from edge of trail to edge of sign
3. 4 foot minimum distance between ground and bottom edge of sign

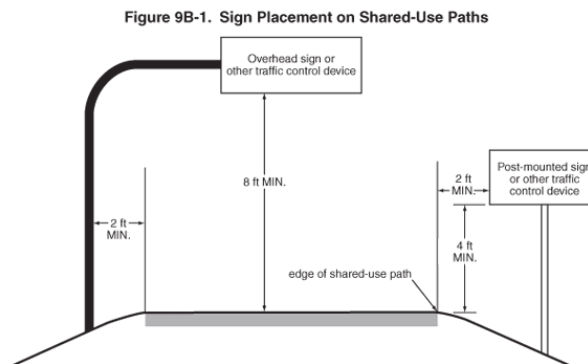


Figure 16: Sign placement for trails, MUTCD, 2009 Edition.

Roadways

For bicyclists, a good baseline distance required to read a sign and determine an action is 30-50 feet from the intersection. Additional engineering judgment is required when placing directional signs to allow for visibility of the sign with parking, vegetation and other possible obstructions.

Sign mounting height is also outlined in the MUTCD ([Section 2A.18](#)); however, due to speed and sight line differences between bicyclists and motor vehicles, minimum post heights are recommended for bicycle signs.

Mounting height guidance:

1. Sidewalk Clearance: 7 feet of clearance from the bottom of the sign to the ground should be allowed. If there are multiple signs per post, and the lowest sign is lower than 7 feet, the lowest sign cannot stick-out more than 4 inches into the sidewalk. If bicycles use the sidewalk the clearance height should be 8 feet.
2. If there is no sidewalk and few obstructions such as parked cars, optimum vertical height for bicycle signs is 7 feet from the bottom of the sign.

6 -- Design and Implementation of the Bicycle Wayfinding Sign System

The 2 Plan outlines a bicycle network that consists of existing and proposed routes on roadways and trails. Wayfinding is an important component of the recommended bicycle network. While implementation of the signage improvements in this Plan can begin immediately, in some locations it must be closely coordinated with implementation of certain physical network recommendations.

Implementation Steps

1. Identify the routes in each of the three bikeway classifications that will be signed.
2. Identify a set of destinations to use in the sign network and organize them in a hierarchy as described on Page 11 (*Sign Content Legends*)
3. Using this chapter of the Plan as a base, develop and adopt a protocol that addresses the wide range of design options discussed in this chapter and includes all the sign panels that are expected to be used.
4. Conduct in-field feasibility analysis of one or more routes to be signed as a batch. The number of routes and amount of mileage to study will be determined by funding availability and other institutional factors. Produce a feasibility report or deficiencies analysis to determine if the route is *sign-ready*, i.e. generally safe and fully functional for the type of cyclists that will use the route based upon its classification. Following are some criteria that can be used for feasibility analysis.
5. Determine if deficiencies can be mitigated prior to or as part of the sign installation work, or if the route should be shelved until it is ready for the expected users.
6. Determine if the work will be done in-house by city staff, or bid out to contractors.

7. Develop a sign plan that includes a map of all sign locations and all necessary details for sign fabrication and installation, based upon the selected method of procuring the work.
8. Fabricate and install the signs and inspect the work carefully to ensure that all signs are done correctly.

The following list of potential issues should be reviewed in the feasibility analysis phase to determine each route's *sign-readiness*:

- Directness
- One way streets
- Signal operations
- Crosswalks and curb ramps
- Turning restrictions
- Public ROW
- Permits needed from public agencies
- Drainage Grates
- Pavement Quality
- Lighting and personal security
- On-Road / Off-Road Transitions