

# Trail Design Standard Language Guidelines

Definitions and Considerations to Enhance Any Trail Network

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June 20, 2011

These definitions and standards are commonly found in regional trail master plans throughout Colorado. The Weld Trails Coordination Committee partners have compiled these guidelines to provide small to mid-sized municipalities a resource in regional trail design that can be adapted to meet individual needs. The goal is to offer trail users a consistent experience throughout the regional trail network.

The Weld Trails Coordination Committee (WTCC) is a group of governmental and elected officials, and community organizations who represent all corners of Weld County. WTCC functions as a catalyst to influence the creation of a regional guideline document that offers common language to promote a system-wide, trails master plan for Weld County. The Weld Trails Coordination Committee focuses efforts on these four areas:

1. Advocacy of trails for recreational, transportation and tourism purposes while respecting individual community heritage,
2. Information sharing between municipalities,
3. Educating the public on trail benefits, and
4. Promoting coordinated trail planning and connectivity throughout Weld County and the Northern Colorado region.

WTCC partners draw from their collective knowledge to be a resource provider, assisting partners who lack established relationships in the trail building community of Weld County and beyond.

WTCC links you to technical resources such as this Standard Language Document. For more information about the WTCC and additional resources, visit the website at [www.HealthyWeld2020.com](http://www.HealthyWeld2020.com)



## Trail Design Standard Language Guidelines

The following general trail design definitions and standards illustrate typical construction practices for regional trail systems in Colorado. They are intended to be used as suggested practices for constructing local trail networks and may not apply to every situation, based on varying site conditions.

### GENERAL DEFINITIONS

- **Trail Directness** - the ability to connect two locations within the corridor in the most efficient manner.
- **Topography** - alignments where excessive grade changes exist should be identified early, alternative routes should be selected if possible.
- **Environmental Impact** - alignments where known environmental issues exist should be avoided.
- **Existing Community Trails Plan** - trail alignments that are part of existing community trails plans should be considered in developing regional connections.
- **Cost Effectiveness** - the ability to utilize existing overpass or underpass structures or existing utility corridors usually are much more cost effective.
- **Landowner Willingness** - since some segments of the trail may follow private property lines, landowner support is an important criteria for trail alignment selection.
- **Scenic Aspects** - the unique character of the front range is important to the selection of the trail corridor alignments.
- **Potential Economic Benefits** - trail usage can spur further residential and commercial development that will benefit local businesses, communities and neighborhoods.
- **Recreational, Historic and Cultural Sites** - alignments that connected existing recreational, historic, and cultural features should be preferred.
- **Safety** - preference should always be given to alignments that are conducive to use by young and old without worrying about highway traffic or other unsafe conditions.

### TRAILHEAD CONNECTIVITY RIGHT-OF-WAY

**Easement** - a conveyance of certain, but not all, rights associated with a property. Several types of easements may be applicable here including: public access (ie., for trails); conservation (to protect natural resources, floodplain or water quality values); and preservation easements (to protect historic integrity or values of a property) or combinations thereof. Many easements may allow the owner to continue his use of the property for compatible purposes such as farming and some easements may allow the owner to restrict public access. In some cases, an entity may simply purchase the development rights.

**Fee Title I** - Fee simple purchase-includes the entire "bundle" of rights in perpetuity-usually the most costly acquisition.

**Option, Lease-Option or First Right of Refusal** - this is an agreement with the owner to secure the right to acquire the property or right-of-way in the future. This protects the land in the short term until funds are found to make the purchase. Variations on this might include transaction through a third party such as a land conservancy or The Trust for Public Lands, where the third party buys and holds the land on the town's behalf. Communities may make rent payments or installment payments on the property over an extended period of time.

**License or Revocable Permit** - a property owner grants the right to use the property (usually a trail right-of-way) for a period of years (usually 25 years or more). In the case of a revocable permit, the grantor may terminate the right of use or access under certain conditions. Examples include the right for a trail to pass through a State Highway right-of-way or through a property where the owner is hesitant to grant permanent access.

**Cooperative Partnership Land Management** - Certain public agencies may choose to cooperate and partner in the pursuit of mutual land management benefits. Under this scenario, public land managers agree to manage the land for multiple objectives such as conservation, land treatment of wastewater, wetland banking, joint use recreational/maintenance trails and water quality benefits. These might be implemented through short and long term intergovernmental agreements.

**Conservation Easement Tax Credit** - On May 28, 1999, Governor Bill Owens signed House Bill 1155, a law that grants an income tax credit to individuals or corporations for the donation of conservation easements to governmental entities or non-profits. The original maximum tax credit was \$100,000 and could be used over a period of up to 20 years. An act signed on June 1, 2001, raised that maximum to \$260,000 (100 percent of the first \$100,000 of the donated value and 40 percent of the remaining value, up to that cap) and set the maximum credit that could be used each year at \$50,000.

## RECOMMENDED TRAIL DEVELOPMENT STANDARDS

	Urban	Sub-Urban	Rural*
Width	10 -12 feet	8 feet	8 feet**
Maximum Grade	5%	5%	8.33% up to 200 feet
Maximum Cross Slope	3%	5%	5%

*\*ADA standards should be met whenever feasible. For more information on ADA Accessible Guidelines, please review the following: Designing Sidewalk and Trails for Access Part II or II :Best Practices Design Guide by Beneficial Designs, Inc., September 2001 and Forest Service Trail Accessibility Guidelines FSTAG, May 2006.*

## TRAIL DEVELOPMENT CONSIDERATIONS

Surface	Concrete *, gravel, crusher fines (natural may be suitable for rural and/or equestrian, running path, and motorized vehicle uses).
Structures	Bridges, walls, culverts and other structures should meet generally accepted engineering and accessibility standards.
Drainage	Trails should be free of standing water.
Accessibility	Designed to accommodate the needs of all populations, compatible with federal guidelines or rules adopted in compliance with the Americans with Disabilities Act (ADA).
Environmental	Avoid environmentally sensitive areas. Mitigate if necessary to comply with local, state and federal rules and regulations.

*\*All concrete trails should meet ADA accessibility standards.*

*The Colorado State Parks Trails Program recommends that managing authorities abide by all Federal, State, and Local regulations for the development and maintenance of trails.*

## **MULTIUSE RECREATIONAL TRAIL / SITE PATH INTERSECTIONS / REST AREAS / SIGHT DISTANCE**

- Sub grade preparations include compacted road base or use on-site gravel material where approved by an engineer. Over-excavate if unstable sub-soils are encountered and replace with suitable fill material. Compact all fill areas and remove all top soil prior to sub grade preparation.
- Minimum 6 inch thick concrete. Apply broom finish to trail length. Saw cut joints at minimum of every 10 feet along trail length. Saw cut joints at minimum of every 10 feet along trail.
- Trails must be able to support maintenance vehicles and cross traffic vehicles. Where vehicle cross traffic is present, trail thickness may need to be increased.
- Backfill edge with topsoil. Finish grade to be flush with trail edge (typical) and seed with native grasses.
- Cross-slope should allow for drainage to prevent standing water.
- Maximum 6% grade.
- Minimum 8 feet overhead clearance; 10 - 12 feet preferred.
- Standard width is 10 feet for two-way bicycle trails. A separate parallel gravel trail is recommended for pedestrians.
- Where possible, amenities can enhance the user's experience. Amenities include: benches and wheelchair parking pads, trash receptacles, pet waste bag dispensers, lighting, restrooms, drinking fountains, shade trees or shade structures, mile markers, and signs.

## **TEMPORARY SOFT SURFACE TRAILS (GRAVEL FINES)**

### **DESIGN GOALS / CONCEPTS**

- Materials should provide stable surface and remain relatively dry.
- Color should blend with the natural environment to minimize visual impact.
- Design for wheelchair accessibility wherever reasonable, minimum 36 inch width.
- Minimize erosion of surface material, i.e., provide concrete pans at side drainage locations to limit creation of gullies.
- Gradients less than 3% are preferable.
- Create meanders with gentle curve which conform to the natural topography.

### **DESIGN GUIDELINES**

- Standard width is 10 feet for 2-way bike/pedestrian trails, high use or intended high use trails can be up to 16' with designated walking and biking lanes.
- For pedestrian-only hiking trails, minimum width is 8 feet.
- For grades over 4%, surface erosion protection is required.
- 3/8 inch and smaller crushed and compacted gravel fines to be approved by engineer prior to construction.
- Use a geo textile fabric under the gravel fines.

## **AMENITIES**

Where possible, amenities can enhance the user's experience. Amenities include: benches and wheelchair parking pads, trash receptacles, doggie-bag dispensers, lighting, restrooms, drinking fountains, shade trees or shade structures, mile markers, and signs.

## **COMBINED TRAILS, NARROW RIGHT-OF-WAY**

Bicycle, jogging, and equestrian trails can be combined where the right-of-way is forced into a narrow space. In this case, combined trails should have a 10 foot minimum width of hard surface trail, and an 8 foot wide soft surface trail.

## **EQUESTRIAN TRAIL CLEARANCE**

The minimum desirable width for a combined horse and jogging trail is eight feet. Vertical trail clearance for horse and bicycle trails should be 10 feet.

## **EQUESTRIAN AND JOGGING TRAIL SURFACE**

Equestrian users and joggers prefer a non-paved, softer surface, although paved surfaces can be used. Where separate surfacing is possible, crusher fines should be used if there is a matrix of larger particles to resist the grinding and kicking motion of horses' hooves.

## **RECOMMENDED CRUSHER FINES CHARACTERISTICS**

1. Irregular and angular.
2. Fines should be laid to an average depth of 6 inches.
3. Stones for crusher fines should be as hard as possible. Sandstone is not generally acceptable while granite is excellent. Fines bound with limestone provide an even stronger surface.
4. Horses should be kept off trails with crusher fines where the trail surface slope exceeds 6%. Have horses use the hard surface paving for steep sections. Horses should be kept off all boardwalks. If box culverts are large enough and have clear sightline to the opposite end, they can be used by equestrians.

## **SEPARATE CRUSHER FINES JOGGING NATURE TRAILS**

In some areas, the available trail corridor permits a separate crusher fines jogging and/or nature trail. These trails allow access to points of interest, rest areas, vistas and wildlife viewing areas. A crusher fines trail along paved sections in this plan is 3 feet wide and has a minimum vertical clearance of 8 feet.

## **TRAILS ALONG COUNTY ROADS**

Trails should be separated horizontally from roadways wherever possible for safety and aesthetics. Along existing county roads, the trail should be separated from the roadway by a ditch or raised berm with a minimum 12 foot division. Fences should be set back from the edge of the trail surface by a minimum of 3 feet.

## **PRIVATE DRIVEWAYS**

Where private driveway crossings occur, two situations are possible:

1. Trail users yield to driveway, or
2. Driveway users yield to trail users.

The first should be used at busy driveway intersections or where sight lines or site features decrease trail user's safety. Where driveways are less busy, the second can be used. Signage and pavement markings should be provided to control traffic in each scenario.

## **RAILROAD CROSSINGS**

Crossings should be adequately designed for safety and ease of crossing. A minimum 20 foot level path should be provided on each side of the tracks so that trail users have an adequate place to stop and wait while trains pass.

A gradual slope should be provided at the approach to the level resting area. Grades should be a maximum of 10% on the approaches. Track crossings should use a compressible flangeway filler to provide a safe and easy crossing. Filler material should be approved by the affected railroad.

Crossings should be designed so that they approach all roadways at a 90° angle if possible. A minimum cross angle of 45° is permitted. All crossings should be signed with appropriate railroad crossings signs. Additional signs should be provided indicating bicyclists should dismount. All signing should meet the Manual of Uniform Traffic Control Devices (MUTCD) Standards.

## **TRAIL UNDERPASSES**

Wherever possible, trail underpasses should be used to cross busy highways and roads. Underpasses can either be under an existing bridge or in a specially constructed culvert. An alternate route is necessary at all underpass crossings to allow for at-grade passage and access to the roadway.

## **UNDERPASS WIDTH AND HEIGHT**

The minimum width of the path in a box culvert should be 10 feet. Paths beneath bridges should be considered a hazard zone and widened by 2 - 4 feet, if possible. The minimum vertical clearance in the underpass is 8 feet with 10 feet being preferred. Warning/rumble strips should be placed at river edges of the trail for safety and lane markings should be provided through the approach and underpass. Wing walls may be necessary at the upstream and downstream ends of underpasses to keep stream flows off the trail surface.

## **SIGHTLINES**

Adequate sightlines to the entrance of an underpass are critical for user safety. Users approaching an underpass should have an unobstructed view of the center of the entrance from at least 140 feet away. From a point of 60 feet away from the entrance to the underpass, users should be able to see the center of the path at least 40 feet into the underpass.

## **BRIDGES**

### **DESIGN GOALS/CONCEPTS**

- Consider breakaway capability to minimize flood obstruction.
- Bridges should be sturdy, safe, vandal-resistant, and easily maintained:
  - Good skid-resistance on deck.
  - Railings should be free of splinters and provide a smooth, clear surface.
  - Railings should allow view to the creek from all heights, yet prevent anyone from falling through.
  - The scale of the bridge should be in keeping with its surroundings.
- Bridge color should blend with natural environment or tie into the color scheme of any adjacent development.

## **BRIDGE APPROACHES AND DRAINAGE**

Where separated crossings occur, access to cross-streets should be provided. High headwalls should also be provided in these locations to minimize snow overshoot and debris from snow

plows. Culvert drains may be required at approaches. Drain pans adjacent to trail surfaces may also be required.

### **TRAILHEADS / TRANSFER POINTS**

The term, transfer point, refers to the transition from road to trail in the travel process. The transfer point should be designed to tie the site together both visually and functionally. The first step is to provide a gradual transition from the parking/transfer area to the trail. A concrete ramp meeting the ADA guidelines should be incorporated in at least one entry point per trailhead.

### **MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)**

Developed by the United States Department of Transportation, offers standards and basic principals regarding traffic control signage. All regulatory and warning signs and their locations will meet the MUTCD standards for sign dimension, style and placement.

### **REGULATORY SIGNS**

Communicate a demand of action on the trail user such as stop or yield.

### **WARNING SIGNS**

Alerts users of possible or particular events such as a sharp turn or traffic crossing.

### **DIRECTIONAL SIGNS**

Indicate the direction along a path that leads to a destination.

### **INFORMATIONAL SIGNS**

Offers useful or interesting information about the trail or surrounding area.

### **FUNDING SALES TAX**

One potential mechanism for generating revenue for trails and open space is collection of sales tax. For example, the City of Brighton collects a 3/4 of a cent per dollar sales tax that is used to fund recreation, parks, trails, and open space as well as some maintenance. Adams County also collects an open space tax that funds grants for passive and active open space as well as trails and parks purchases and projects.

### **PROPERTY TAX**

Typically, property taxes support a significant portion of local government activities. The revenues from property taxes can also be used to pay debt service on general obligation bonds issued to finance open space system acquisitions. For locally funded open space, park and trail programs, property taxes can provide a steady stream of financing while broadly distributing the tax burden. In other parts of the country, property taxes have been a popular method to pay for park and open space projects with voters as long as the increase is restricted to parks and open space.

### **EXCISE TAXES**

Excise taxes are taxes on specific goods and services. Examples include lodging, food, and beverage taxes that generate funds for promotion of tourism, and the gas tax that generates revenues for transportation related activities. Excise taxes may be a viable source for funding a future regional trails program.

### **BONDS / LOANS**

Bonds have been a very popular way for communities across the country to finance their open space, parks and trails projects. A number of bond options are listed below. Since bonds rely on the

support of the voting population, an education and awareness program should be implemented prior to any vote.

### **REVENUE BONDS**

Revenue bonds are bonds that are secured by a pledge of the revenues from a certain local government activity. The entity issuing bonds pledges to generate sufficient revenue annually to cover the program's operating costs, plus meet the annual debt service requirements (principal and interest payment). Revenue bonds are not constrained by the debt ceilings of general obligation bonds, but they are generally more expensive than general obligation bonds.

### **GENERAL OBLIGATION BONDS**

Local governments can issue general obligation (G.O.) bonds that are secured by the full faith and credit of the entity. In this case, the local government issuing the bonds pledges to raise its property taxes, or use any other sources of revenue, to generate sufficient revenues to make the debt service payments on the bonds. A general obligation pledge is stronger than a revenue pledge, and thus may carry a lower interest rate than a revenue bond. Frequently, when local governments issue G.O. bonds for public enterprise improvements, the public enterprise will make the debt service payments on the G.O. bonds with revenues generated through the public enterprise's rates and charges. However, if those rate revenues are insufficient to make the debt payment, the local government is obligated to raise taxes or use other sources of revenue to make the payments. G.O. bonds distribute the costs of open space acquisition and make funds available for immediate purchases. Voter approval as required.

### **SPECIAL ASSESSMENT BONDS**

Special assessment bonds are secured by a lien on property that benefits by the improvements funded with the special assessment bond proceeds. Debt service payments on these bonds are funded through annual assessments to the property owners in the assessment area.

### **COLORADO STATE PARKS - STATE TRAILS PROGRAM GRANT PROCESS**

Through its State Trails Program grant process, Colorado State Parks provides funds for the acquisition of land or water to be used for recreational purposes or for the construction or redevelopment of outdoor recreational facilities. Only if the project is done with the Colorado State Parks can the funds be used for planning projects. Municipalities, counties and special districts are eligible to apply. The grant process is competitive and requires a 50/50 fund match. Projects should attempt to be in line with the current Statewide Comprehensive Outdoor Recreation Plan (SCORP).

### **DEPARTMENT OF LOCAL AFFAIRS - ENERGY AND MINERAL IMPACT ASSISTANCE**

Energy and Mineral Impact Grants administered by the Department of Local Affairs (DOLA) assist communities affected by the growth and decline of extractive industries. This money can fund improvements to public facilities and local government planning efforts where cultural heritage tourism-related goals can be furthered through economic development initiatives. Municipalities, counties, school districts, special districts and state agencies are eligible for the funds. Because these grants require matching funds, applications with higher matches receive more favor as they highlight community support.

### **DEPARTMENT OF LOCAL AFFAIRS - Heritage Grants Through The Smart Growth Initiative**

Administered by the Department of Local Affairs, Heritage Grants awarded through the Smart Growth Initiative are intended to address the impacts of growth. These grants have been frequently used to fund planning efforts, including those that end or mitigate the loss of agriculture and working landscapes. Towns, cities, counties and special districts can apply for the grants. These

grants require matching funds and applications with a higher match are favored because they demonstrate community support.

### **COLORADO DEPARTMENT OF TRANSPORTATION / TEA-21**

The Colorado Department of Transportation (CDOT) will accept Transportation Enhancement applications from federal, tribal, state, county or municipal governmental agencies. The applicant restriction was adopted because of project development and financial administration requirements associated with this federally funded program. CDOT recognizes that many private, non-profit, and civic organizations have a strong interest in, and support for, using these funds. These groups must partner with government agencies to develop project applications and sponsorships. Eligible Activities: There are twelve (12) eligible activities described in TEA-21. These activities fall within the project categories listed below. Only these activities qualify as Transportation Enhancement activities.

The 12 eligible activities as paraphrased below are:

1. Pedestrian and bicycle facilities.
2. Pedestrian and bicycle safety and education activities.
3. Acquisition of scenic easements and scenic or historic sites.
4. Scenic or historic highway programs, including tourist and welcome centers.
5. Landscaping and scenic beautification.
6. Historic preservation.
7. Rehabilitation/operation of historic transportation buildings, structures, or facilities.
8. Conversion of abandoned railway corridors to trails.
9. Control and removal of outdoor advertising.
10. Archaeological planning and research.
11. Environmental mitigation of water pollution due to highway runoff, and provision of wildlife connectivity.
12. Establishment of transportation museums.