

Optional Technical Features

An optional technical feature would be a short parallel route or just a wide space in the trail for a challenge or obstacle. It is "optional" in the sense that a mountain bike rider has the option to use that feature or stay on the main trail. The PAT has referred to these as "pull-outs". The idea is to build features that make the best sense with the site. For instance, making a feature out of a fallen log, if there happened to be one, or making a wood bridge on posts or pin piles for low impact where the slope is steep, or for crossing a wet spot. Some features only make sense in flatter areas. The following information is extracted from the Beacon Bike Park document prepared by the Evergreen Mountain Bike Alliance for Friends of Cheasty Greenspace at Mountainview, dated May 28, 2014. These are features considered potentially appropriate for Cheasty Greenspace by EMBA. The document did not consider a wide range of technical features, that would be more challenging or impactful, that may be appropriate in other mountain bike parks. Please note that while there is a section on "jumps", no one envisions Cheasty to be a "jump trail". A plausible scenario would be an option for riders to try a pair of rolling bumps, where a beginner could gently go up and down, while a more advanced rider may "pop the gap" between the two bumps.

3. Technical Trail Features (TTFs)

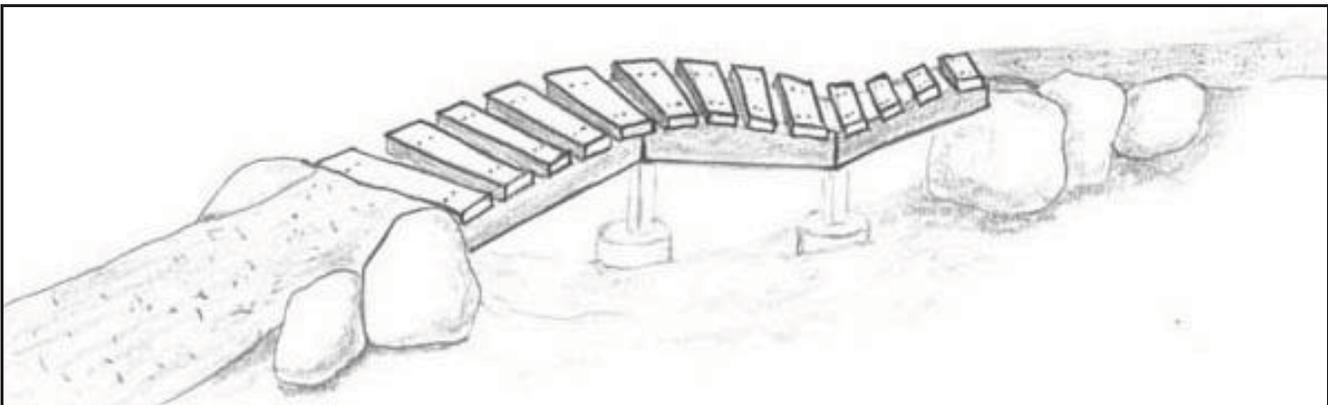
3.1. Introduction

Selecting, designing and constructing Technical Trail Features (TTFs) is a large component of the Beacon Bike Park project. TTFs are natural or man-made obstacles or options in the trail or alongside the trail that require bike handling skills to ride. TTFs are fun for riders and they provide skill building and progression opportunities. In the case of bridges, rollers, berms and rock armored trail, they can also serve to improve sustainability. They range from easy (such as a 3" roll-able root in the trail or a wide bridge crossing a stream) to expert level (such as a steep rocky chute, a narrow elevated log ride, or a 5' high drop-off).

The following provides descriptions of the various types of TTFs that would be appropriate for Beacon and the key standards and not-to-exceed specifications to which they will be constructed. It does not describe all of the detailed specifications, standards and construction techniques involved. There is no guarantee that all of the features described below will be implemented.

3.2. Ladder Bridges

Also called "boardwalks", ladder bridges were first used to allow trail users to cross wet areas. Now, they are common popular mountain bike trail features that can be built with varying width, twist and undulation to make them fun trail options that require balance and bike handling skills to cross successfully.



Not-to-Exceed Specifications for elevated ladder bridges:

	Easier ●	Intermediate ■	Advanced ◆
Deck Height	<2 ft.	<4 ft.	<6 ft.
Deck Width	>deck height	>1/2 deck height	>1/4 deck height
Bisecting angle between sections	<i>Easily</i> allow turns without wheel lifting techniques	Allow turns without wheel lifting techniques	Tight turns may require wheel lifting techniques

3.3. Skinnies and Log Rides

When riding in the backcountry, balance is a key skill required to negotiate very narrow trail passages and/or trails with exposure to dangerous falls. Skinnies and log rides are narrow elevated riding surfaces for developing balance skills. They can be built from fallen trees, split logs, milled planks or dimensional lumber. Specifications are the same as for elevated ladder bridges (see above).



3.4. Drops

Rock, log and root drops are common natural features on backcountry trails, so are great skill building features to have at bike parks. The characteristic that distinguishes a drop from a jump is the take-off angle. A jump has a positive take-off angle, so sends the rider higher in the air than the lip of the jump. A drop has a flat or negative take-off angle, so sends the rider downward. The two require different skills and technique.

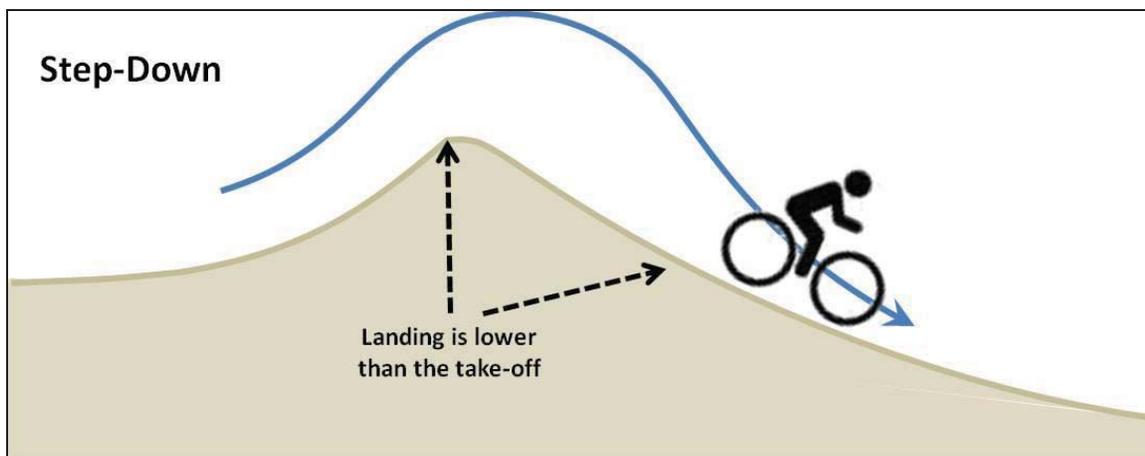
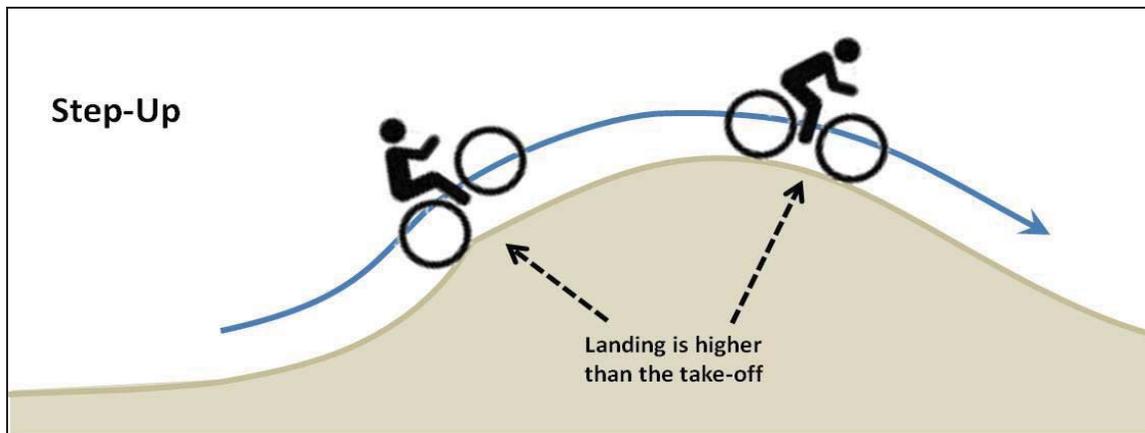
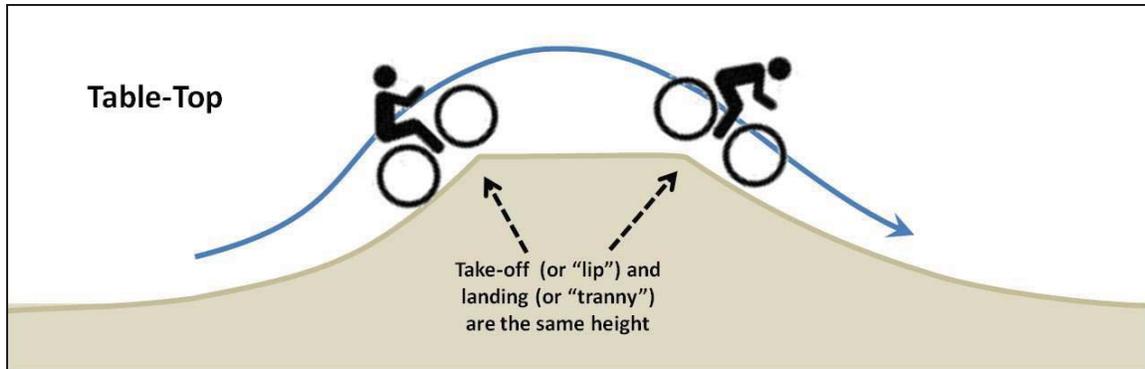


Not-to-exceed specifications for drop height and width:

	Easier ●	Intermediate ■	Advanced ◆
Deck height	<1 ft (rollable)	<2 ft	<6 ft
Width:Height	2:1	1:1	1:2

3.5. Jumps

The most popular and most common features at bike parks are jumps. The three most common categories are Table-Tops, Step-Downs and Step-Ups. The following are exaggerated to show the concept.

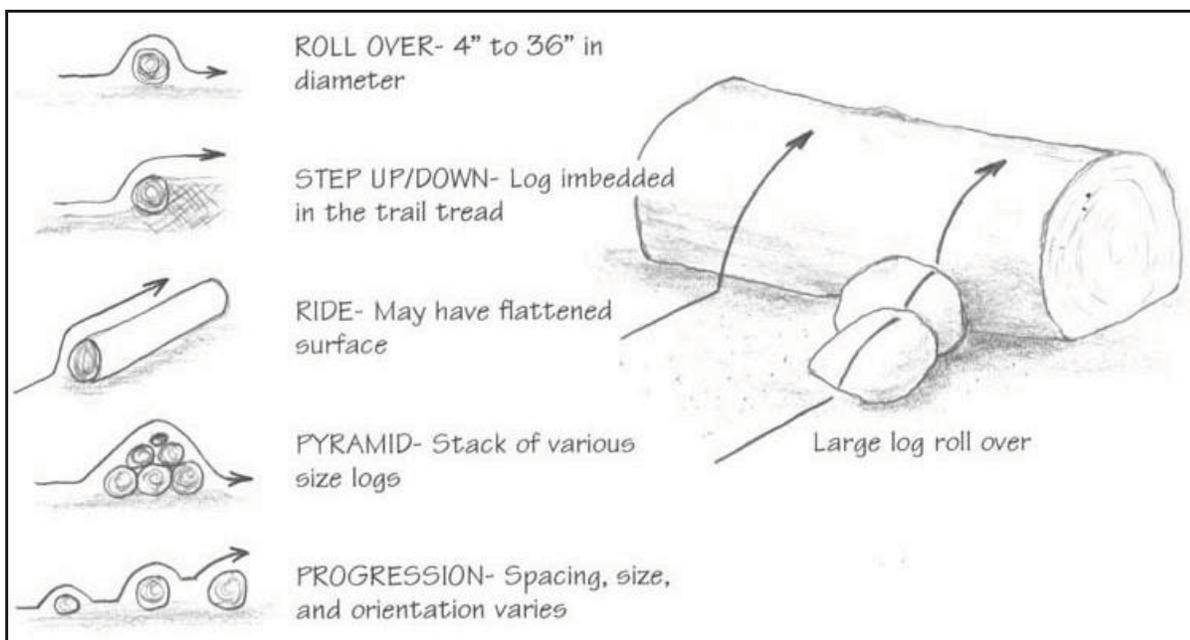


Specifications. Mountain bike jump design & layout depends so much on target audience, risk management objectives, skill level, progression, landscape, materials, speed and other factors that it is not recommended to have a general set of specifications. Smaller easier jumps may be barely distinguishable from rollers. Rollers may also be doubled up so that less skilled riders will naturally roll them, but expert riders take off on the 1st and land on the back side of the 2nd.



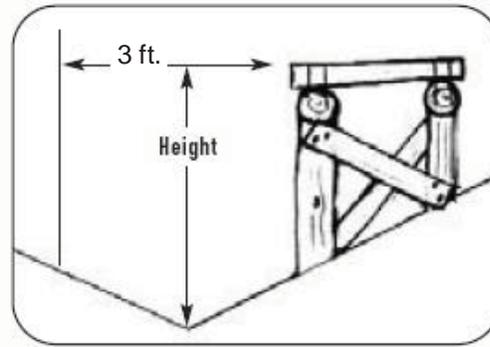
3.6. Other Log Features

Blowdown logs are a common natural feature on trails in the woods and many different types of natural and manmade log features can be implemented.



3.7. Elevated TTF Height

A TTF's difficulty depends greatly on the height of the riding surface. TTF height is measured vertically from the feature's deck (tread or riding surface) to the lowest point within 3' adjacent to the feature.



3.8. Materials

The following materials will be used for wooden TTF construction:

- Framing (posts, stringers, braces): pressure treated dimensional lumber (in some cases, cedar or Douglas Fir logs may be used for stringers and sleepers/sills)
- Footings: poured concrete, concrete pier block or 2-4" cobble rock mixed with soil or +5/8"- crushed
- Decking: split cedar or rough sawn cedar

Split Cedar is the preferred decking material. It is rot resistant, splits easily and provides a grippy surface and natural look. The disadvantage of split cedar is the labor involved in splitting and shaping the decking. The 2nd choice is rough sawn cedar. Although expensive and not as grippy as split cedar, it is rot resistant and very easy to work with.

4. Risk Management & Signage Plan

4.1. Risk Management Techniques

The following is a description of the key risk management techniques and practices that will be used when constructing mountain trails and TTFs at Beacon Bike Park.

- Build trails according to established **Trail and TTF Standards**.
 - Trails and TTFs must be durable, predictable and designed to moderate the risk of injury when riders fail to negotiate them properly.
- Emphasize **Skill Instead of Consequence**.
 - Challenging features don't have to be overly dangerous. All of the TTFs described above have various design techniques that emphasize skill over consequence. Example: An 8" wide log ride that is 1 ft off the ground is just as difficult as one that is 6 ft off the ground, but less risky.
- Provide **Options and Ride-Arounds**.
 - When building TTFs, offer easier alternate routes that avoid the feature whenever possible. Don't build advanced technical challenges on trails designed for beginners or intermediates unless they have a signed ride-around. Offer opportunities for all skill levels.
- Build skill **Gateway Features**.
 - Entrances to difficult trails and TTFs will be made challenging (at least as difficult as the average challenge of the trail). These gateways dissuade less skilled riders and reduce the risk of them attempting a trail or feature that is beyond their ability.

- **Build skill Filter Features.**
 - More difficult features located in less risky locations will slow riders down or cause riders to bail before a high risk area. Example: A tight turn before a small low-risk jump will cause riders lacking cornering skills to come up short on the small low-risk jump before a more difficult feature with higher consequences further down the trail. Example: a very narrow skinny low to the ground before a feature that is high off the ground will cause inexperienced riders to dismount or fall in a low-risk location before the TTF is high above the ground where the rider is more likely to be injured should a fall occur.
- **Provide appropriate Fall Zones.**
 - Hazards such as rocks and logs will be cleared from areas where riders are likely to land from a fall. TTFs will be located such that unmovable hazards such as trees and large stumps are not in the fall zone.
- **Build “Choke Points”.**
 - Narrow, difficult and very visible TTFs will slow riders down or cause riders to bail before a higher risk area or before an intersection. Choke points are built close to the ground with safe fall zones in case of a fall.
- **Design Proper Flow** into trails.
 - Avoid abrupt transitions from open and flowing to tight and technical. Reduce the likelihood that a rider will have to ever slam on the brakes.
- **Reduce Surprise.**
 - Provide clear site lines and don't surprise trail users with unexpected technical trail features. Challenging trails should be properly signed. Make sure that people can see technically challenging trail sections well in advance. The most difficult section of a TTF will be made visible from the entry. By placing the difficult section in view, the rider can make an informed decision before they may get into difficulty with a TTF that may be beyond their ability.
- **TTFs should appear to be more difficult than they actually are.**
 - Test each feature with riders of various styles and skill levels and measure their bike handling and response after riding the feature. The feature should always be easier than it appears. If there is any element of negative surprise, the feature needs to be re-designed and re-built.
- **Mark trails and TTFs according to established Sign Standards.**
 - Trailhead and en-route signs can provide general information about trails and features, but their highest priority is to alert riders to the difficulty level and technical challenges on the trail ahead.
- **Educate** riders.
 - Evergreen Mountain Bike Alliance and partners will offer various mountain bike boot camps, classes and technical riding skills clinics at Beacon Bike Park. Information on biking etiquette and how to reduce user conflict will also be taught and posted.

Throughout design, construction and maintenance of the mountain bike trail system, Evergreen will keep informed as to the latest changes, safety advisories, and recommended technical design changes that are occurring in the sport of mountain biking. If Evergreen becomes aware, at any time, that a constructed design feature has been identified as dangerous; it will bring the situation to the attention of Seattle Parks immediately and advise as to the range of actions that would be required to mitigate the perceived danger.

4.2. Fall Zones

The Fall Zone is the area adjacent to the trail or TTF that the rider may deviate into should they fail to negotiate the trail or TTF. Trails and TTFs will be located with careful review of rider flow and the surrounding area. Potential causes of injury are trees, logs, branches, stumps, rocks and other forest debris. Like skateboarding