



JEFFCO REGIONAL BIKEWAYS
WAYFINDING
GUIDE OCTOBER 2016

APPENDICES

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Appendix A

Wayfinding Issues and Opportunities

OVERVIEW

An audit of existing wayfinding facilities was completed by both driving and bicycling along Jefferson County's network of on- and off-street network of bicycle facilities. These field tours focused on larger regional networks (C-470, Clear Creek Trail, etc.) and infrastructure within the communities of Arvada, Edgewater, Golden, Lakewood, Westminster, and Wheat Ridge. The routes traveled represent trail and on-street facilities typical of Jefferson County and local communities. These routes are also likely to be selected as wayfinding corridors.

The purpose of this audit was to document existing wayfinding infrastructure and identify opportunities. The following sections summarize the field tours through photos and observations concerning the form and function of:

- Existing bicycle wayfinding
- Existing community wayfinding
- Regional wayfinding

EXISTING BICYCLE WAYFINDING

EXISTING BICYCLE INFRASTRUCTURE OBSERVATIONS

Jefferson County has a network of designated on- and off-street bicycle facilities that are used for both recreation and daily travel. Existing wayfinding largely provides guidance along a single route, not to destinations or other facilities. Existing bicycle wayfinding elements primarily include:

- *Manual on Uniform Traffic Control Devices (MUTCD)* regulatory, warning, and guide signs
- Customized wayfinding signage
- Multi-use trail wayfinding signage
- Pavement markings

Inconsistent sign placement and messaging requires existing knowledge of the bicycle network to successfully navigate to destinations and other bike facilities. Sign clutter also presents navigational challenges as bicyclists may become overwhelmed while trying to interpret information while in motion.

2.1.1 MUTCD Regulatory, Warning and Guide Signs

The majority of bicycle wayfinding throughout Jefferson County is standardized MUTCD signage. This uniformity provides continuity throughout the county and across jurisdictional boundaries but does not provide information prompting bicyclists of their geographic location and is often inconsistently placed along routes.

Standard MUTCD regulatory signs and plaques for bicycle facilities appear throughout Jefferson County.



Bike lane signs in Wheat Ridge (left) and Westminster (right).

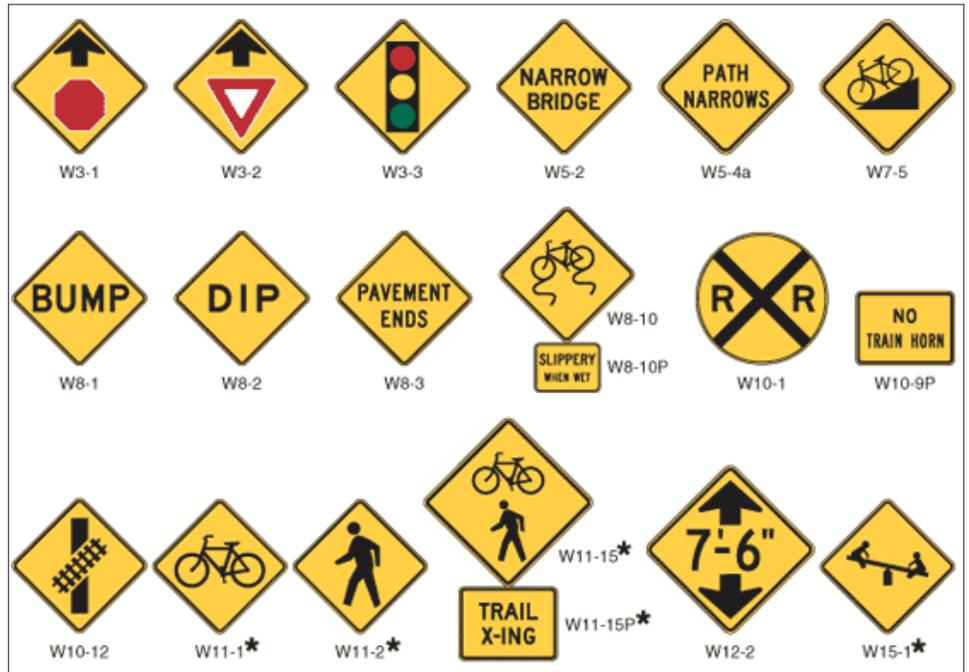


In Lakewood, regulatory signage alerts both bicycles and vehicles to bike and vehicle travel and parking lanes.



Throughout the county, regulatory signage is often obstructed by vegetation.

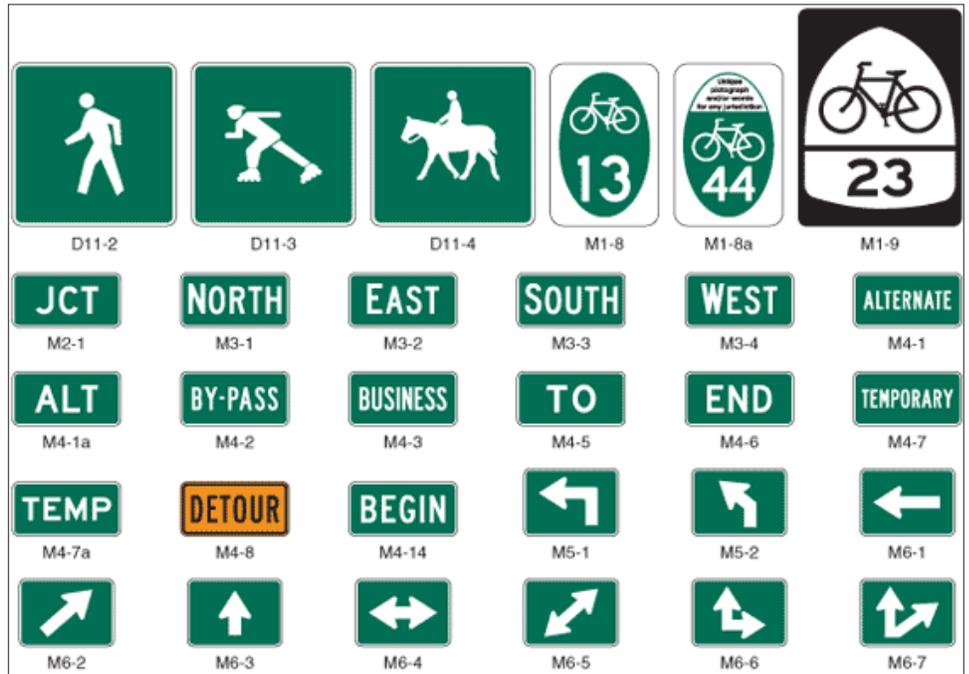




From top:

Standard MUTCD warning signs, plaques, and object markers appear throughout Jefferson County.

In Arvada, warning signs alert bicyclists of steep grades and direct them to slow for the upcoming curve. Signage also alerts vehicles to pedestrian and bicyclists.



From top:

Standard MUTCD guide signs and plaques for bicycle facilities appear throughout Jefferson County.

In Lakewood, guide signs provide direction along bike routes. For bicyclists familiar with route networks, the markers are important to wayfinding but are absent for many segments throughout Jefferson County.

From left:

Guide signs are often in poor condition and do not provide travel clarity to bicyclist unfamiliar with the network.

Overlapping signs direct bicyclists to bike routes but do not clearly indicate routes and can be difficult to interpret while in motion.



CUSTOMIZED BICYCLE WAYFINDING SIGNAGE

With the exception of custom multi-use wayfinding signage described in Section 3 (page 11), Golden is the only community with customized wayfinding signage. Golden utilizes standard MUTCD signs with the addition of a customized Golden Bikeway supplemental sign.

MUTCD signs are supplemented with “Golden Bikeway” indicators throughout the city.



MULTI-USE WAYFINDING SIGNAGE

Multi-use wayfinding signage is largely located along regional trails throughout the county such as Bear Creek Trail, Ralston Creek Trail, C-470 Bikeway, US 36 Bikeway, Little Dry Creek Trail, and Big Dry Creek Trail. Wayfinding elements often include trail markers, decision signs, and confirmation signs. While networks such as the C-470 Bikeway have consistent branding across jurisdictional boundaries, wayfinding elements typically vary by community. This can make navigation difficult for bicyclists unfamiliar with the network.

From left:

Decision signs along the C-470 Bikeway provide bicyclists with information regarding distance to destinations and the segment of the regional trail they are currently traveling.

US 36 Bikeway confirmation and turn sign.



From left:

Little Dry Creek confirmation sign and sign directing bicyclists on an adjacent bike lane to trail.

Ralston Creek Trail confirmation sign in Arvada.



From left:

Jefferson County's West 32nd Ave Trail is clearly marked with signage that matches signs found throughout the open space network.

Bike route and directional signage is attached to a telephone pole directing bicyclists to the Wheat Ridge Green Belt and Clear Creek Trail.



From left:

Signage along the Westminster segment of Big Dry Creek Trail provides direction and orientation to cyclists. Wayfinding signs incorporate branding elements for Westminster Open Space, Jefferson County Open Space and National Recreation Trails.

Signage along roadways directs vehicle to trail parking/access sites.



From left:

Signs direct bicyclists to Clear Creek Trail.

Directional signage along the West Rail Line Bike Path in Lakewood.



Examples of Bear Creek Trail signage.



On-street pavement markings include simple white bicyclist marking and colored markings to reinforce proper bicyclist positioning.

From left:

Wheat Ridge pavement marking

Golden's application of a green pavement marking

PAVEMENT MARKINGS

In many Jefferson County communities, bike facilities include simple bike pavement markings and more pronounced green boxes. Along Clear Creek trail, the lack of signs has resulted in guerrilla wayfinding that includes directions arrows and destinations.



From left:

Arvada's application of green pavement markings

Lakewood pavement marking



Guerrilla wayfinding along Clear Creek Trail guides trail users and includes direction to destinations.



EXISTING COMMUNITY WAYFINDING AND BRANDING

EXISTING COMMUNITY WAYFINDING AND BRANDING OBSERVATIONS

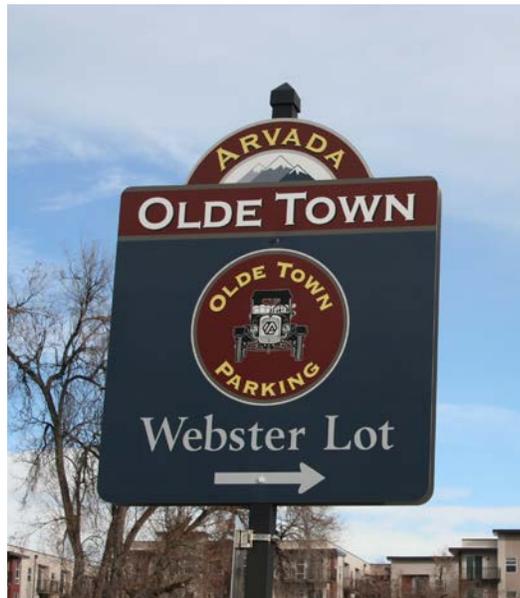
Multiple wayfinding initiatives exist throughout Arvada. Although wayfinding sign designs vary, consistency is established through the use of a similar color palette (dark blues and reds) and application of Arvada's logo.

A variety of community wayfinding signs are located throughout Jefferson County. Community wayfinding is largely present in areas with a concentration of destinations and/or visitors from outside the community. A common form of community wayfinding throughout Jefferson County includes the customization of street signs to include branding indicating jurisdictional location.

From left:

Olde Town Arvada vehicular wayfinding

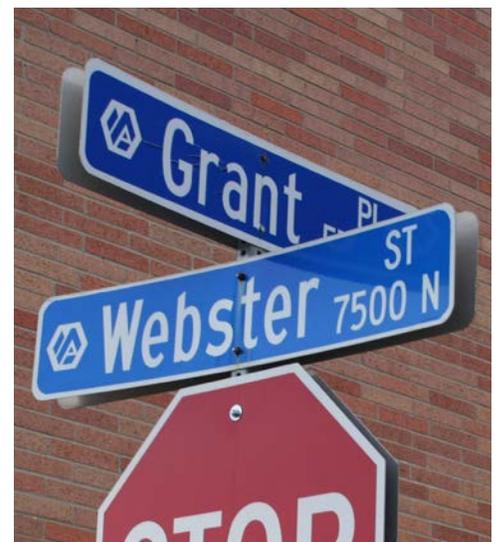
City of Arvada vehicular wayfinding



From left:

Terrace Park wellness walk wayfinding

Street signs with Arvada's logo



A popular tourist destination, Golden has an abundance of wayfinding oriented towards visitors arriving by car as they approach, enter and travel through the City. Within Golden's downtown, both directional signage and maps are provided for visitors traveling by foot or bicycle. The wayfinding elements incorporate elements of the old west and table mountain.



Lakewood's branding appears on street, park, and civic center signs.



From left:

Edgewater incorporates branding on street sign design.

Wheat Ridge also includes branding on street signs.



From left:

Westminster's wellness walk directional signs.

Vehicular wayfinding directing visitors to Westminster's municipal buildings.



Westminster's branding appears on street signs and park signs.



REGIONAL WAYFINDING

EXISTING REGIONAL WAYFINDING OBSERVATIONS

Examples of regional wayfinding include the Lariat Loop National Scenic Byway (vehicle), C-470 Bikeway (bike and pedestrian) and Jefferson County Open Space (bike, pedestrian, and vehicle). These initiatives offer consistent county-wide wayfinding branding, design, placement and messaging.

Lariat Loop confirmation/turn sign



From top, clockwise:

C-470 Bikeway decision sign

Jefferson County Open Space sign



OPPORTUNITIES

Although wayfinding varies throughout Jefferson County, many county-wide opportunities exist to improve bicycle wayfinding for both recreation and daily use through the current development of a bicycle wayfinding plan. The following highlights major observations and related opportunities.

1

Observation: Existing facilities largely require a knowledge of the network to navigate through the county.

Opportunity: Establish consistent placement and unified messaging in signage to effectively guide bicyclists along routes and to different facilities.

Opportunity: Provide signage that directs bicyclists to destinations within communities to enhance the easability of making daily trips via bike and enables visitors and community members to discover new destinations.

2

Observation: Physical barriers (highways, water bodies, topography, etc.) present challenges to navigating through the county.

Opportunity: Address barriers by establishing clear, consistent wayfinding to enable riders to easily navigate around barriers or gaps.

3

Observation: Sign clutter makes wayfinding difficult to follow and interpret.

Opportunity: Reduce sign clutter to enable bicyclists to easily interpret signs and make decisions while in motion.

4

Observation: Branding and sign design and message varies across jurisdictional boundaries.

Opportunity: Establish unified branding to provide a seamless experience throughout the county, regardless of local jurisdiction or facility type. Wayfinding design should incorporate local branding elements to inform bicyclists of their location within the county.

Opportunity: Develop a local identity for Jefferson County that connects the wayfinding elements to the county's uniqueness and makes the experience of the network memorable.

Appendix B

Best Practices and Case Studies

1. Introduction

This report summarizes best practices and general signage guidelines associated with a wayfinding system plan. These recommendations are based on findings from applicable research, existing precedents, and policy pertaining to wayfinding signage. These best practices will be a guide for the placement and design of a wayfinding system and should be incorporated into the overall Jefferson County Bicycle Wayfinding Plan document.

The following best practices are described with respect to wayfinding principles, wayfinding sign family elements, and placement recommendations. This review will explain what is involved in effective wayfinding using well-researched and proven practices.

2. Wayfinding Principles

The legibility of a place describes how easy it is to understand. Places are more legible when they are arranged so that people can intuitively determine the location of destinations, identify routes, and recognize areas of different character. Wayfinding helps to make places more legible by better enabling individuals to:

- easily and successfully find their way to their destination,
- understand where they are with respect to other key locations,
- orient themselves in an appropriate direction with little misunderstanding or stress, and
- discover new places and services.

In order to help ensure that wayfinding systems are the most effective, the following guiding principles were developed for bicycle wayfinding plans. The principles are based on best practices from around North America.

These wayfinding principles combine to create a wayfinding system plan that is both legible and easy to navigate. These principles should be applied in the Jefferson County Wayfinding Master Plan to guide design, placement, and destination logic. By following a clear set of principles, an organized approach to wayfinding design will be achieved.

1 : Connect Places

Effective wayfinding information should enable both locals and visitors

1 : 1 : Connect Places
Effective wayfinding information should enable locals and visitors to travel between destinations and discover new destinations and services accessible by bicycle. Wayfinding should help improve local economic well-being by encouraging locals and visitors to utilize services within Jefferson County. Wayfinding should enhance connections within the county and to neighboring communities and expand the bicycle network. The wayfinding navigation should be seamless on a regional level.

2 : Promote Active Travel

Wayfinding should encourage increased bicycling by revealing a clear and attractive system that is easy to understand and navigate. The presence of wayfinding signs should validate bicycling as a transportation option as well as reduce fear amongst those potentially interested in bicycling. Wayfinding should expand the awareness and use of bicycle facilities.

3 : Maintain Motion

Wayfinding information should be presented in a way that is easy to understand. Bicycling requires physical effort and frequent stopping and starting to check directions may lead to frustration. Wayfinding information that is quickly understood contributes to an enjoyable experience. Consistent, clear, and visible wayfinding elements allow bicyclists to navigate while maintaining movement.

4 : Be Predictable

Wayfinding should be predictable and consistent. When information is predictable, it can be quickly understood and recognized. Predictability should relate to all aspects of wayfinding placement and design (i.e. sign materials, dimensions, colors, forms, and placement). Predictability also means that new situations are quickly understood. Once users trust that they will encounter consistent and predictable information, their level of comfort is raised and new journeys become easier to attempt and complete. Similarly, maps should employ consistent symbology, fonts, colors, and style. The system should work within local, state, and federal guidelines for a variety of reasons - including the ability to be funded through state and federal sources.

5 : Keep Information Simple

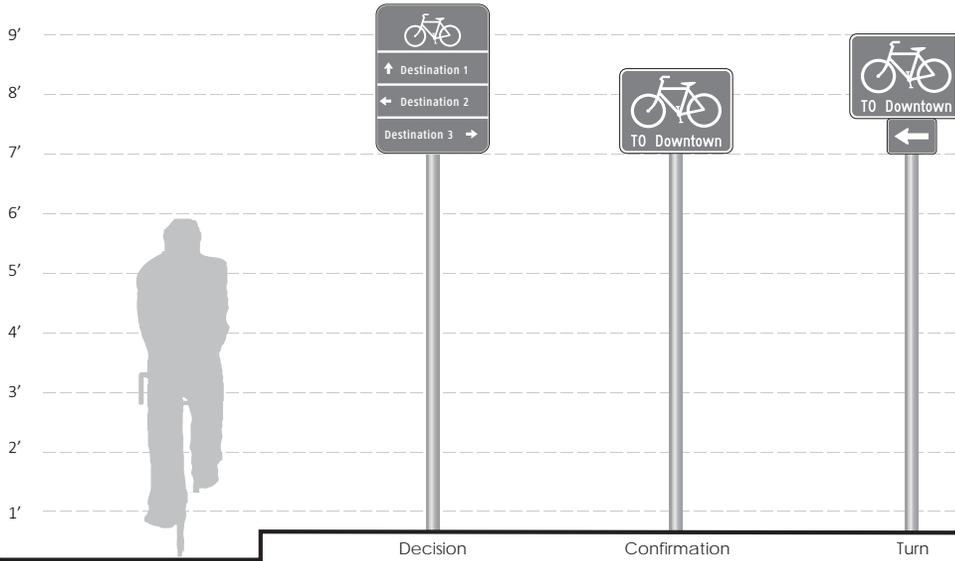
Information should be presented in as clear and logical form as possible. Wayfinding signage should be both universal and usable for the widest possible demographic and with special consideration for those without high educational attainment, English language proficiency, or spatial reasoning skills. It is important to provide information in manageable amounts. Too much information can be difficult to understand; too little and decision-making becomes difficult. Information should be provided in advance of where major changes in direction are required, repeated as necessary, and confirmed when the maneuver is complete.

3. Wayfinding Navigation Elements

The following describes the fundamental family of wayfinding signs and enhanced wayfinding tools which have been implemented to provide additional clarity to wayfinding networks and provide additional opportunities to create custom components reflecting the unique character of communities.

3.1 FUNDAMENTAL NAVIGATIONAL ELEMENTS

The fundamental family of signs which provide cyclists with navigational information consists of decision, confirmation, and turn signs. The function, content, and placement of each are described below.



Fundamental on-street wayfinding tools



D1-3c

MUTCD decision sign with three destinations.

3.1.1 DECISION SIGN

Function and content: Decision signs clarify route options when more than one potential route is available. Signs typically consist of a system brand mark, space for up to three destinations, distance in miles and/or time (based on 10 mph or 6 minute per mile travel speed). Decision signs may include specific route or path name.

Per the FHWA's *Standard Highway Sign Manual*, the standard size for a three-line destination sign is 18 inches high by 30 inches wide. However, many municipalities use a vertical format sign being 24 inches wide by 30 or 36 inches tall. This is accomplished by omitting the bicycle symbol from each separate line and instead having a single bike symbol at the top of the sign. Generally providing 6 inches of vertical space per destination



Fort Collins Bikeway decision signs meet MUTCD standards and include custom branding.

line allows for the 2 inch minimum text height. Sign width is not standardized by the MUTCD. These dimensions apply to both on- and off-street bicycle facilities.

Placement: Decision signs should be placed before decision making points or intersections. Sufficient distance prior to the intersection should be provided to allow for safe recognition and response to information provided. Care should be taken so that the turn or options the sign refers to are obvious. Decision signs should not be placed near side or access paths that could be confused with the primary route.

Clearance: The nearest edge of any sign should be placed a minimum of 24 inches from face of curb for both on-street bicycle facilities and paths. Mounting height should be a minimum of 7 feet from the bottom edge of sign to finish grade for on-street signs and a minimum of 4 feet for paths.

3.1.2 CONFIRMATION SIGN

Function and Content: Placed after a turn movement or intersection to reassure cyclists that they are on the correct route. System brand mark and route or pathway name may be included. A minimum size of 24 inches wide by 18 inches high should be used for bike route signs whether on-street or off-street.

Placement: Signs should be placed 50 to 100 feet after turns. Confirmation signs need not occur after every intersection. They should be prioritized at locations where a designated route is not linear, as well as after complex intersections. Complex intersections include those having more than four approaches, non-right angle turns, roundabouts, or indirect routing.

Clearance: The nearest edge of any sign should be placed a minimum of 24 inches from face of curb for both on-street bicycle facilities and paths. Mounting height should be a minimum of 7 feet



Confirmation signs may be as simple as a standard "Bike Route" sign or they may include information.



In Los Angeles, California, directional arrows are added to bike route signs to clarify the need for a turn movement.

from the bottom edge of sign to finish grade for on-street signs and a minimum of 4 feet for paths.

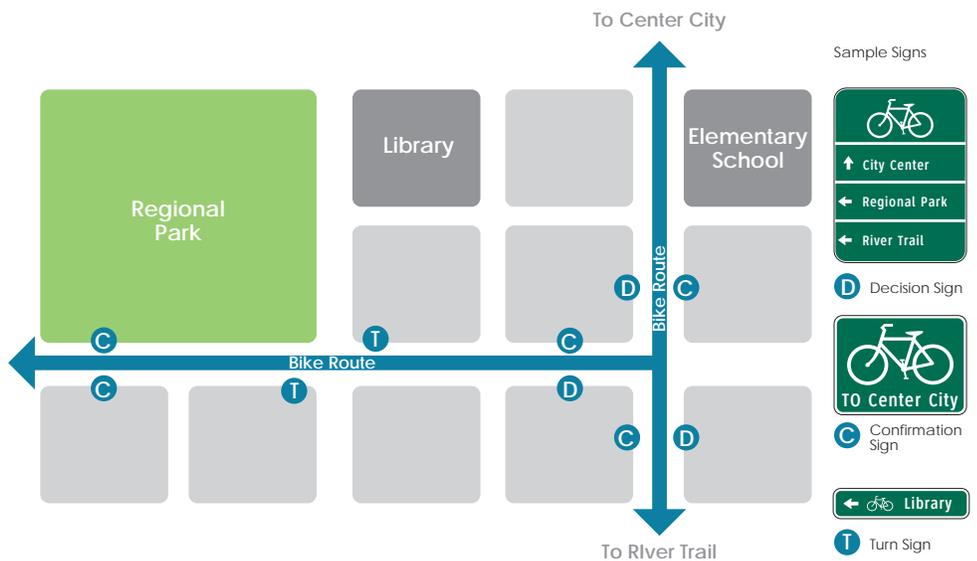
3.1.3 TURN SIGN

Function and Content: Used to clarify a specific route at changes in direction when only one route option is available. Turn signs may include a system brand mark, route or pathway name, directional arrow. Standard D1-1 series signs may be used to indicate turns. Similar to decision signs a minimum height of 6" should be used and width may vary according to destination length.

Standard turn arrow signs (M5 and M6 series) may also be used in conjunction with bike route signs to clarify turn movements.

Placement: Placed at turns prior to the turning action to provide cyclists advance notice of a change in direction. Turn signs may be used in conjunction with a decision sign at complex intersections warranting additional information.

Clearance: The nearest edge of any sign should be placed a minimum of 24 inches from face of curb for both on-street bicycle facilities and paths. Mounting height should be a minimum of 7 feet from the bottom edge of sign to finish grade for on-street signs and a minimum of 4 feet for paths.



Typical placement scenario showing a decision sign being located prior to an intersection of two bicycle facilities. A confirmation sign is provided after the turn movement as well as periodically along the route for reassurance.

3.2 ENHANCED NAVIGATIONAL ELEMENTS

3.2.1 PAVEMENT MARKINGS

Directional pavement markings indicate confirmation of bicyclist presence on a designated route and where bicyclists should turn. Especially in urban settings, pavement markings can often be more visible and can help supplement or reinforce signage.

On-Street Markings

The following images show different types of pavement markings used for wayfinding purposes. While the shared lane marking is currently the only FHWA approved pavement marking shown, cities have experimented with the other options.



In Berkeley, California, and Minneapolis, Minnesota, some bicycle boulevards have large “Bicycle Boulevard” stencils that take up nearly the entire width of one travel lane.



Lakewood, Colorado, customized pavement marking enhances connectivity from light rail station to West Rail pathway.

In Lakewood, Colorado, along the West Rail/D-10 route, the chevrons on the top of the MUTCD-standard shared lane marking (sharrow) indicate the direction of intended travel (second photo from left in the four-photo matrix). Although this practice is not FHWA approved or eligible for federal funding, many local transportation engineers are confident that the benefits of the turned chevrons outweigh the risks. Portland, Oregon, installs standard shared lane markings with federal funds, and then makes modifications later with local monies to add the directional wayfinding component.

Off-Street Markings



Some pavement markings, including off-street shared use path markings, can give an identity to the route and include directional and trip information, including distances and/or times. While such markings are not included as traffic control devices within the MUTCD, numerous agencies around the nation follow such practices.

Research Triangle Park, North Carolina, off-street marking.

3.2.2 MILE MARKERS

Mile markers aid pathway users with measuring distance traveled. Furthermore, mile markers provide pathway managers and emergency response personnel points of reference to identify field issues such as maintenance needs or locations of emergency events. System brand mark, path name, and distance information in miles may be included as well as jurisdiction identification.

Mile markers should be placed every 1/4 to 1/2 mile along a pathway network. Point zero should



begin at the southern and westernmost terminus points of a pathway. Mile numbering is often reset at zero as a pathway crosses a jurisdictional boundary.

Although it is ideal to place mile markers on the right hand side of the path facing bicycle traffic, they may also be installed on one side of a pathway, on a single post back-to-back.

3.2.3 STREET NAME SIGN BLADES

Municipalities across the nation have enhanced street name sign blades to provide additional recognition of bikeways. Enhancements include

supplemental signs and sign toppers added to existing MUTCD standard street sign blades and graphic embellishments integrated into new street name sign blades.

Good wayfinding practice also includes the use of street name sign blades on off-street pathways in reference to the roadway network. Numerous cities follow the practice of indicating cross streets at bridges, underpasses, and at-grade mid-block roadway crossings to inform pathway users of their location.

Green, blue, and brown are all accepted colors for street name sign blades according to the MUTCD, as long as colors are used consistently.



From left:

Neighborhood greenway sign topper in Portland, Oregon. (source: Jonathan Maus/bikeportland.org)

Yucca Street sign topper in Los Angeles, California.



3.2.4 MAP KIOSKS

Kiosks with area and/or citywide orientation maps, can provide helpful navigational information, especially where bicyclists may be stopping long enough to digest more information (i.e. transit stations or stops, busy intersections, trail heads). The use of icons and high contrasting colors is a good practice which makes maps understandable to a wide audience.

Adding circles that indicate walk and bike times provides encouragement to explore urban areas. Additionally, orienting signs with respect to the audience's view (or, a heads up orientation) is considered by wayfinding practitioners to be more intuitive than maps where north is at the top. High contrast graphics and the use of color coded areas or districts help make maps comprehensible to a wide audience.

Kiosks with maps are also a useful resource for trail users. Again the use of high contrast, simple graphics and icons enhances legibility for a broad spectrum of users. Kiosks should contain information on trail or path rules and regulations including allowed uses. Emergency contact information is also typically present. Interpretive or educational information may also be integrated. Per the ADA standards, trailhead facilities built with federal funds shall include the following information:

1. Length of the trail or trail segment
2. Surface type
3. Typical and minimum tread width
4. Typical and maximum running slope
5. Typical and maximum cross slope



Orientation map with color coded districts (top) and map integrated into a covered bicycle parking facility (bottom) in Portland Oregon.

4 Wayfinding Signage Technical Guidance

A variety of standards and guidelines influence both the sign designs and placement of wayfinding elements in Jefferson County. This section will address national standards for wayfinding signage.

4.1 BICYCLE SIGN STANDARDS

4.1.2 NATIONAL GUIDANCE

The Manual on Uniform Traffic Control Devices, or MUTCD, is a document issued by the Federal Highway Administration of United States Department of Transportation. The MUTCD specifies the standard for all traffic control devices installed on any street, highway, bikeway, or private road open to public travel. The MUTCD was established in order to achieve uniformity and consistency in traffic control devices (wayfinding signage is considered a traffic control device) so that information would be readily recognized and understood by travelers. Both on-street and off-street bicycle facilities are required to follow the standards within the MUTCD.



D1-3c



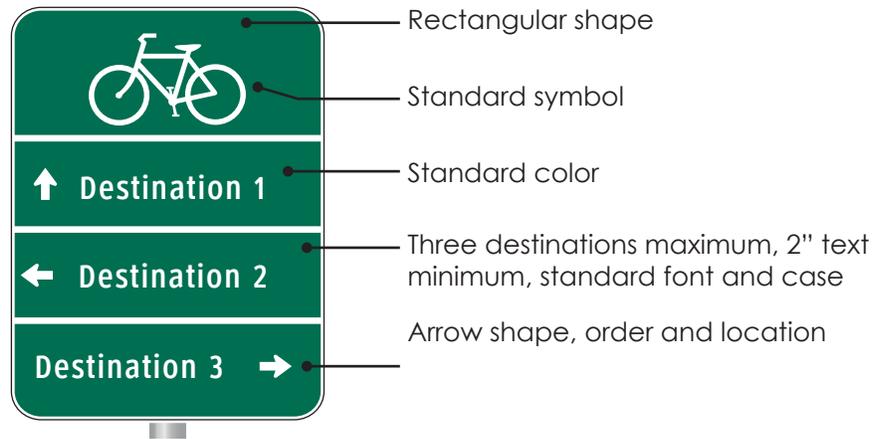
M1-8



D11-1c

Per the MUTCD, devices should be designed so that:

- Size, shape, color, composition, lighting or retro-reflection, and contrast are combined to draw attention to the devices; simplicity of message combine to produce a clear meaning.
- Legibility and size combine with placement to permit adequate time for response.
- Uniformity, size, legibility, and reasonableness of the message combine to command respect.



Standard MUTCD Compliant Directional or Decision Sign

The MUTCD also recommends the arrangement and amount of text, or legend, on each section of each sign:

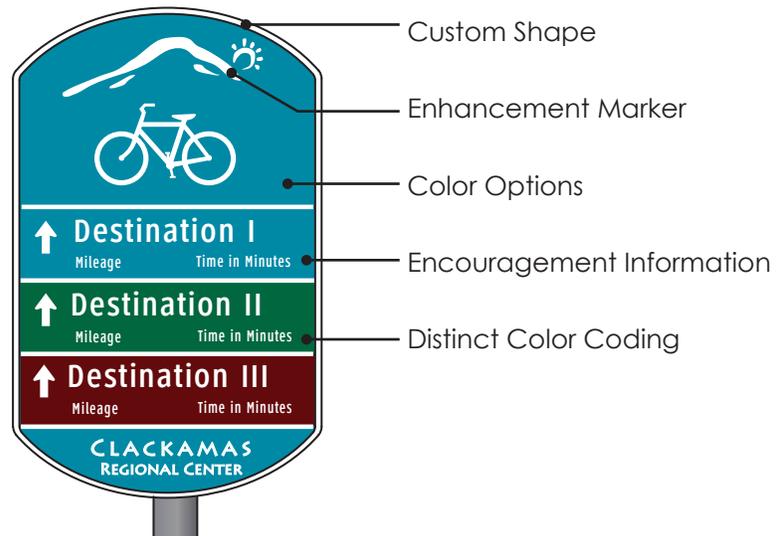
- Guide signs should be limited to no more than three lines of destinations, which include place names, route numbers, street names, and cardinal directions.
- A straight ahead location should always be placed in the top slot followed by the destination to the left and then the right. If two destinations occur in the same direction, the closer destination should be listed first followed by the farther destination.
- Arrows shall be depicted as shown above for glance recognition, meaning straight and left arrows are to be located to the left of the destination name, while an arrow indicating a destination to the right shall be placed to the right of the destination name. The approved arrow style must be used.
- 19 characters (including spaces) in titlecase should be considered a maximum length for a single destination title. 10-14 characters (including spaces) in titlecase should be considered an ideal maximum length for a single destination title.
- In situations where two destinations of equal significance and distance may be properly designated and the two destinations cannot appear on the same sign, the two names may be alternated on successive signs.
- Approved fonts include the Federal Series (series B, C, or D), also known as Highway Gothic. Clearview is also currently approved for use, however the FHWA is considering rescinding the use of Clearview.
- A contrast level of 70% needs to be achieved between foreground (text and graphics) and background.

4.2 COMMUNITY WAYFINDING STANDARDS

4.2.1 NATIONAL GUIDANCE

Wayfinding signs, which allow for an expression of community identity and pride, reflect local values and character, and may provide more information than signs which strictly follow the basic guidance of the MUTCD. Section 2D.50 of the MUTCD describes community wayfinding signs as follows:

1. Community wayfinding guide signs are part of a coordinated and continuous system of signs that direct tourists and other road users to key civic, cultural, visitor, and recreational attractions and other destinations within a city or a local urbanized or downtown area.
2. Community wayfinding guide signs are a type of destination guide sign for conventional roads with a common color and/or identification enhancement marker for destinations within an overall wayfinding guide sign plan for an area.



Flexible directional or decision sign incorporating community wayfinding standards.

The design of the directional arrows shown above provide clarity and are approved by the FHWA. The standard arrow has been deemed by engineering study to have superior legibility. Enhancement markers may occupy up to 20% of the sign face on the top or side of the sign.

Colors

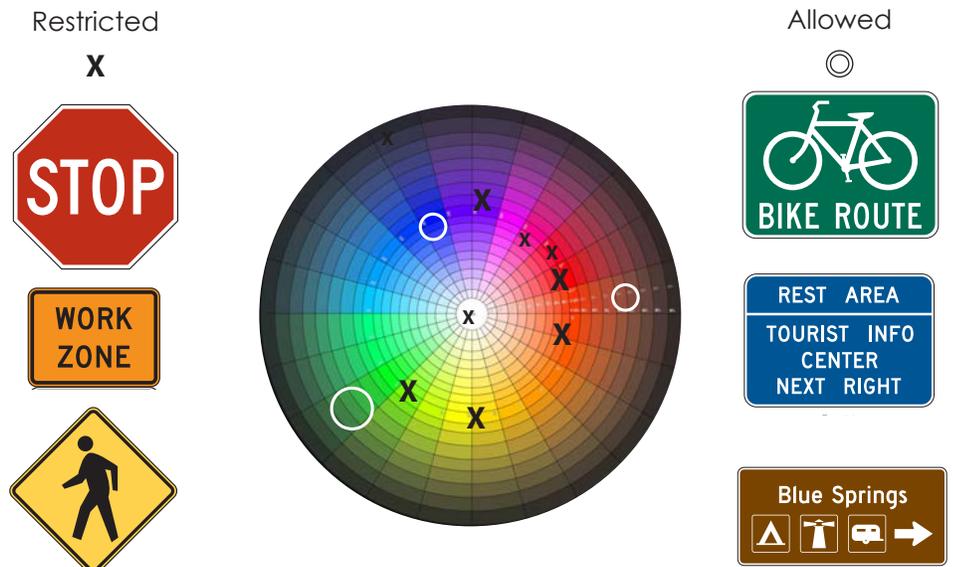
Per the community wayfinding standards, color coding may be used on wayfinding guide signs to help users distinguish between multiple

potentially confusing traffic generator destinations located in different neighborhoods or subareas within a community or area. Community wayfinding guide signs may use background colors other than green in order to provide a color identification for the wayfinding destinations by geographical area within the overall wayfinding guide signing system.

The MUTCD prohibits the use of some colors for wayfinding signs, these colors are known as “assigned colors.” The “assigned colors” consist of the standard colors of red, orange, yellow, purple, or the fluorescent versions thereof, fluorescent yellow-green, and fluorescent pink. They cannot be used as background colors for community wayfinding guide signs, in order to minimize possible confusion with critical, higher-priority regulatory and warning sign color meanings readily understood by road users.

The color wheel diagram below depicts colors which are already assigned specific meanings and thus shall not be used on community wayfinding signs. Green is the standard color for guide signs. Blue and brown are also used for traveler information including destination and street name signs. The remaining colors are eligible for use on community wayfinding signs as long as they are sufficiently different from the “assigned colors.”

Each of the colors depicted with an “x” are not allowed for use on community wayfinding signs. Green, blue and brown are approved for use on traveler information signs and have been accepted by some DOTs for wayfinding signs. The remaining colors not having restricted uses are appropriate for wayfinding signs per the community wayfinding standards.



4.3 SUPPLEMENTAL INFORMATION – DISTANCE AND TIME

The addition of measuring distance in terms of miles and minutes has been employed by a number of cities in the United States. Adding distance in familiar units has been found to be an effective encouragement tool to bicycling. To some bicyclists, two miles may sound daunting while twelve minutes sounds approachable, and, to other bicyclists, the same is true vice versa. A pace of 10 miles per hour or 6 minutes per mile is the typical pace used on bicycle wayfinding signs. This is lower than typical bicycle design speed in order to best reflect and encourage the riding speed of the casual rider.

4.4 FLEXIBILITY IN STANDARDS

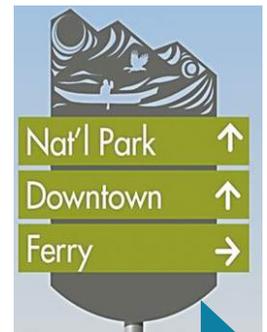
Both the FHWA and USDOT have made statements in recent years encouraging a flexible approach in support of facilities for biking and walking:

“...DOT encourages transportation agencies to go beyond the minimum requirements, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages and abilities, and utilize universal design characteristics...” (2010)

Federal Highway Administration's (FHWA) support for taking a flexible approach to bicycle and pedestrian facility design. (2013)

While the MUTCD provides standards and guidelines for the design, size, and content of wayfinding signs, many jurisdictions have implemented unique signs to enhance visibility while reinforcing local identity. The MUTCD Spectrum figure below shows a range of wayfinding elements that have been implemented by municipalities around the nation. The range extends from rigid MUTCD on the left to the more flexible options on the right. Signs which adhere to the MUTCD basic minimum standards are readily understood by a wide audience, economical, and simple to fabricate and maintain. These signs also are clearly eligible to be implemented utilizing federal transportation funding sources. Signs that follow the community wayfinding standards may be more costly to design, fabricate, and maintain, however they have the added benefits of reflecting local

character and identity. If a precedent has not already been set, the Colorado Department of Transportation should be consulted to verify that community wayfinding standards may be applied to bikeways while retaining eligibility for federal transportation funds.



- MUTCD compliant signs
- Information is clear and consistent
- Regional context or local identity is not present
- Variation in sign size and shape
- Encouragement information not present

- D1 series signs consolidate into a single sign reduces the number of signs required, overall sign clutter and sign dimension variation
- MUTCD does not provide for travel times however numerous cities and states incorporate this information

- Community signs may be augmented by unique system or municipality identifiers or enhancement markers as per Section 2D.50
- MUTCD allows for custom color variations for community wayfinding signs

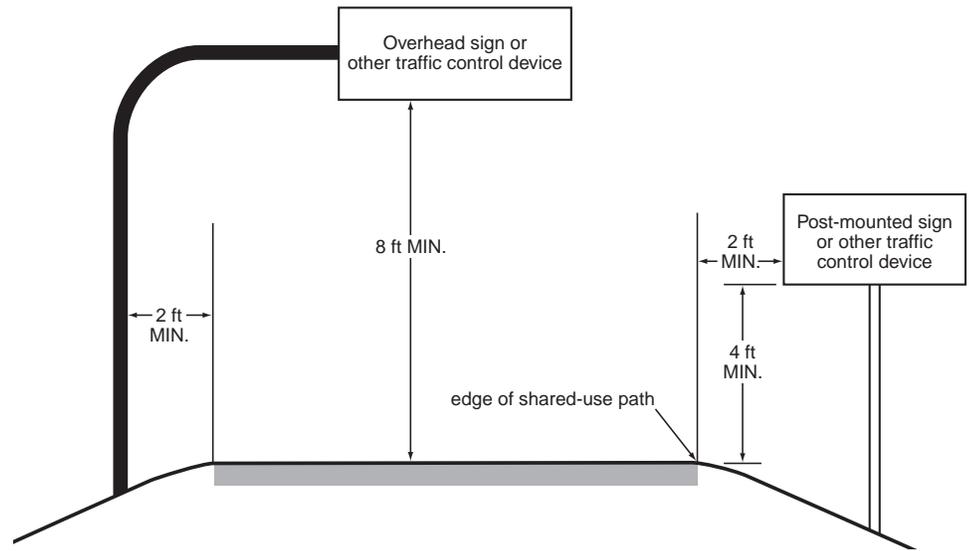
- Directional sign with clear directional information and arrows, high contrasting text, custom sign post and decorative elements

- Custom framing and support structures, unique sign shapes, high contrast graphic content and non-standard colors and layout

5 Wayfinding Sign Placement Guidance

The Guide for the Development of Bicycle Facilities by the American Association of State Highway Transportation Officials, or AASHTO, provides information on the physical infrastructure needed to support bicycling facilities. The AASHTO guide largely defers to Part 9 of the Manual on Uniform Traffic Control Devices, or MUTCD (discussed in the following section), for basic guidelines related to the design of wayfinding systems for bicycles. Additional information provided by AASHTO regarding wayfinding is as follows:

- Many communities find that a wayfinding system for bicycles is a component of a bicycle network that enhances other encouragement efforts, because it provides a visible invitation to new bicyclists, while also encouraging current bicyclists to explore new destinations.
- Bicycle wayfinding signs should supplement other infrastructure improvements so that conditions are favorable for bicycling, as signs alone do not improve safety or rider comfort.
- Guide signs may be used to designate continuous routes that may be composed of a variety of facility types and settings.
- Wayfinding guidance may be used to provide connectivity between two or more major bicycle facilities, such as a street with bike lanes and a shared use path.
- Wayfinding may be used to provide guidance and continuity in a gap between existing sections of a bikeway, such as a bike lane or shared use path.
- Road/path name signs should be placed at all path-roadway crossings to help users track their locations.
- Reference location signs (mile markers) assist path users in estimating their progress, provide a means for identifying the location of emergency incidents, and are beneficial during maintenance activities.
- On a shared use path, obstacles, including signs, shall be placed no closer than 24 inches from the near edge of the travel way and no more than 6 feet away. For pole mounted signs, the lowest edge of the sign shall be 4 feet above the existing ground plane.



Minimum clearances on shared-use paths

5.1 ACCESSIBILITY STANDARDS

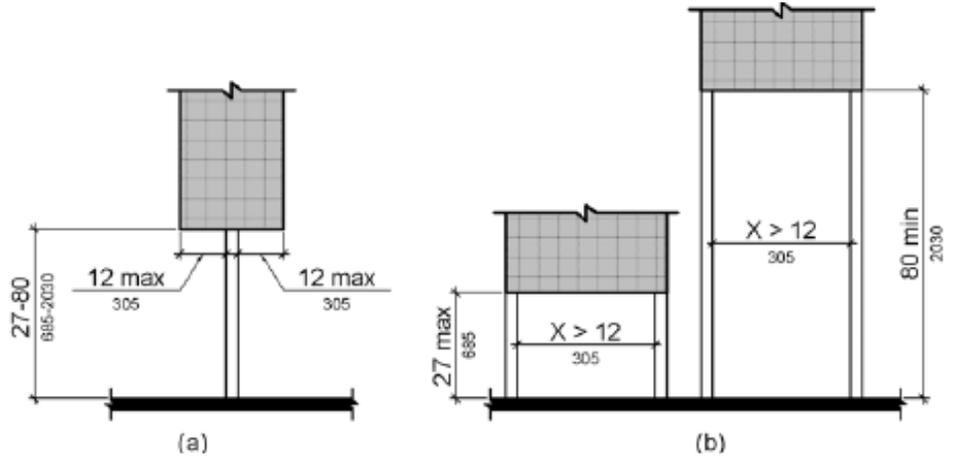
As wayfinding systems often relate to accessible routes or pedestrian circulation, it is important to consider technical guidance from the Americans with Disability Act, or ADA, so that signs and other elements do not impede travel or create unsafe situations for pedestrians and/or those with disabilities. The Architectural and Transportation Barriers Compliance Board provides guidance for accessible design for the built environment. Standards which should be considered when designing and placing wayfinding signs includes the following.

5.1.1 VERTICAL CLEARANCE

Vertical clearance shall be 27 inches high minimum, or 80 inches maximum when signs protrude more than 12 inches from the sign post or support structure.

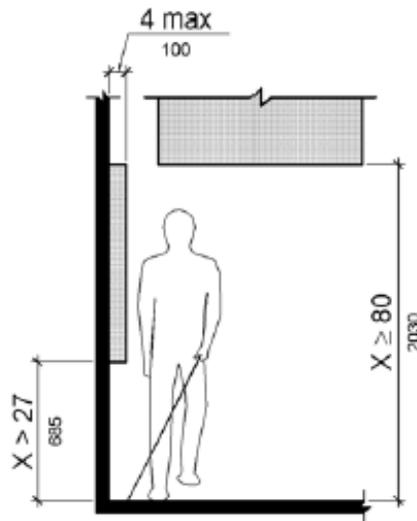
5.1.2 POST-MOUNTED OBJECTS

Where a sign or other obstruction is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 12 inches, the lowest edge of such sign or obstruction shall be 27 inches minimum or 80 inches maximum above the finish floor or ground.



5.1.3 PROTRUDING OBJECTS

Objects with leading edges more than 27 inches and not more than 80 inches above the finish floor or ground shall protrude 4 inches maximum horizontally into the circulation path.



5.1.4 REQUIRED CLEAR WIDTH

Protruding objects shall not reduce the clear width required for accessible routes. Generally this requirement is met by maintaining four feet minimum clear width for maneuvering. This requirement applies to both sidewalks and pedestrian circulation paths.

5.1.5 SHARED USE PATHS

Accessibility standards for shared use paths are currently being developed by FHWA and can be reviewed in the document titled, "Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way." Proposed standards address post-mounted objects as follows. Where objects are mounted on free-standing posts or pylons and the objects are 27 inches minimum and 80 inches maximum above the finish surface, the objects shall overhang pedestrian circulation paths 4 inches maximum measured horizontally from the post or pylon base. The base dimension shall be a minimum of 2-1/2 inches thick. Where objects are mounted between posts or pylons and the clear distance between the posts or pylons is greater than one foot, the lowest edge of the object shall be 80 inches maximum or 27 inches minimum above the finished surface.

6 Destination Selection and Programming

Following the principle to “connect places,” the following describes an approach for selecting potential destinations to which cyclists may want to travel. Bicycle signs typically only allow for three slots of information or destinations per sign. Thus, a consistent approach to selecting destinations to be included on wayfinding elements is necessary, given the multitude of potential destinations possible. Signs should follow the same approach throughout Jefferson County so that the system is clear and predictable. Destinations and their names should be referred to consistently on all relevant wayfinding signs.

6.1 DESTINATION SELECTION

Potential destinations for inclusion on signs are categorized within four levels. Level 1 destinations should receive first priority on wayfinding signs, followed by Level 2 and then Level 3. Level 4 destinations should only be included when other destinations are not present to fill available slots on a sign. All destinations to be signed should be open and accessible to the public.

LEVEL 1 - CITIES AND REGIONAL DESTINATIONS

Level 1 destinations include regional destinations found within Jefferson County. Highlighting nearby cities provides large scale geographic orientation for regional cycling. Level 1 destinations provide “pull through” destinations for bicyclists who are traveling significant distances as well as a full range of attractions and services. Pathway facilities that extend beyond the boundaries of the county may include prominent destination cities outside of Jefferson County. If a town/city does not include an activity center and services, it may be excluded from signs. Level 1 destinations should be included on directional signs and orientation maps. Signs within 5 miles of a Level 1 destination should include the Level 1 destination.

LEVEL 2 – DISTRICTS AND NEIGHBORHOODS

Level 2 destinations provide a finer grain of navigational information than Level 1 destinations by directing users to recognizable districts and neighborhoods. These may be city centers, historic, commercial, cultural, or educational districts, or neighborhoods with a distinct name and character. Emphasis should be placed on districts providing a mix of services. Neighborhoods not offering services or attractions, need not

be included. Level 2 destinations should be included on signs up to 2 miles away.

LEVEL 3 - LANDMARKS

Level 3 destinations are specific landmarks or major attractions which generate a high amount of bicycle travel. Landmarks include transit stations, major tourist venues, regional parks, open spaces and post-secondary educational institutions. Level 3 destinations should be signed up to 1 mile away.

LEVEL 4 – LOCAL DESTINATIONS

Level 4 destinations are local destinations such as civic buildings, parks, high schools, shopping centers, and healthcare facilities. They typically occur on signs in low density areas where few other destinations are present or along pathways not connecting higher priority level 1-3 destinations. Level 4 destinations may be signed up to 1 mile away.

LEVEL 1

- Cities
- Regional Trail



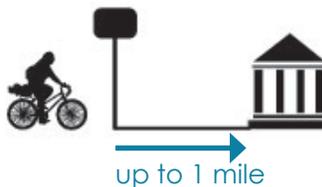
LEVEL 2

- Commuter/LRT Stations
- Regional Parks
- Major Civic/Commercial Center



LEVEL 3 AND 4

- Business and Services
- Medical facility
- Shopping Center
- Visitor Center
- College/University
- Historic Site
- Museum
- Performing Arts Venue
- Geological feature
- Stadium or arena
- Designated districts and neighborhoods



6.2 SIGNING DISTANCES

Signing distances suggest the maximum distance that destinations should appear on directional signs. This process ensures that information is spread along the journey in manageable amounts according to a cyclist's immediate needs.

Level 1 destinations provide navigational guidance to the widest spectrum of system users and thus should be prioritized on signs. As a priority, Level 1 destinations should appear on signs up to five miles away. Level 2 destinations appeal to a broad spectrum of users and should be included on signs up to two miles away. Level 3 and 4 destinations are places of either regional or local interest and should be signed up to one mile away. Cities farther than 5 miles from a Level 1 destination may elect to sign that destination in order to provide a large scale geographic orientation.

Distances may be measured either to a destination boundary or center, as long as the approach is consistent throughout the region. Cities (Level 1 destinations) typically have a well-defined edge and thus should be measured to boundary lines. Districts (Level 2 destinations) are less defined in terms of their boundaries and thus should be measured to their centers. Level 3 and 4 destinations are typically specific addresses and thus distances should be measured to the main entrance of the specific location. If a Level 3 or 4 destination is large or has several access points, distance should be measured to the point at which the cyclist will arrive.

6.3 DESTINATION ORDER

The closest destination lying straight ahead should be at the top of the sign or assembly, and below it the closest destinations to the left and to the right, in that order. If more than one destination is displayed in the same direction, the name of a nearer destination shall be displayed above the name of a destination that is further away.

In situations where two destinations of equal significance and distance may be properly designated but two destinations cannot appear on the same sign, the two names may be alternated on successive signs.

6.4 ABBREVIATIONS

When placing destination names on signs, the use of abbreviations should be kept to a minimum whenever possible. When insufficient space is available for full wording, abbreviations may be used. MUTCD accepted abbreviations are included in the table below. Unless necessary to avoid confusion,

periods, commas, apostrophes, question marks, ampersands, and other punctuation marks or characters that are not letters or numerals should not be used in any abbreviation.

Word Message	Abbreviation	Word Message	Abbreviation
Alternate	ALT	Miles Per Hour	MPH
Avenue	AVE	Minute(s)	MIN
Bicycle	BIKE	Mount	MT
Boulevard	BLVD	Mountain	MTN
Bridge	BR	National	NATL
Center (as part of a place name)	CTR	North	N
Circle	CIR	Parkway	PKWY
Court	CT	Pedestrian	PED
Crossing (other than highway)	X-ING	Place	PL
Drive	DR	Road	RD
East	E	South	S
Hospital	HOSP	Street	ST
Information	INFO	Telephone	PHONE
International	INTL	Terrace	TER
Junction / Intersection	JCT	Trail	TR
Mile(s)	MI	West	W

7 Case Studies

7.1 CASE STUDY: GREAT ALLEGHENY PASSAGE TRAIL

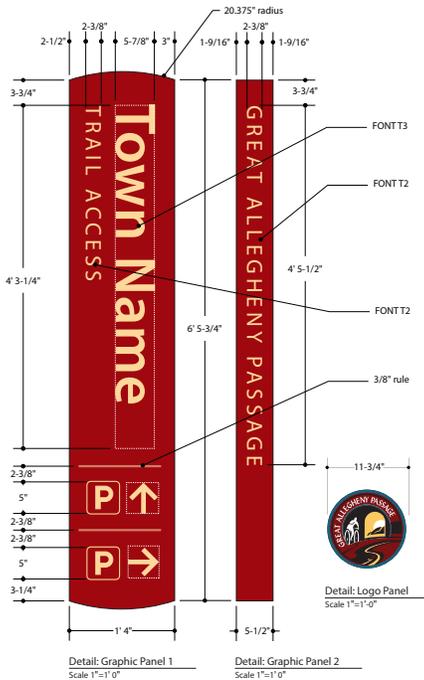
The multi-state 150-mile trail wayfinding system is designed for both pedestrians and bicyclists. To establish continuity across states, counties and “trail towns,” a family of wayfinding elements was developed that communicates the overall identity of the trail and local municipality. Guidelines for the trail’s graphic identity and sign locations and designs are documented in the “Graphic Identity & Sign Guidelines Manual” that is easy to use and readily accessible to partners.

Graphic continuity is achieved through the use of a consistent logo, color palate, typeface and family of symbols (illustrating amenities), materials and dimensions. Wayfinding elements include placeholder for local municipalities or towns to prominently display their name, making it clear to the visitor where they are along the trail.

In addition to consistency through design and message, the network successfully establishes legibility through predictability. The trail’s sign guidelines manual provides clear direction regarding sign placement along the trail. A consistent approach to sign placement and hierarchy establishes a continuous, predictable experience.

Since implementing wayfinding signs, trails users have indicated the quality of the visitor experience has improved.

The Great Allegheny Passage Graphic Identity & Sign Guidelines is available online at: <http://www.atatrail.org/docs/GAPGuidelines.pdf>





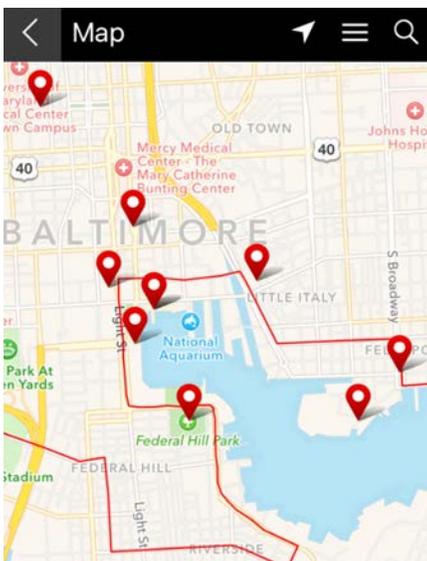
7.2 CASE STUDY: THE INDIANAPOLIS CULTURAL TRAIL

The 8-mile urban bike and pedestrian path connects downtown Indianapolis' neighborhoods, cultural districts and entertainment areas. The Cultural Trail wayfinding network is unique in that, in addition to the traditional network of wayfinding and regulatory signs, the wayfinding network is supplemented by historical markers, public art, and distinct brickwork.

The wayfinding family of elements make for a trail that is well designed and easy to use for both bicyclists and pedestrians. Regular, well-placed signs help pedestrians, bicyclists and motorists navigate the trail and interact with other user groups. Consistent placement along on- and off-street facilities creates a cohesive and safe experience for users. This sense of safety was captured in a trail survey where 95% of respondents reported feeling safe while on the Trail.

While the trail is popular for both tourism and recreation, it has also become a preferred route for daily travel. Over 50% of survey respondents indicated that they use the trail several times a week.





7.3 CASE STUDY: CHESAPEAKE EXPLORER MOBILE APP

The National Park Service mobile app provides wayfinding information directing visitors to parks and trails in the Chesapeake Bay region, including the Star-Spangled Banner National Historic Trail, Captain John Smith Chesapeake National Historic Trail, Potomac Heritage National Scenic Trail, Chesapeake Bay Gateways and Watertrails Network, and national and state parks.

The Chesapeake Explorer app enables visitors to find and visit places by activity, trail name, or type of site. The app highlights suggested tours and includes a feature for users to build their own tour and map the route. Key wayfinding features include:

- Plan Your Visit – For over 400 parks and historic sites provides addresses, hours of operation, fees, and other helpful information.
- Suggested Tours – Highlights suggested history, driving, biking or walking tours. Tours provide turn-by-turn directions and approximate travel times.
- My Tour – Create personal tours and save the route for viewing later. Edit tours anytime and get driving directions.
- Maps – Enables geo-location to find sites nearby and generates directions on demand to any site in the app.
- Search by Nearby - Highlights destinations near user's location or by selecting search area.
- Search by Activity - Locates nearby opportunities for hiking, biking, boating, fishing, camping, and birdwatching.
- Search by Site Type – Locates nearby parks, preserves, trails, or historic sites and museums.

The mobile app supplements traditional wayfinding elements (signs, kiosks and maps) to establish a cohesive experience throughout the large geographic region.

8 References

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"Design Guidelines for Bicycle Wayfinding." City of Oakland, CA, 2009.

"Graphic Identity & Sign Guidelines Manual." Allegheny Trail Alliance and Trail Town Program, August 31, 2008. <http://www.atatrail.org/docs/GAPGuidelines.pdf>

"Guide for the Development of Bicycle Facilities, Fourth Edition." American Association of State Highway Transportation Officials, 2012.

"Manual on Uniform Traffic Control Devices." Manual on Uniform Traffic Control Devices. Department of Transportation, 2009. <http://mutcd.fhwa.dot.gov/index.htm>

"Standard Highway Signs," Federal Highway Administration, 2012.

"Wayfinding Signs for Shared-Use Paths." National Committee on Uniform Traffic Control Devices, Spring 2014. <http://www.ncutcdbtc.org/sponsors.html>

Appendix C Regional Destinations

Tier	Name
1	City of Edgewater
1	City of Lakewood
1	City of Wheat Ridge
1	City of Denver
1	City of Arvada
1	Little Dry Creek Trail
1	Ralston Creek Trail
1	Clear Creek Trail
1	Van Bibber Creek Trail
1	Jefferson County Courts
1	Downtown Evergreen
1	Evergreen Lake
1	Kipling Pkwy
1	Farmers' High Line Canal Trail
1	Big Dry Creek Trail
1	Indian Hills
1	Tiny Town
1	Idledale
1	El Rancho
1	Genesee
1	Morrison
1	City of Westminster
1	Morrison
1	City of Golden
1	Centennial Trail
1	Bear Creek Trail
1	C470 Bikeway
1	Grant Terry Trail
1	Highway 93 Trail
1	Cressman Gulch Trail
2	Garrison Station
2	Federal Center Station
2	Red Rocks College Station
2	Lamar Station
2	Wadsworth / Hampden

Tier	Name
2	Southwest Plaza
2	Lakewood-Wadsworth Station
2	Oak Station
2	Sheridan Station
2	Crown Hill Park
2	William Frederick Hayden Park
2	Bear Creek Lake Park
2	Estes
2	Bear Creek Greenbelt
2	Belmar Park
2	Addenbrooke Park
2	Lakewood Park
2	Sloans Lake
2	Ward Rd Station
2	Active Adult Station
2	Anderson Park
2	Wheat Ridge Rec Center
2	Prospect Park
2	Olde Town Arvada Gold Line Station
2	Arvada Transit Hub
2	Gold Strike Gold Line Station
2	Arvada Ridge Gold Line Station
2	Standley Lake Regional Park S Trailhead
2	Long Lake Regional Park
2	Arvada Reservoir Tucker Lake Park
2	Majestic View Nature Center
2	Ralston Central Park
2	Arvada City Hall
2	Chatfield Reservoir
2	Deer Creek Canyon Park
2	Lookout Mountain
2	Promenade at Denver West
2	Denver West Village

Tier	Name
2	Lakewood Library
2	Belmar
2	Lakewood Civic Center
2	Belmar Library
2	City Commons South
2	Colorado Mills
2	City Commons North
2	Church Ranch Park 'n Ride
2	Westminster Center Park 'n Ride
2	Westminster Station
2	College Hill Library
2	Irving Street Library
2	City Hall
2	City Park Fitness Center
2	City Park Recreation Center
2	Countryside Recreation Center
2	The MAC
2	Sports Center
2	Swim & Fitness Center
2	West View Recreation Center
2	Ice Centre at The Promenade
2	Heritage Golf Course
2	Legacy Ridge Golf
2	Butterfly Pavilion
2	Standley Lake Nature Center
2	Green Mountain
2	South Table Mountain
2	Lookout Mountain
2	North Table Mountain
2	Bergen Park
2	Brooke Forest
2	Aspen Park
2	Conifer
2	Coal Creek Canyon
2	Centennial Cone Park
2	Clear Creek Canyon Park
2	Elk Meadow Park
2	Flying J Ranch Park
2	Hildebrand Ranch Park
2	Lair O' the Bear Park
2	Matthews Winters Park

Tier	Name
2	Meyer Ranch Park
2	Mount Falcon Park
2	Mount Galbraith Park
2	Mount Glennon Park
2	Mount Lindo Park
2	Pine Valley Ranch Park
2	Reynolds Park
2	South Valley Park
2	Van Bibber Park
2	Welchester Tree Grant Park
2	White Ranch Open Space Park
2	Windy Saddle Park
2	Alderfer Three Sisters Park
2	Apex Park
2	Cathedral Spires Parking
3	Lakewood Heritage Center Gift Shop
3	Lakewood Heritage Center
3	Dinosaur Ridge Museum and Visitor Center
3	RED ROCKS COMMUNITY COLLEGE
3	ROCKY MOUNTAIN COLLEGE OF ART AND DESIGN
3	COLORADO CHRISTIAN UNIVERSITY
3	CROWN HILL PARK
3	JEWISH CONSUMPTIVES RELIEF SOCIETY
3	GOLDEN HILL PARTNERSHIP
3	DAVIES CHUCK WAGON DINER
3	WASHINGTON HEIGHTS SCHOOL
3	THE STONE HOUSE
3	THE PETERSON HOUSE
3	GOLDEN HILL CEMETERY
3	RED ROCKS PARK
3	CROWN HILLS CEMETERY
3	Fed Center
3	LAKWOOD HERITAGE CENTER
3	Dinosaur Ridge Museum & Visitor Center
3	CITY OF LAKEWOOD CULTURAL CENTER

Tier	Name
3	JEFFCO STADIUM
3	ALL STAR PARK
3	JEFFERSON COUNTY FAIRGROUNDS
3	CHARLES WHITLOCK RECREATION CENTER
3	LAKWOOD LINK RECREATION CENTER
3	GREEN MOUNTAIN RECREATION CENTER
3	CHARLES WHITLOCK RECREATION CENTER
3	LAKWOOD LINK RECREATION CENTER
3	CARMODY RECREATION CENTER
3	GREEN MOUNTAIN RECREATION CENTER
3	Historic Park and Museum Sod Hse
3	Baugh House
3	Richards Hart Estate
3	Apex Center
3	Olde Town Arvada
3	Arvada Visitor's Center
3	Red Rocks Comm College Arvada Campus
3	Stenger Soccer Complex
3	Harold Lutz Sports Complex
3	Arvada Center for the Arts & Humanities
3	Jeffco Government Center LR Station
3	Oak Street LR Station
3	Evergreen Public Golf Course
3	Hiwan Homestead Museum
3	Center Stage Theater
3	Evergreen Library
3	Evergreen High School
3	Wulf Recreation Center
3	Denver Federal Center
3	Union Blvd District
3	Lutheran Medical Center
3	St Anthony's Hospital

Tier	Name
3	40 West Arts District
3	Lakewood City Center
3	Downtown Lakewood
3	St. Anthony's North Hospital District
3	My Business Park
3	Walnut Creek Business Park
3	Ranch Reserve
3	Benton Park
3	111th Ave & Sheridan Blvd
3	Westmoor Technology Park
3	10789 Dover Street
3	Circle Point Corporate Center
3	Church Ranch District
3	Hawn Property
3	Lake Arbor Area Properties
3	Westminster Center Urban Reinvestment
3	Sheridan Park
3	Westpark & Turnpike Drive
3	80th Ave & Sheridan Blvd
3	76th Ave & Sheridan Blvd
3	South Westminster Properties
3	DeVry University
3	Front Range Community College
3	ITT Technical Institute
3	Regency Beauty Institute
3	Colorado Technical University
3	Denver School of Massage Therapy
3	University of Phoenix
3	Union High School
3	Gregory House
3	Harris Park School
3	Bowles House
3	Westminster University
3	Metzger Farm
3	84th Avenue Neighborhood Health Center
3	St. Anthony North Health Campus
3	Northwest ER - North Suburban Med Ctr

Tier	Name
3	Church Ranch Neighborhood Health Center
3	The Orchard Town Center
3	Ice Centre at The Promenade
3	The Orchard Town Center
3	The Shops at Walnut Creek
3	Historic Westminster Arts District
3	Downtown Westminster
3	Stanley Lake Regional Park
3	Westminster City Park
3	Federal Center
3	Morrison Natural History Museum
3	Astor House Museum
3	Clear Creek History Park
3	Golden History Center
3	Colorado Railroad Museum
3	Buffalo Bill's Grave and Museum
3	American Mountaineering Center

