MASTERPLAN

MT. FUTAGOYAMA TWIN PEAKS TRAIL PARK

Niseko Area Mountain Bike Association

05th March 2022/cb

CONTENT

Vision and Mission

Niseko Area Mountain Bike Association (NAMTBA) has set out to develop state of the art mountain bike trails and with-it mountain bike tourism around Niseko. NAMTBA's mission is to grow and unify the Niseko area mountain bike community towards the common goals of creating, enhancing, maintaining, and protecting great places to ride in Niseko and the surrounding area. To seek harmony with the greater Niseko community and with the natural environment of Hokkaido in the Niseko Area Mountain Bike Association's quest to transform Niseko into Asia's premier mountain bike destination.

NAMTBA's Vision

«A united Niseko area with a common mission to create a world class sustainable mountain bike community, and off-road biking ecosystem. »

Mt. Futagoyama Twin Peaks Trail Park is NAMTBAs first project and should be developed as high-quality MTB trails and experience. At least in the initial phase of the first five years Futagoyama Twin Peaks Trail Park will be the go-to MTB trails for riders across all levels of experience. The park is supposed to be freely accessible for everyone and hold great riding experiences. As mountain biking as a sport is still developing in Japan, the trail park will have the special mission to pull as many beginners into the sport as possible and therefore offer safe and fun riding.

But not just on the users side the trail park has a pioneering role. Also, on the organizational side for NAMTBA the park is a trail blazer project. With the parks success NAMTBA gets the chance to proof the success of MTB tourism, pull more riders into the sport and legitimize its role among local riders and community. It also is the first project for local trail builders that will be the first of many to come, to learn a new craft and develop a new field of employment.

With our 18 years of experience in developing mountain biking in communities and as a tourism segment, Allegra knows the challenges ahead. Our combined knowhow is in this report to make the Niseko Area the next emerging place of best riding locations in the world.

The idea of Futagoyama Twin Peaks Trail Park

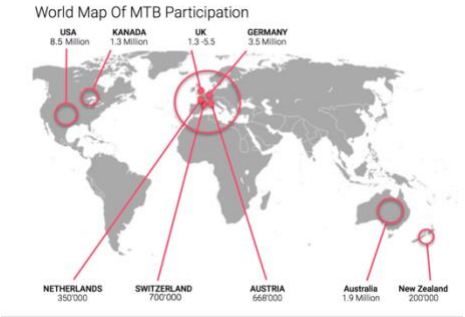
The forest in-between Hirafu and Hanazono ski resorts, called Mt. Futagoyama, should be developed into an MTB trail park, with different trail loops that start and end at the same access point. In the trail park there's no lifts like in a bike park, but a forestry road could offer the option of shuttle uplift. The riding experience is more oriented towards a mix of pedaling and riding downhill, in MTB term called "Enduro" riding. The trail park will not be focused on technically difficult downhill riding or high-speed races.

Futagoyama trail park should offer easy access to the sport and the forest for riders of all age groups. Especially beginners, with some challenging trails for experienced riders.

In the compact area a dense offer of different technical challenges will be developed in round courses with the length between 200 meters and 2 kilometers. In the trail park, groups, individuals, families, kids-groups, or MTB instructors with their clients can ride freely and have fun or exercise on their technique.

Why Mountain biking

Mountain biking has seen large growth numbers in the past 30 years, growing into an important strategic pillar for summer tourism in the Alps, as well as the rest of Europe or the U.S.. As part on the mega trend in society the bicycle becomes more and more fashionable as a means of commuting, as a status symbol and as a leisure time activity and sport.



Large ski resorts like Lenzerheide, Switzerland, and Sölden, Austria, have seen growth numbers in MTB visitors and ticket sales of up to 50% in the past ten years, currently selling between 70'000 and 190'000 MTB day passes per summer season.

According to recent research, outdoor activities are booming worldwide. There are many indicators that support the thesis that outdoor activities will further grow in popularity. This is showcased by the following figures:

- Globally, adventure tourism now valued at $445 billion is expected to grow to $1'335 billion by 2023 .[1]
- Hiking and cycling are expected to make up for 32.5 % among tourism products in rural destinations in the future.[2]

The e-bike sector has grown rapidly in recent past. Despite the high number of sold electric bicycles so far, manufacturers estimate that market saturation will exceed 50% in 2021. This means that the number of electric bikes in circulation is expected to double in the next 15 to 20 years.

Funding

NAMTBA as an established non-profit-organization is already working on several sources of funding, including private sector funding.
Options of funding for Mt Futagoyama ("Twin Peaks") Trail Park:

- Sponsorship of different elements of the trail system, such as: Trails, Loops, Hubs, Elements, obstacles, or individual segments of trail
- Sponsorship of brands and companies in the MTB & bicycle Industry
- National Government, grant schemes to promote cycling tourism
- Local businesses
- Crowd funding
- Others tbd

1 https://www.prnewswire.com/news-releases/global-adventure-tourism-market-expected-to-reach-1335738-million-by-2023-allied-market-research-672335923.html

2 2015_theALPS-Bike-Study-2015

Tasks

Allegra was assigned by NAMTBA to create a masterplan, concept, and trail designs for Futagoyama Trail Park.

Design of any new trails, segments or reroutes is guided by the sustainable trail principles promulgated by PTBA, Allegra and accepted resources such as the current editions of the Trail Solutions; IMBA's Guide to Building Sweet Singletrack, Managing Mountain Biking; IMBA's Guide to Providing Great Riding, Bike Parks; IMBA's Guide to New School Trails, and the USDA's Trail Construction and Maintenance Notebook.

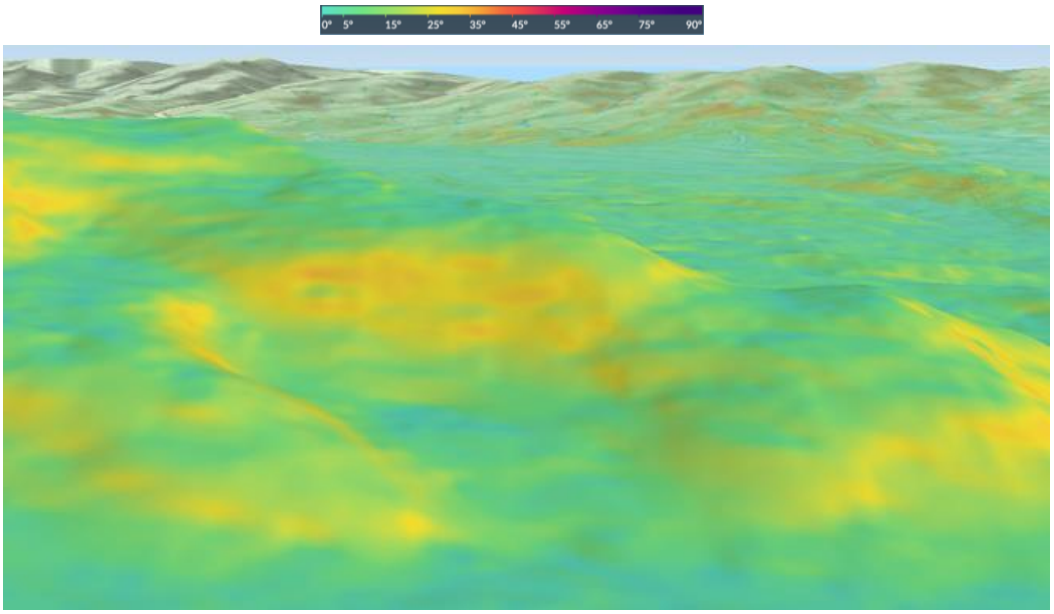
All trails planned and constructed as part of this project shall be natural surface singletrack that is purpose-built for mountain bikers.

A subset of the larger family of rolling contour trails, flow trails share the following basic characteristics:

- Synergy with the landscape: Making the most of what the natural terrain provides by using the trail to explore the topography and features (rocks, trees, waterways) present. Some describe a trail with good flow as one that has been revealed, not so much as constructed.
- Opposition to user forces: Flow trails maximize the efficiencies afforded by using a bicycle and are designed to counteract forces that direct a user off the trail. Bermed turns and cambered tread surfaces, for example, promote traction, safety, sustainability, and enjoyment.
- Conservation of momentum: The ideal trail avoids "flow killers" such as sharp turns, incongruent features, and disjointed climbs and descents. Instead, it utilizes undulations and cambered turns to rewards smooth, deliberate riding and maximize forward motion. A flow trail encourages a better understanding of the bicyclist/bicycle interface, allowing riders to reach that unique sensation of floating through the landscape.
- Leading the user forward: A sense of discovery, combined with a design that maximizes a rider's forward momentum, helps to draw the user forward. The trail is never repetitive or predictable, nor is it "awkward", with variety and innovation combining to create an intuitive feel.

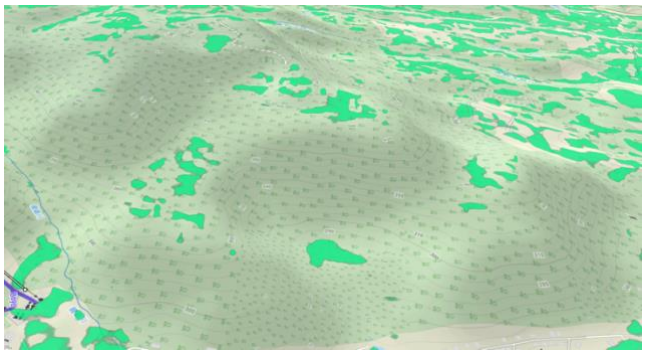
Terrain Analysis

The given area around Mt. Futagoyama offers mostly suitable terrain for MTB trail development concerning the topography.
A slope gradient analysis was done digitally on Mt. Futagoyama and following map was produced.



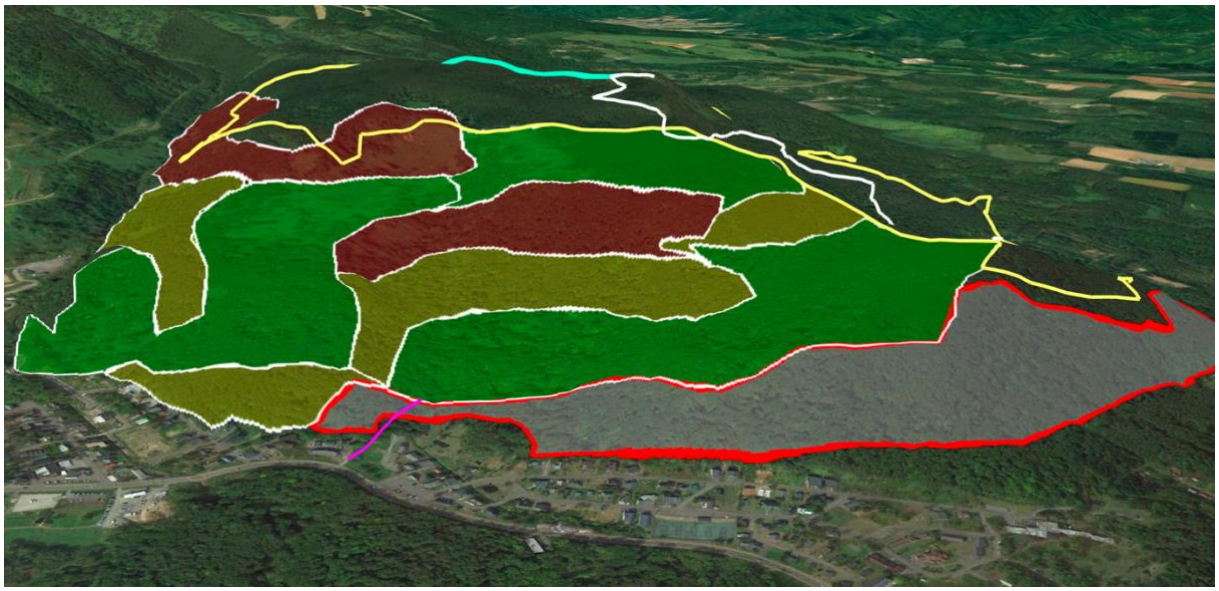
- Areas in green, or between 5° and 15°, are ideal for trail development as they offer a good side slope for drainage, construction, and riding.
- Areas in yellow between 16° and 25° still suitable for trails but require a specialized planning skills and good know how in trail construction.
- Areas between 26° to 31° are difficult for trail development. Excavation and bench cutting can only be done by experts. The trail thread needs to be specifically stabilized.
- Areas in orange or above 35° are not suitable for flow trail construction and are not sustainable for MTB trails.

Additional areas in green or below 5° are very flat and can accumulate a lot of water. Depending on the climate and soil conditions these areas need to be inspected in the field.



Potential Mapping

The terrain at Futagoyama Forest offers a lot of potential. The terrain analysis has shown some moderately steep terrain, as well as a few flat areas. Those should be avoided.



- Green Areas: Below 15 degrees slope gradient
  Suitable for all trail grades, and most trail types. Easy to build in with mostly high production rates.

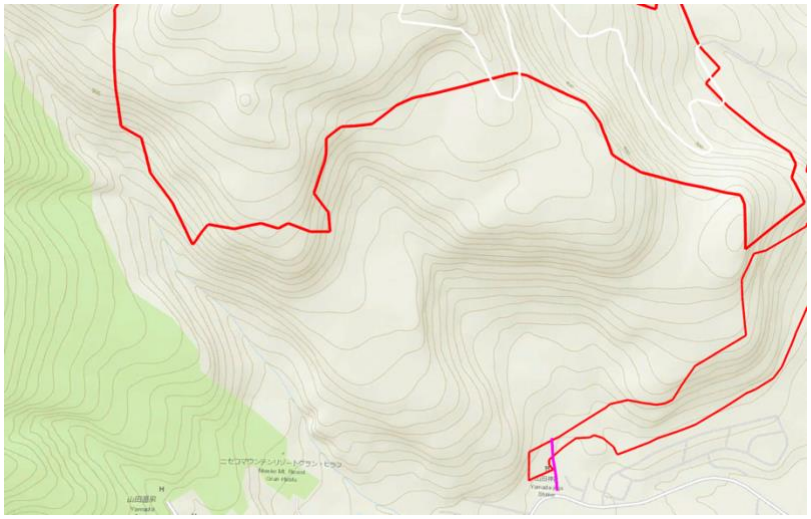
- Yellow: Between 15- and 25-degrees slope gradient
  Suitable for most trail grades. Easier trail grades like green and blue need a wider trail thread (up to 1.5m) to reduce the fear of exposure to the steep hill side for beginners.

- Red: Between 25- and 35-degrees slope gradient
  Only suitable for intermediate or expert trails. Beginner trails would mean a level of construction impact and excavation that is not sensible in a forest. Special care needs to go into slope stabilization.

Master Plan Report

The master planning process has begun mid-February with kickoff meetings and spatial analysis. In a second step three trail designers have combined their ideas for the trail development in the park.
Any information in this report subject to change in a later phase of this project.

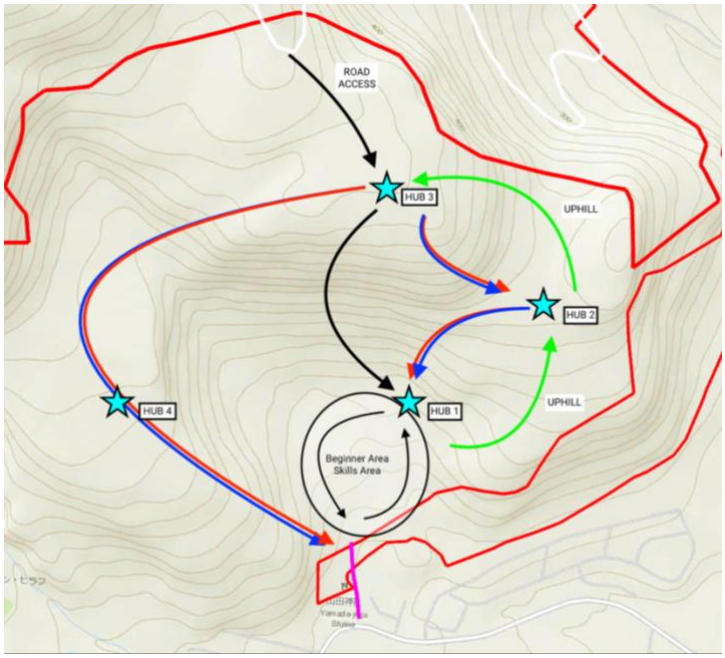
Corridor Designs



The approved area and restrictions in Mt. Futogayama Forest. Red lines indicate private land boundaries or forest areas not to be used.

Our initial concepts for Mt. Futagoyama Twin Peaks Trail Park suggest the use of hubs where trails meet, either uphill or downhill trails can be combined.
The bowl-shaped terrain at the bottom of the hill, close to the trail access, will be provide a beginner's skills area.
The eastern slopes and terrain terraces will provide ideal terrain for uphill trails, as each terrain step offers the rider the option of rest. The uphill trails are stacked in several sections.

Each terrain step will provide a trail hub for users to combine different up- and downhill trails and have options. Trail hubs from their own trail-loops.



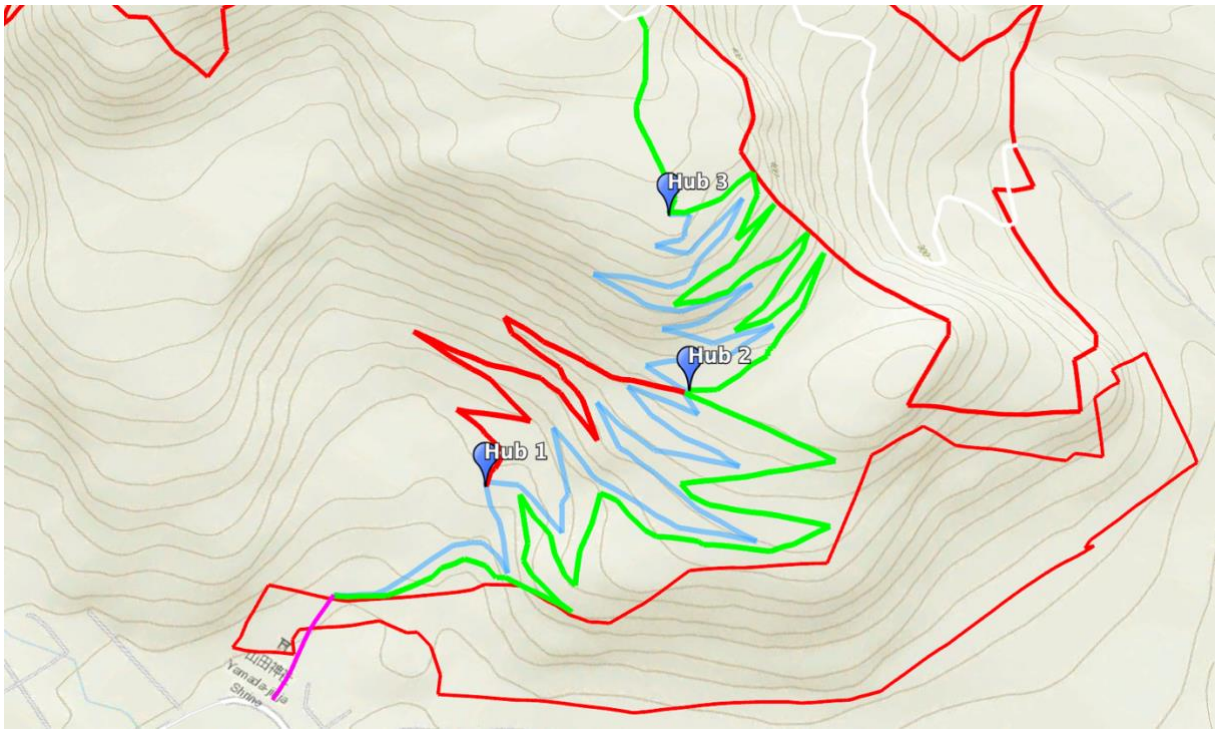
The top is connected to the forest road for shuttle access. The western side will only provide long downhill trails of different trail grades. The south-east facing slope offers the best terrain for a trail development. Additionally, the steeper terrain in the

center can be used for advanced, narrow single trail type of experiences.

Maps

Development Phase 1

The development in phase 1 will see the trail access connected through the eastern terrain to the forest road on top.
A grade 1 uphill trail (green) will climb up via hubs 1 to 2.
From hub 1 there is a trail back down to the trail head (grade 2 blue).
From hub 2 there are two trails back down to hub one. One will be a blue flow trail (grade 2) and the other one will be a red air-flow trail (grade 3).
From hub 3 again there will be a blue flow trail (grade 2) back down to hub 2.

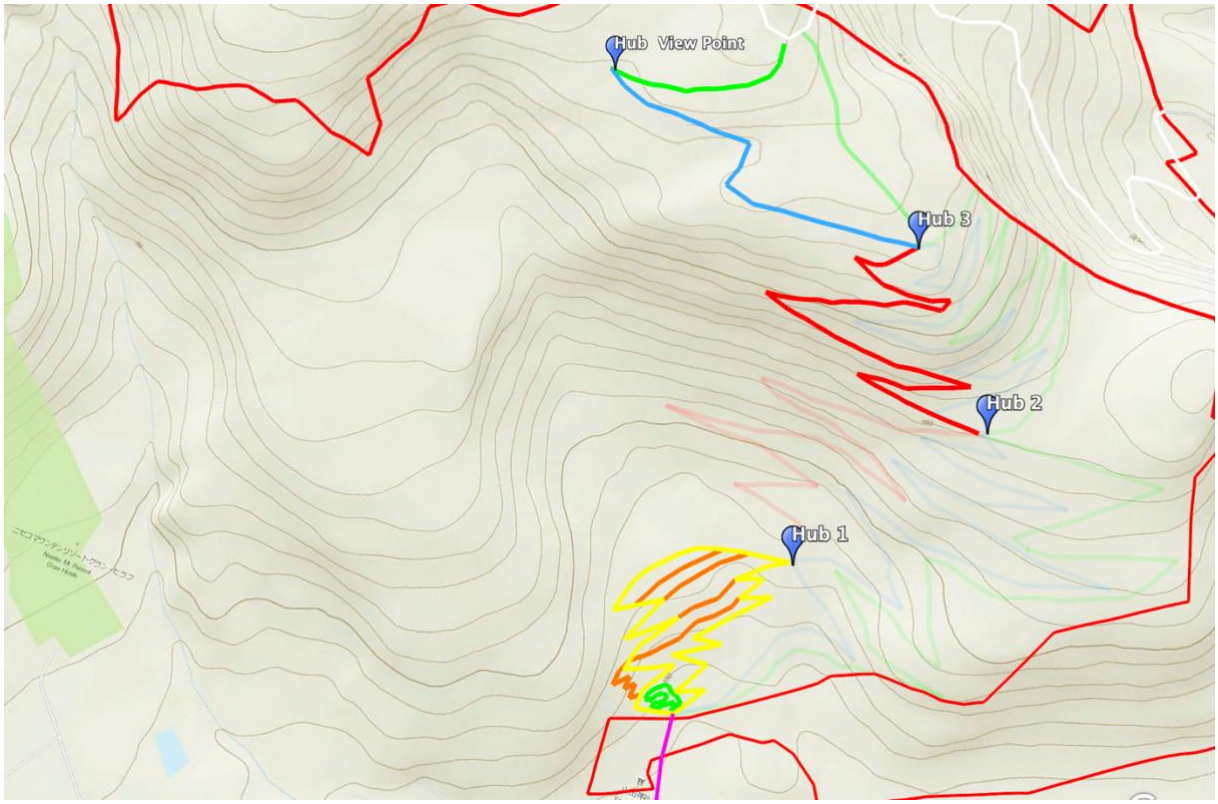


Overview Phase 1 Trail Development

	Trail	Length in m	Grade	Elevation difference	Width	Difficulty	Remarks
Phase 1	Uphill Section 1	2020	5%	100	1.40	Green	Easy way up, platforms to rest
	Uphill Section 2	1700	5%	85	1.40	Green	
	Uphill Section 3	450		18	1.40	Green	Connector to Road Access
	Flow trail Section 1	2010	5%	100	1.40	Blue	Classic Flow trail with Berms and Rollers. Easy Elements of Rock and Wood. Single Easy Jumps
	Flow trail Section 2	1500	5%	77	1.40	Blue	Additional Jumps
	Airflow Section 1	1460	7%	100	1.40	Red	Flow trail with Jump- Elements (Tables, Drops, Wallride – Bike Park Style) always easy option
Total Phase 1		**9140**					

Development Phase 2

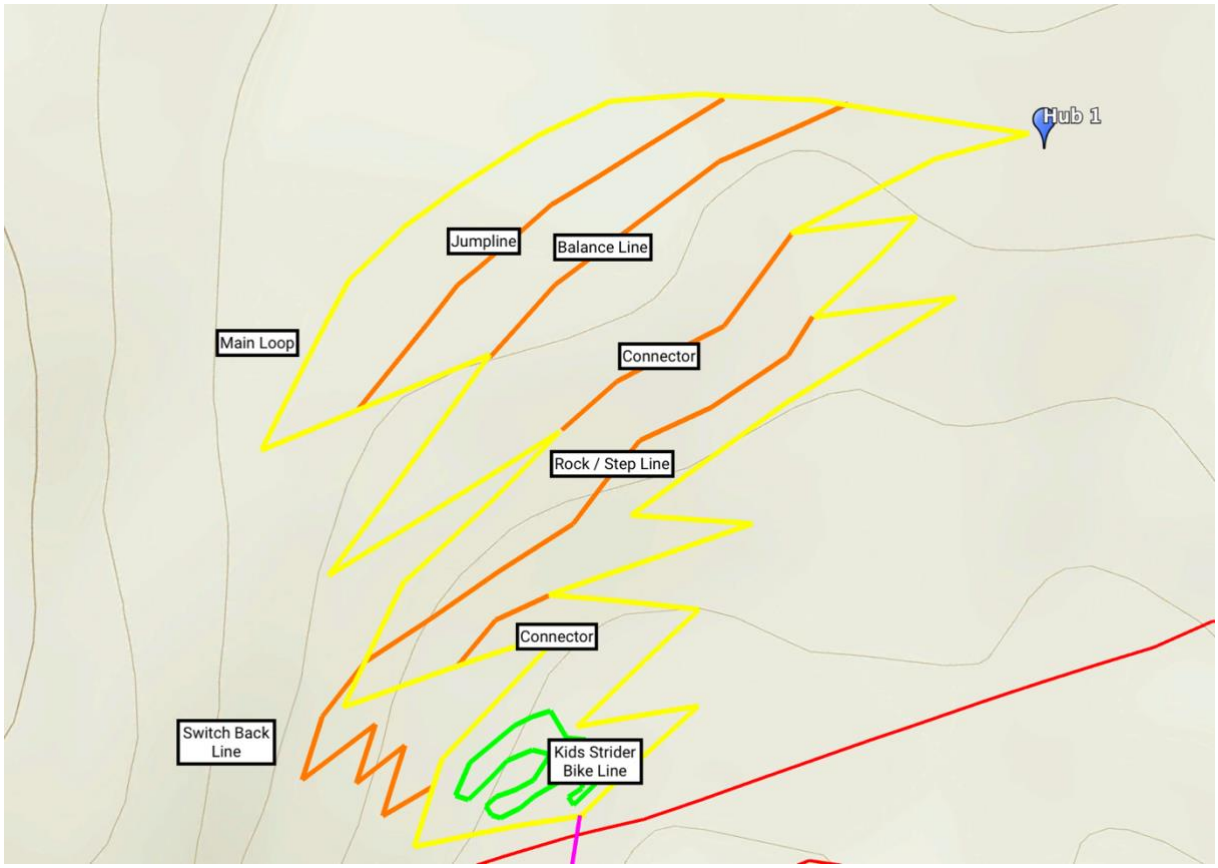
Phase 2 will see the development of a skills training area at the bottom of Futagoyama forest, near the trail access. Additionally, the grade 3 (red) air-flow trail will be built from hub 3 down to hub 2. In preparation for phase 3 an additional hub will be accessed through a blue flow trail.



Overview Phase 2 Trail Development

	Trail	Length in m	Grade	Elevation difference	Width	Difficulty	Remarks
	Flowtrail Section 3	650		18	1.40	Blue	
	Skill Center	2333					
	Airflow Section 2	1110	7%	77	1.40	Red	Bigger Jumps than Airflow 2, no Gaps
	Connector Shuttle Drop Off	340		15	1.40	Blue	
Total Phase 2		**4433**					

Skills Center



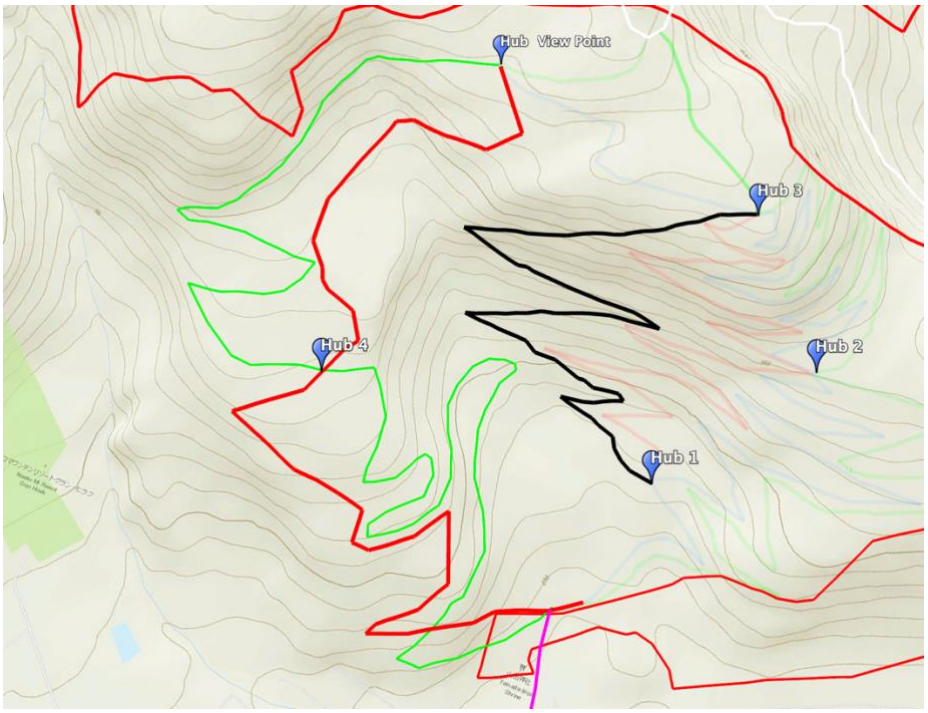
The Skills Center consists of a main loop circling the different skills lines. The skills lines are accessed from the top and focus on specific MTB skills elements.

Overview Skills Center

Trail	Length in m	Grade	Difficulty	Remarks
Main Loop	1410	5%	easy with options	Around the trail different elements in low size
Connector 1	96	6%	easy with options	Re-Connects Balance and Jump Line
Connector 2	36	0%	easy with options	Re-Connects- Rock/Step Line
Rock/Step Line	173	8%	All difficulty levels	Rock gardens and steps-ups and step-downs
Balance Line	135	0%	All difficulty levels	Balance-Element wood and rock
Jump Line	146	4%	Intermediate	Easy Tables, 1m high, 2-3 meters wide / Medium Tables 1.5m high, 4m long // 8-10 Tables in total
Switchback Corner	137	10%	Intermediate-Difficult	
Kids Strider Line	200			
Total	2333			

Development Phase 3

Phase 3 sees the development of western side of Futagoyama Trail Park and additional intermediate and advanced trails in the forest.



	Trail	Length in m	Grade	Elevation difference	Width	Difficulty	Remarks
	Enduro Trail	2230	9%	177	1.00	Black / Double Black	Rooty, Rocky, Jumpy, Switchbacks, Sweep turns
	Flow Trail West	3400	6%		1.20	Blue	
	Pro Line	2178	9%	196	1.00	Red	Jumps, Gaps etc. Possible Event Line
		7808					

Mt. Futagoyama Twin Peaks Trail Park Concept

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Trail Park Concept

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Productization of Trails

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Description & Suggestions of Elements

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Signage Plan

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Trail Specifications

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Mt. Futagoyama Twin Peaks Trail Park Construction Planning

Construction Planning

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Cost Estimates

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Construction Time Tables

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Construction Instructions

Allegra's Trail Planning and Construction standards align with international Benchmarks such as the Professional Trail builders Association.

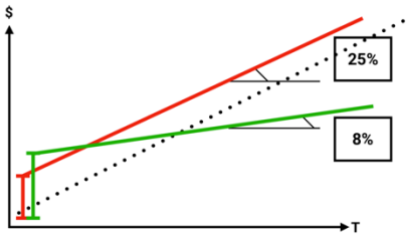
Sustainability and Costs of MTB Trails

For MTB trails, especially in touristic or heavy use, sustainability is important. While local trails, only used by a few riders might not need sustainability standards, as their use frequency is very low, heavily used trails need to withstand impact such as erosion, displacement, compaction, and user force.

A trail must be:

- Socially sustainable, meeting the local riders expectations and catering to the needs of the community
- Ecologically sustainable, minimizing negative impact on fauna and flora
- Economically sustainable, optimizing costs of operation and maintenance

The true costs of MTB Trails: The Maintenance



It's not decisive if the initial investment into a trail is 100'000$ or 120'000$. Much more important is how the maintenance and operational cost develop over the coming years after construction.
It's not uncommon for MTB trails to cause 25% annual maintenance costs of the original construction budget.
Well planned and built trails, according to international standards, should usually cause costs of a maximum of 8% annually.

Trail Construction

Each trail segment shall satisfy the enumerated guidelines for the type associated with the specific segment. Trail width guidelines apply to active tread only; backslope and any fill slopes are not included.

The trail tread shall consist of packed earth or rock. If not allowed by the trail design characteristics, then all stumps and/or roots should be excavated and removed from the trail tread. Backslope dimensions are derived from surrounding area such that they satisfy a three-to-one (3:1) definition.
The trail should contain frequent grade reversals. To encourage self-cleaning, the grade of the drains at the bottom of the grade reversals must be sloped to drain in an aggressive manner while simultaneously resisting user forces. In some cases, this will require insloping with a drainage basin placed into the hillside. If grade reversals result in a fill slope, these slopes and the associated features will be finished to satisfy the above-grade earthen structure guidelines. Any downslope spoils must be distributed such that no berm is present.

If borrow pits are created in the course of trail construction, they will be finished to satisfy the requirements of the trail and its surroundings: slopes graded to the local angle of repose,

stumps and roots trimmed, spoils stabilized and covered with forest duff. Borrow pits may not form a potential injury hazard.

Corridor Clearing

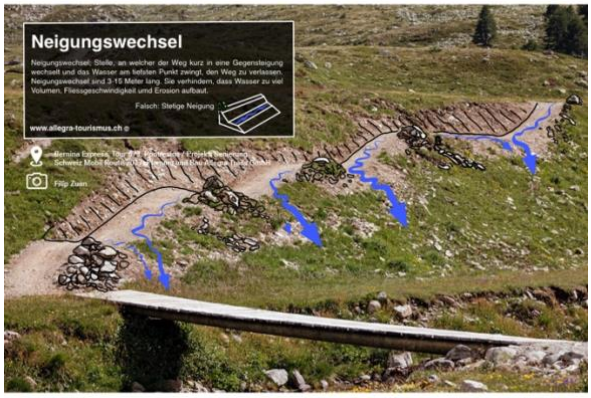
Corridor clearing shall be confined to within 1.5 meters of trail and backslope edges. The trail corridor shall be cleared of all woody plants larger than (10) centimeters DBH. The extent of corridor clearing has to meet the requirements for the specific trail type. Any stumps resulting from the clearing should be excavated and removed. Any woody debris not used in trail closure should be removed from sight of the trail or arranged to blend into the landscape.

Erosion Control

To satisfy erosion and sediment control requirements, the trail must be finished as the project advances. Ideally, all roughed-in corridor will be finished the same day. Any segments requiring delayed finishing must be approved in advance by client.

Rolling Grade Dip

The minimum length of the drain portion shall be two (2) meters and the rise must be at least three (3) meters long; the height differential between the bottom of the dip and the top of rise shall be approximately twenty (20) centimeters to sixty (60) centimeters. The sides of rise must have a slope of at least two-to-one (2:1) or the angle of repose of the local soil, whichever ratio is greater (e.g., whichever slope is more gentle).



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Rolling grade dips must be sited at least ten (10) meters uphill from significant turns in order to reduce the effects of unweighting on higher speed users. Exceptions on these dimensions and requirements may be made on a site-by-site basis to accommodate terrain constraints or to enhance the user experience on expert or advanced trails. In certain locations the client may find smaller structures reinforced with large rocks that fit the character of the trail to be an acceptable substitute.

Materials and Cost Estimates

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