TOWN OF VAIL RECREATION PATH SYSTEM
GENERAL STANDARDS

The recommendation below are derived from AASHTO's 1999 Guide for the Development of Bicycle Facilities and modified to create a Town of Vail Standard for Recreation Paths. Users of Vail's recreation paths may include walkers, strollers, roller bladers, bikers, dog walkers, joggers, and snowshoers.

These recommendations are only a portion of the recognized standards and are intended to be used as a quick reference. Prior to designing new portions or modifying existing portions of path, multiple design resources should be consulted by the designer. There are four types of paths described under this section:

A. Shared Use Paths
B. Bike Lanes
C. Shared Roadways
D. Pedestrian Paths

A. Shared Use Paths

These are paths that are used for multiple activities such as biking, rollerblading, walking, etc. They are typically designed for 2-way traffic and are separated from vehicular traffic. Most recreation paths in the Town are Shared Use Paths. Examples of this in the Town of Vail are the Katsos Ranch portion of the Gore Valley Trail, and the section of the North Recreation Path from the West Vail Roundabout to Buffehr Creek Road.

Town of Vail Design Guidelines:

Path width: 10' minimum for mixed use paths. In heavy use areas, 12' to 14' is desirable.

Shoulder width: A 3' horizontal clear area free of posts, trees, and other obstacles is desirable. In addition, there should be a minimum 1' wide graded gravel shoulder at a maximum 6:1 slope (i.e. 2" over 2'). An 18" width is desirable where possible. Where there are substantial drop-offs steeper than 3:1, a 5' wide graded area from edge of pavement to top of slope is desirable. In addition, a physical barrier such as vegetation, a railing, or a fence should be considered.

Pavement: The paving surface should be either asphalt or concrete. An effort should be made to convert some existing asphalt paths to concrete due to the greater durability of concrete. Asphalt should have a minimum 3" depth on 6" of compacted road base. Concrete should have a minimum 4" depth on 6" compacted road base. When feasible, control joints should be sawcut into concrete paths instead of tooled in order to reduce the bump between sections.

Vertical clearance: 8' minimum, however more may be needed to permit maintenance and emergency vehicle access. Under crossings and tunnels, 10' is desirable.

Railings: Railings placed along the path for protection, such as along drop-offs, ditches, creeks, or on bridges should be a minimum of 54" high. Pedestrian only railings may be 42" high.

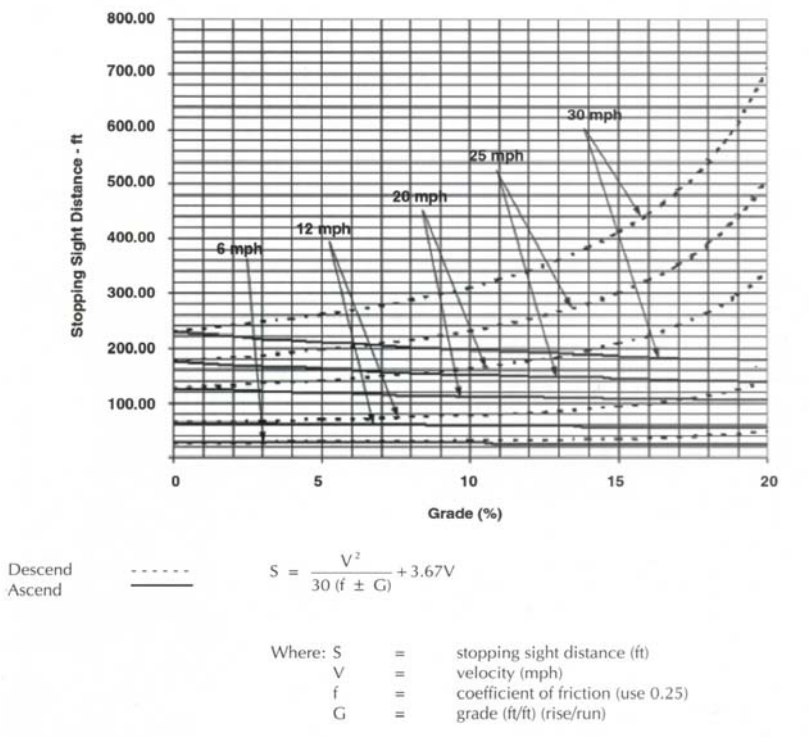
Grades: 5% maximum should be the target grade for recreation paths. A grade of 8.33% for a distance of 30 feet is the maximum grade allowed by the Americans with Disabilities Act. However in some situations site conditions may require steeper grades. The following chart indicates steeper grades and the recommended maximum distances for those grades.

5-6%	up to 800 ft.	8%	up to 300 ft.	10%	up to 100 ft.
7%	up to 400 ft.	9%	up to 200 ft.	11+%	up to 50 ft.

Options to mitigate steep grades may include adding 4-6’ of width to allow room for dismounted cyclists, signage that may include grade information and recommended speeds, longer minimum stopping distances, a wider path with switchbacks, wider horizontal clearances, recovery area, and/or protective bike rails.

Cross Slope: The maximum cross slope on a path should be 3%, although 2% is preferable.

Sight Distance: Sight distances and stopping distance will vary depending on the speed of the cyclist, the cyclists reaction time, the grade of the path, and whether the cyclist is ascending or descending. Use the following chart to determine stopping sight distance according to speed and grade. As a general rule for Town of Vail paths, a cyclist travelling at 15 mph on a descending grade of 5% will require approximately 80 feet of site distance.



From AASHTO Guide for the Development of Bicycle Facilities 1999

Achieving proper sight distance can be accomplished in several ways. Removing vegetation is the most cost effective method. Realigning the path is also an option in certain areas. Where it is not possible to achieve the proper sight distance, adding a centerline stripe and widening the path may suffice.

Sight distance on the crest of vertical curves is also an important consideration in the design of new trails. Design information is provided in the AASHTO Guide.

Signs/Marking: A four inch (4”) wide yellow line should be considered for the entire length of the path, broken where adequate passing distance is available. However, for Town of Vail purposes, a centerline should be used where achieving the proper sight distance is not possible, or where the path is less that 10’ wide.

Warning signs should be used in areas where these recommended standards cannot be achieved. These signs should be reduced versions (18” x 18”) of the signs in Section 9B-13 of

the MUTCD and should be used to indicate sharp curves, steep grades, and intersections, etc. Stop signs, stop bars, yield signs, and caution signs should be used as applicable.

In addition, roadway signs and markings should indicate to motor vehicle operators that biking and walking paths are nearby. Some suggestions include the following: "zebra-style" pavement crosswalks, bicycle and pedestrian crossing warning signs, raised platform crosswalks, and midblock neck-downs or intersection curb-bulbs to shorten the crossing distance.

Bridges: The minimum clear width of a bridge should be the same as the approach path, plus the minimum 2' wide clear areas.

Sidewalks: Sidewalks should NOT be used as Shared Use Paths due to conflicts with pedestrians unless adequate width is provided.

B. Bike Lanes

Bike Lanes are intended to delineate a right of way to bicyclists and motorists and to provide more predictable movements by each. They are typically along streets with significant bicycle demand, and are established with appropriate pavement markings and signage. Examples of this in the Town of Vail are along the Frontage Road in front of the Transportation Center.

Design Guidelines:

General: Bike lanes should be one-way facilities in the direction of adjacent traffic. **Two-way bike lanes are NOT recommended** (i.e. South Frontage Road in Intermountain)

Dimensions:	without curb and gutter	6' standard (4' min. in some situations)
	with curb and gutter	6' from face of curd (5' min in some situations)

Utilities: Drains and utility covers extending into the bike lane should be evaluated for bicycle use

Delineation: A bike lane should be delineated from motor vehicle lanes with a 6" wide solid white line. In addition, a bike lane should be painted with standard symbols such as the words "BIKE LANE", or a bike symbol.

Layout: At intersections, parking areas, and turning lanes, various layouts are acceptable. Refer to the AASHTO guide for examples.

C. Shared Roadways

Shared Roadways are roads with significant bicycle demand but without separated Bike Lanes. Examples of this in Vail are Vail Valley Drive, North and South Frontage Roads, and Meadow Drive to Bighorn Park.

Design Guidelines:

The most critical factor in shared roadways is width. Shared roadways should have 4' wide lanes on each side of the road. Another option is to widen the existing vehicular lanes to 14' wide.

There are two types of Shared Roadways. They are, Shared and Shared *Signed* Roadways. The difference between Shared and Shared Signed Roadways, is that the latter is designated by signage to be a preferred bike route. Reasons for this may include the following: providing continuity between other bike facilities such as bike lanes and shared use paths, the road may be a common route through high demand corridors, or there may be low motor vehicle traffic.

Additional design information on Shared Roadways is available in the AASHTO Guide.

D. Pedestrian Paths

There are two types of Pedestrian-only paths in the Town of Vail, Urban and Semi-Primitive trails. Urban trails are located near the village areas and are used by multiple user types including walkers, hikers, people with strollers, people walking to evening events, and joggers. An example of this type of trail is the Streamwalk between the Covered Bridge and Ford Park. The other type of pedestrian only path is the semi-primitive trail. Trails of this type in the Town of Vail are either informal "social trails" such as those that exist on the Katsos Ranch Open Space, or constructed hiking trails such as the Vail Trail between Golden Peak and the Vail Golf Club.

Design Guidelines:

Design guidelines will vary depending on the type and location of the trail. However, the following are general guidelines. Significant additional guidelines are available from ADA guideline manuals, U.S. Forest Service publications on trail design, and other trail design publications.

Width:	Urban trails – 48" min with a passing space each 200 feet Semi primitive – 28" min with a passing space each 400 feet
Surfacing:	Urban trails – Should be an ADA accessible surface such as compacted crushed stone or wood chips. It should be aesthetically appropriate and commensurate with user expectations. The surface should be stable, firm, well drained, graded smooth, and slip resistant. Semi primitive - The surface should be stable, firm, well drained, graded smooth, and slip resistant. Native materials are acceptable if they conform to the above requirements.
Clearance:	Minimum 8' vertical clearance
Grades:	Urban trails - 5% maximum target grade, 8.3% maximum Semi primitive trails – 7% max. sustained running grade, 15% maximum grade up to 600'
Cross slopes:	Urban trails – 3% Semi primitive – 8.3%
Lighting:	Urban trails – should have low level lighting in accordance with user expectations. Semi primitive – no lighting

Conclusions for Recreation Path General Standards

The above guidelines should assist the Town of Vail with the following:

- Inventory existing conditions for compliance with current standards
- Develop an annual routine maintenance plan to ensure the durability of existing recreation paths
- Develop a short term maintenance plan to correct existing problems
- Develop a medium range plan for addressing safety and major maintenance issues
- Develop a long range plan for expanding the existing recreation path system.