

MARYLAND MOUNTAIN PARK
CITY OF BLACK HAWK

MASTER PLAN
OCTOBER 2019



BLACK HAWK®

✦ ACKNOWLEDGMENTS ✦



BLACK HAWK®

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Tramway Mainline

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Bonanza Mill Ruins

✦ INTRODUCTION AND BACKGROUND ✦

Maryland Mountain has played a vital role in the history of Black Hawk since the City was founded in 1864. Located directly northwest of the Black Hawk central business district, it is bounded on the north and east by Hwy 119, Chase Gulch to the south, with private ranch lands to the west. Throughout the late 1800s and early 1900s, this area was a bustling industrial site filled with mines, mills, roads, and tramway railroads. The mining scars have since transformed into a re-forested mountain landscape, but there is still a story to tell.

The City of Black Hawk has worked for years to acquire Maryland Mountain and now desires to create a new recreational destination for the community and guests. This plan establishes a framework for exploring possibilities and setting priorities for recreational and historical interpretive amenities within and around Maryland Mountain. Implementation of the Plan will assist the City in its efforts to offer a variety of experiences to increase overall visitor attendance, and is intended to be a dynamic tool for guiding actions and decisions at Maryland Mountain in the immediate future, as well as over the long term.





➤ PURPOSE ➤

Maryland Mountain presents a significant opportunity for the City of Black Hawk to offer an alternative outdoor recreation and heritage experience to its community and guests. As a City that has successfully focused on gambling and a gaming guest, a new trail system with historical interpretive amenities will now provide an outdoor recreation oriented guest the opportunity to explore in Black Hawk and learn about mining history. As the Front Range population and popularity of outdoor recreation activities continue to increase, Maryland Mountain Park is likely to receive even more visitors.

The Big Idea is to create a comprehensive trail network for mountain bikers and hikers. Developing a hierarchy of trail types will offer a variety of lengths and experiences for both novices and experienced users alike. Along with the new trails, historical interpretive displays and technology will communicate the rich mining and tramway railroad history of Black Hawk while highlighting the mining remains.

The purpose of this document is to provide initial ideas to guide the design and construction of the recreational trail system, associated amenities and set the framework for historical interpretation.

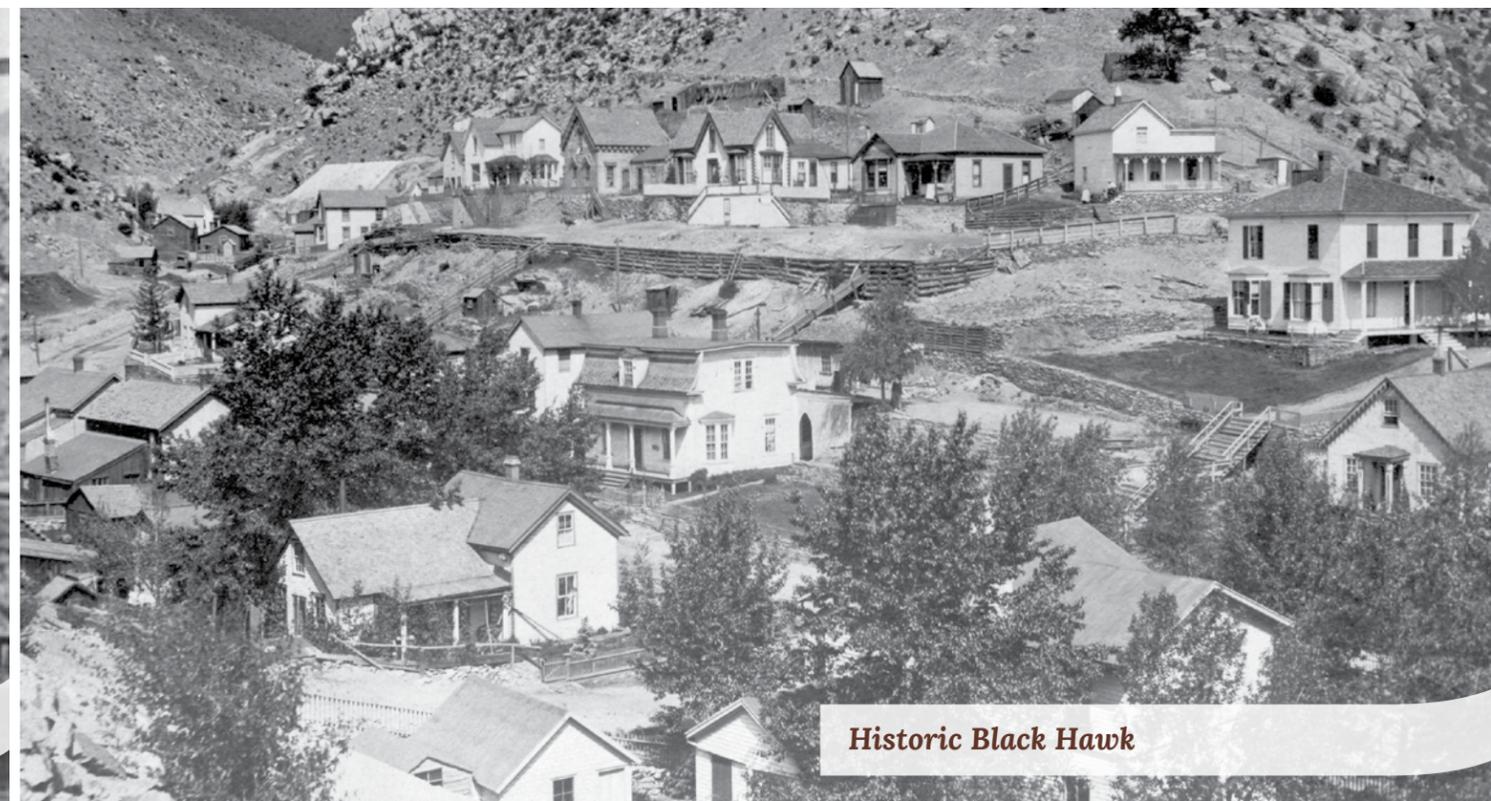
➤ PROJECT GOALS ➤

- As a regional destination, accommodate visitor traffic in a way that minimizes adverse impacts to existing neighborhoods. Provide trailhead parking at an accessible point to the Tramway that ensures safe crossing of Highway 191 using a grade separated overpass.
- Create a trail plan that will integrate with future interpretive facilities including signage, kiosks, and potentially cellular/smart phone technology to provide integrated informative and interpretive messages, enhancing visitor appreciation and understanding of Black Hawk history. Instill visitors with a sense of fun and learning so they are encouraged to visit again and tell others about their Black Hawk experience.
- Trails would be designed to meet IMBA standards appropriate to the type of trail and user, incorporating sustainable trail goals of minimizing impact to the environment, minimizing user conflicts, and minimizing maintenance and costs.
- Consider user safety and managing risks for a safe outdoor recreation experience.
- Incorporate rest overlooks at vantage points to highlight significant vistas.
- Design trails, amenities and interpretive features based on realistic budget and maintenance expectations using phasing to accomplish long term ideas
- Increase ADA accessibility where possible.
- Explore opportunities for ties to regional routes and off-site tramway remains for future expansion of the system.



Historic Black Hawk

Black Hawk Colo



Historic Black Hawk



Bonanza Mill



Shay Locomotive





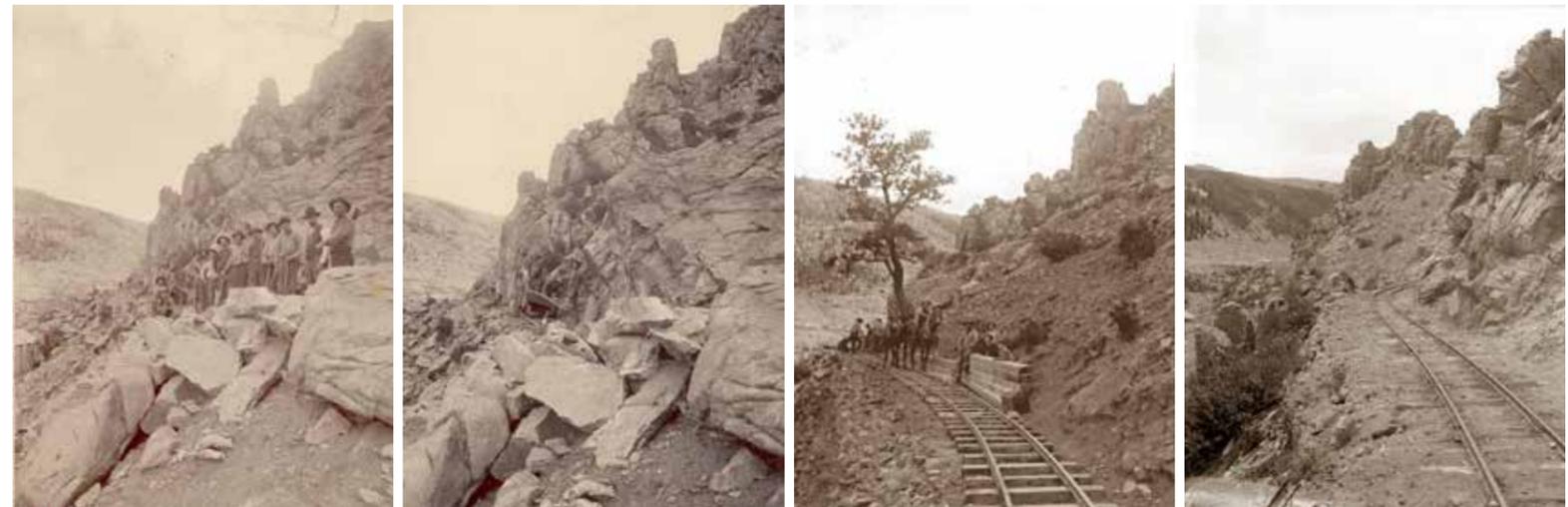
✦ HISTORY OF BLACK HAWK, MARYLAND MOUNTAIN ✦ & THE GILPIN TRAMWAY

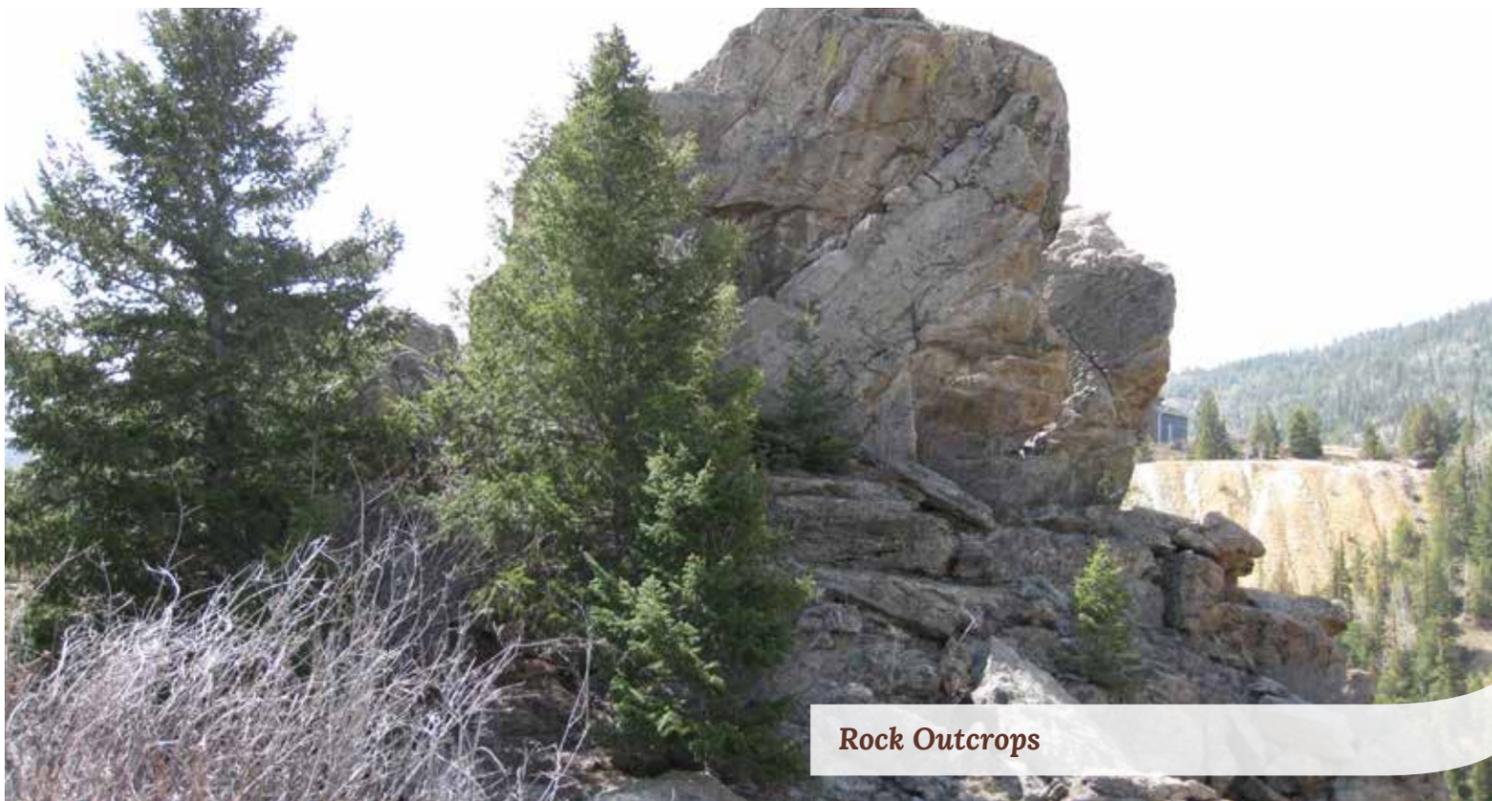
For decades from 1859 until well past the turn of the century, the Black Hawk mining industry was the staple support of the thriving local and regional economy with thousands of miners working in the gold and silver mines, mills, railroads and other mining related businesses. Deep-rock mining required processing of the ore that was brought to the surface in quartz stamp mills, which needed dependable water supplies. Soon North Clear Creek, Chase Gulch and Gregory Gulch were the home to numerous mills, and Black Hawk became the milling center for the entire Rocky Mountain gold mining region.

As mining flourished, the challenge of transporting ore to the mills was not being sufficiently addressed by the early wagon roads. In 1869 the first narrow gauge railroad in the Rockies was built up Clear Creek Canyon from Golden to the Gilpin mining region. Because mines were still separated a considerable distance and elevation from the ore processing mills located along the creeks, the Gilpin Tramway, a “baby railroad” using two-foot narrow gauge rails, was constructed in 1887 to transport ore and supplies from the mines to the mills. The Gilpin Tramway started on Clear Creek about a mile north of Black Hawk, and would travel south skirting the slopes of Maryland Mountain, making its way up Chase Gulch as it climbed around Winnebago Hill and on to other mines in Central City.

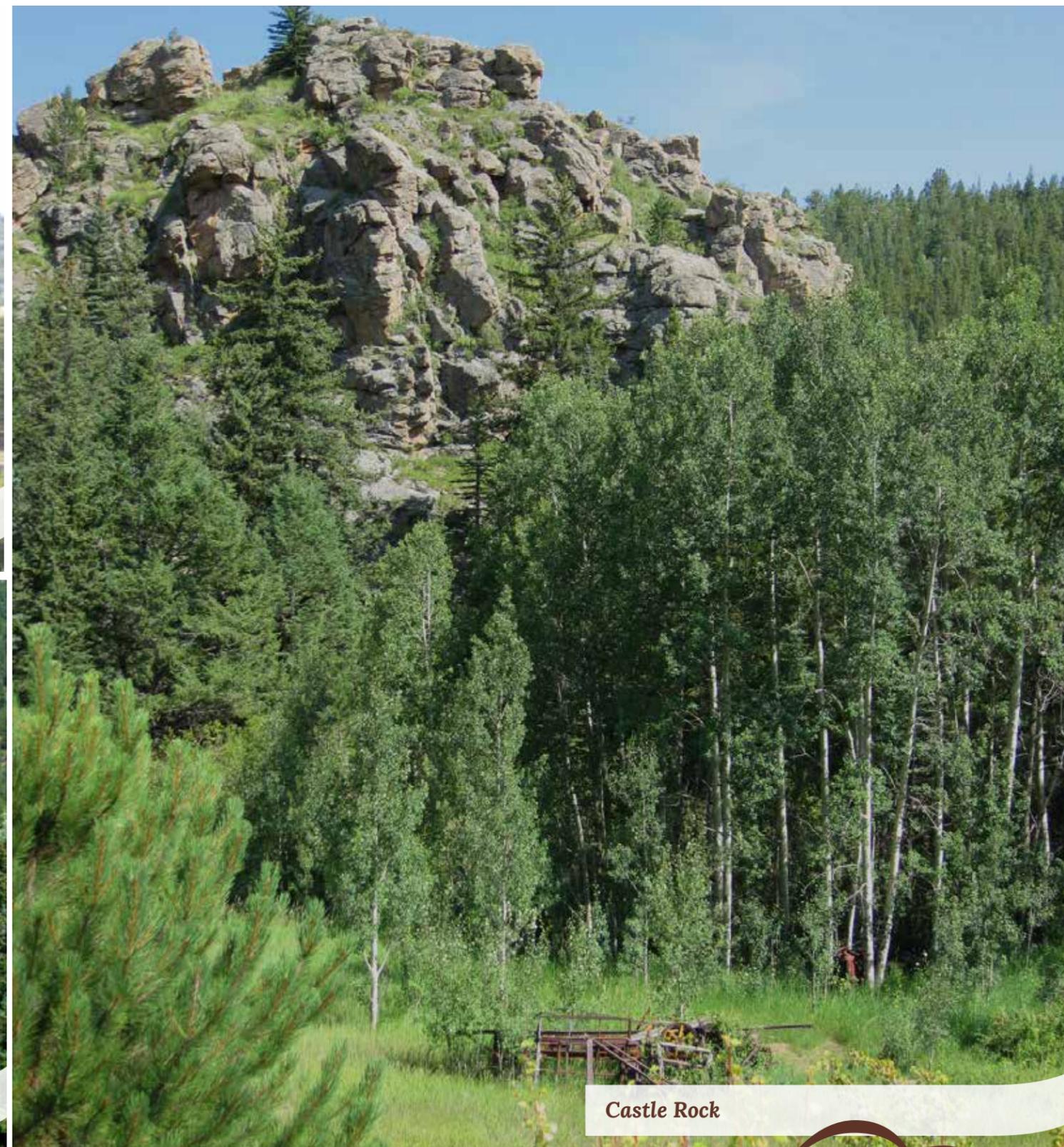
The Tramway was the vein of the Gilpin mining industry. The completion of the Gilpin Tramway afforded a cheaper means of transporting the ore from mines to mills, and was designed to run to nearly every mine in the region, getting ore to the marketplace quickly and economically.

After 1910, with rising labor costs and prices from ore sales falling, mining activities began to decline. As large mills closed, the end of the need for the Gilpin Tramway was evident. At the end of 1916, the railroad discontinued service and by October 1917, the tramway operated only to facilitate its own removal for scrap metal. While the mining legacy has passed, an incredibly rich historic and cultural legacy remains in the visible clues to this colorful past clinging to steep slopes throughout the region, especially the Bonanza Mill, Belden Mill, and the Tramway graded platform.





Rock Outcrops



Castle Rock



Gilpin Tramway Grade



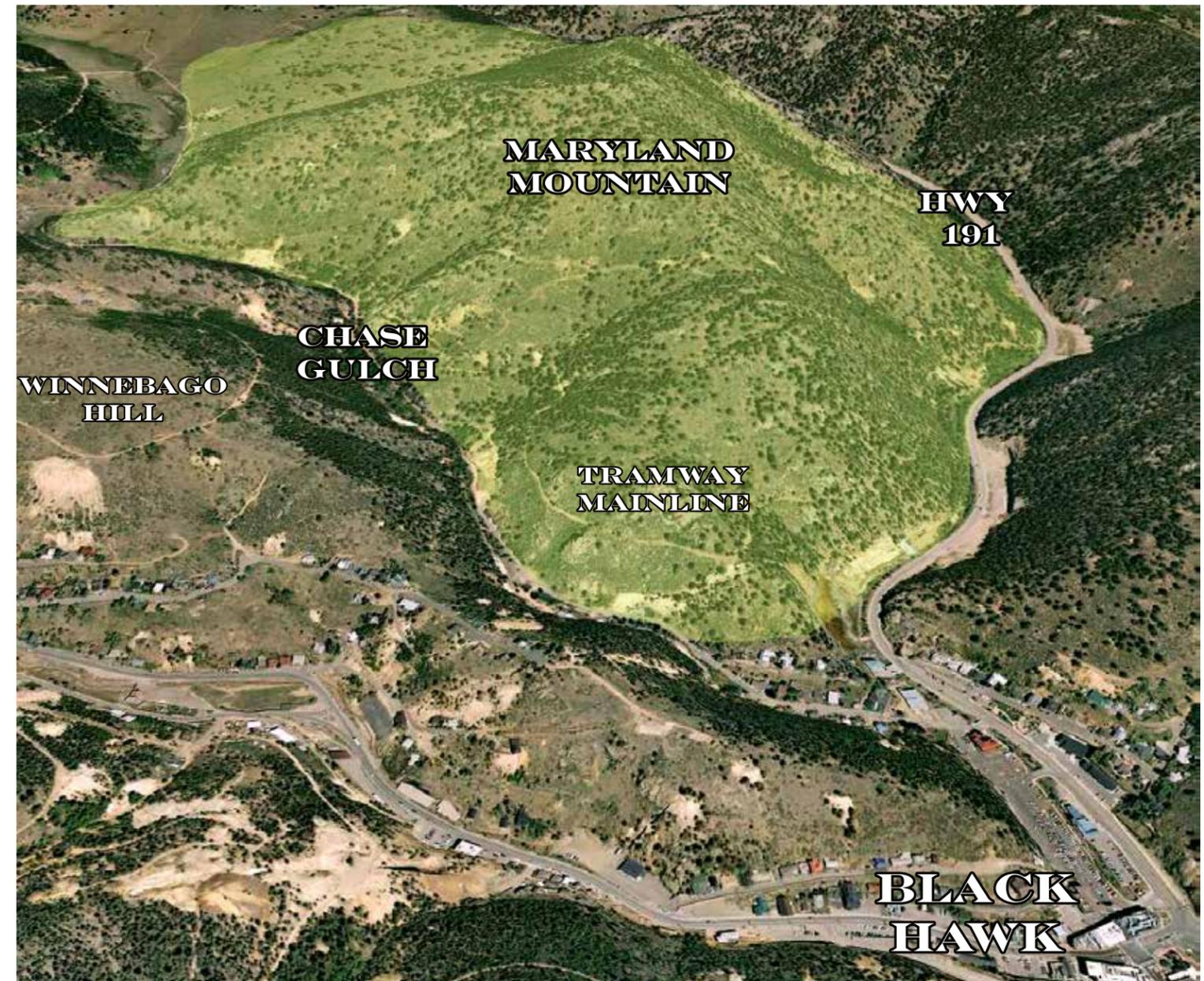


EXISTING CONDITIONS

Maryland Mountain consists of about 600 acres of rugged terrain within Black Hawk city limits. Topography ranges from elevation 8150 in town up to 9200 at the summit, over a thousand feet tall. The landscape is characterized by heavily wooded northern slopes forested primarily with evergreen species of Lodgepole and Ponderosa Pine, Fir and Spruce. South facing slopes are typically open or sparsely wooded with similar evergreen species. The additional moisture provided by Chase Creek has allowed a lush regrowth of Cottonwood, Aspen and Willow and Alder along Chase Gulch.

Spectacular rock outcrops occur throughout the mountain, providing dramatic scenery as well as opportunities to incorporate challenging mountain biking features. Chase Gulch Road passes by the Castle Rock outcrop, providing stunning views of this remarkable feature. Mining relics and ruins exist throughout the site and include mill foundations, tailings piles and the original tramway platform grade.

Access to Maryland Mountain trails will occur through two primary portals. One is directly from Gregory Street; cyclists can ride up Chase Gulch to access trails. Proximity to the center of the City is one of the most appealing elements of the plan. The second access would be from a new trailhead parking facility north of Black Hawk on Highway 191, the Hidden Treasure Trailhead. A third but less emphasized access can also occur on Barrett Street from Central City.

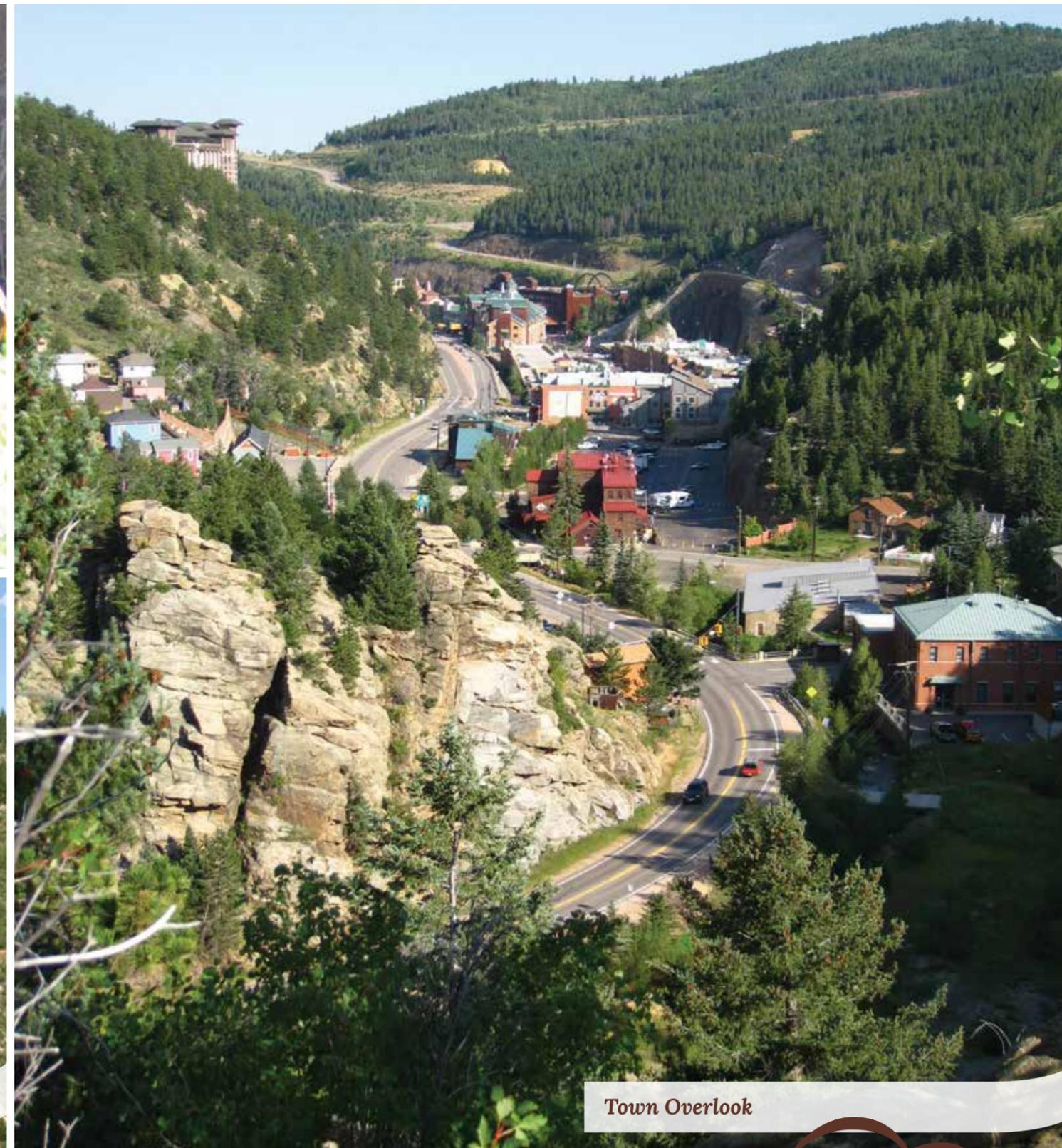




Chase Gulch Waterfall



Maryland Mountain Summit



Town Overlook



PLAN CONCEPTS: PARK TRAILS & AMENITIES PROGRAM

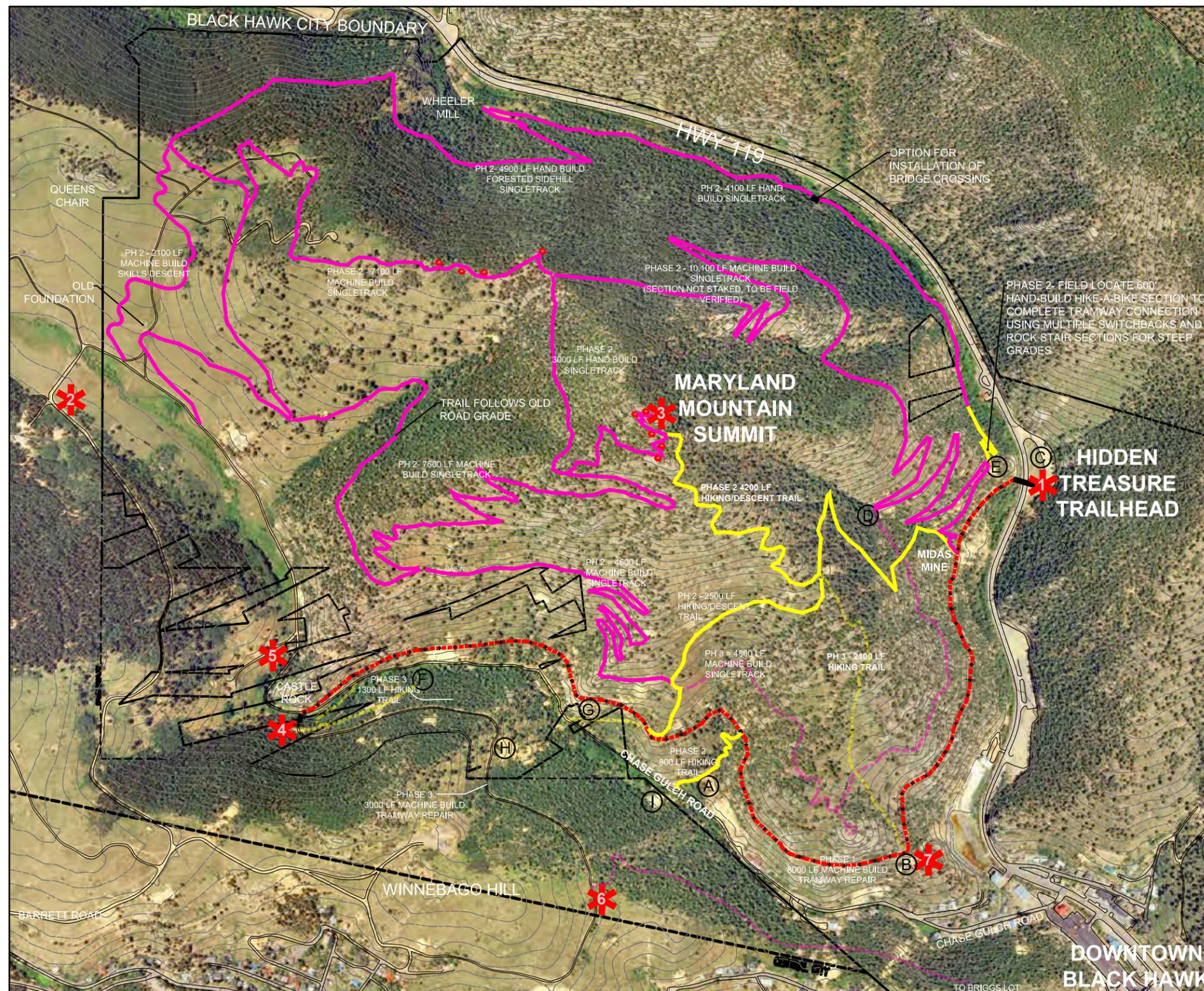
Trails

A hierarchy of trail types using a stacked loop model has been planned to create a comprehensive outdoor experience for a variety of users. Trails have been designed and will be constructed to minimize environmental impacts and fit into the natural landscape. A shared use approach is recommended for most trails – systems that are shared use throughout have the advantage of creating consistent expectations, thus reducing conflict between all types of trail users accustomed to sharing the trail with each other.

The historic Tramway Mainline graded surface will serve as the backbone of the trail system. The Mainline surface will be approximately 48” in width, with grades generally under 4%, making this trail accessible to everyone. Walkers,

runners, strollers, leashed pets and kids on bikes will all enjoy the 2.7 mile Mainline route. The compacted surface and gentle grades also allow accessibility to persons with physical disabilities. The Mainline connects the new Hidden Treasure Trailhead with destinations such as Chase Gulch Waterfall and Town Overlook. The Mainline would also be available in winter for use by Fat/Snow Bikes. Those who desire a more challenging mountain biking experience might venture onto the 8 miles singletrack. Singletrack trails are typically 18” in width with grades that might average up to 8% and include some steeper sections exceeding 12%. The mountain biking singletrack is designed to provide looping opportunities with a connection to the Summit. In addition, approximately two miles of hiking and descending-only trails are also designated.





PLAN LEGEND

- EXISTING HISTORIC TRAMWAY MAINLINE
- PHASE 2 AND PHASE 3 (DASHED) SINGLETRACK MTN BIKE TRAIL ROUTE
- PHASE 2 AND PHASE 3 (DASHED) HIKING TRAIL ROUTE
- TRAIL DESTINATION
- HISTORIC DESTINATION WITH INTERPRETATION
- TECHNICAL TRAIL
- PEDESTRIAN / BIKE BRIDGE

TRAIL PHASES

- PH 1 - HIDDEN TREASURE TRAILHEAD
PH 1 - MAIN LINE = 8000'/1.5 MILES
- PH 2 - MACHINE BUILD SINGLETRACK = 29,400'
PH 2 - HAND BUILD SINGLETRACK = 12,000'
PH 2 - HIKING TRAILS = 7500'
PH 2 - HIKE A BIKE = 600'
PH 2 - MACHINE BUILD SKILLS = 2100'
SUBTOTAL = 51,600' / 9.8 MILES
- PH 3 - MAINLINE REPAIR = 3000'
PH 3 - MACHINE BUILD SINGLETRACK = 4800'
PH 3 - HIKING TRAIL = 3400'
SUBTOTAL = 11,200' / 2.1 MILES
- PH 4 - FUTURE CONNECTION TO BRIGGS LOT AT GREGORY STREET TBD
- TOTAL TRAILS = +/-13.4 MILES



TRAIL SYSTEM DESTINATIONS

1. HIDDEN TREASURE TRAILHEAD / PARKING / RESTROOMS
 2. FUTURE POTENTIAL CONNECTION
 3. MARYLAND MOUNTAIN SUMMIT
 4. WATERFALL / CASTLE ROCK
 5. CONTINENTAL MILLS OUTPOST
 6. POTENTIAL CITY CONNECTION
 7. TRAMWAY OVERLOOK / REST-STOP
 8. HISTORICAL INTERPRETIVE OPPORTUNITIES
- A. BONANZA MILL
B. SITE OF WRECKS OF ENGINES 2&3
C. HIDDEN TREASURE MINE
D. OLD CABIN
E. DEEP MINESHAFT
F. BELDEN MILL VIEWING AREA
G. ROBERT EMMET MINE
H. QUEEN OF THE WEST MINE
I. SARATOGA MILL SKELETAL RECONSTRUCTION



Maryland Mountain Park Master Plan
City of Black Hawk, CO

SCALE: 1" = 200'
August 16, 2019



TRAILHEADS:

The primary trailhead would be located about a half mile north of the City on Highway 119. Named “Hidden Treasure” after the historic use as of the site. The trailhead could provide parking for 55-70 cars, signage, seating, bike racks, restrooms and a bridge across Clear Creek and the Highway for safe access to the trails. Bridge design can incorporate historic railroad trestle design elements.

In addition to the main trailhead, the City is exploring options to create connectivity from Gregory Street to the trail system. A direct connection from Gregory Street to the trail system would allow trail users to park in the City’s parking garage, enjoy the trails, then find their way back to enjoy Gregory Street establishments.

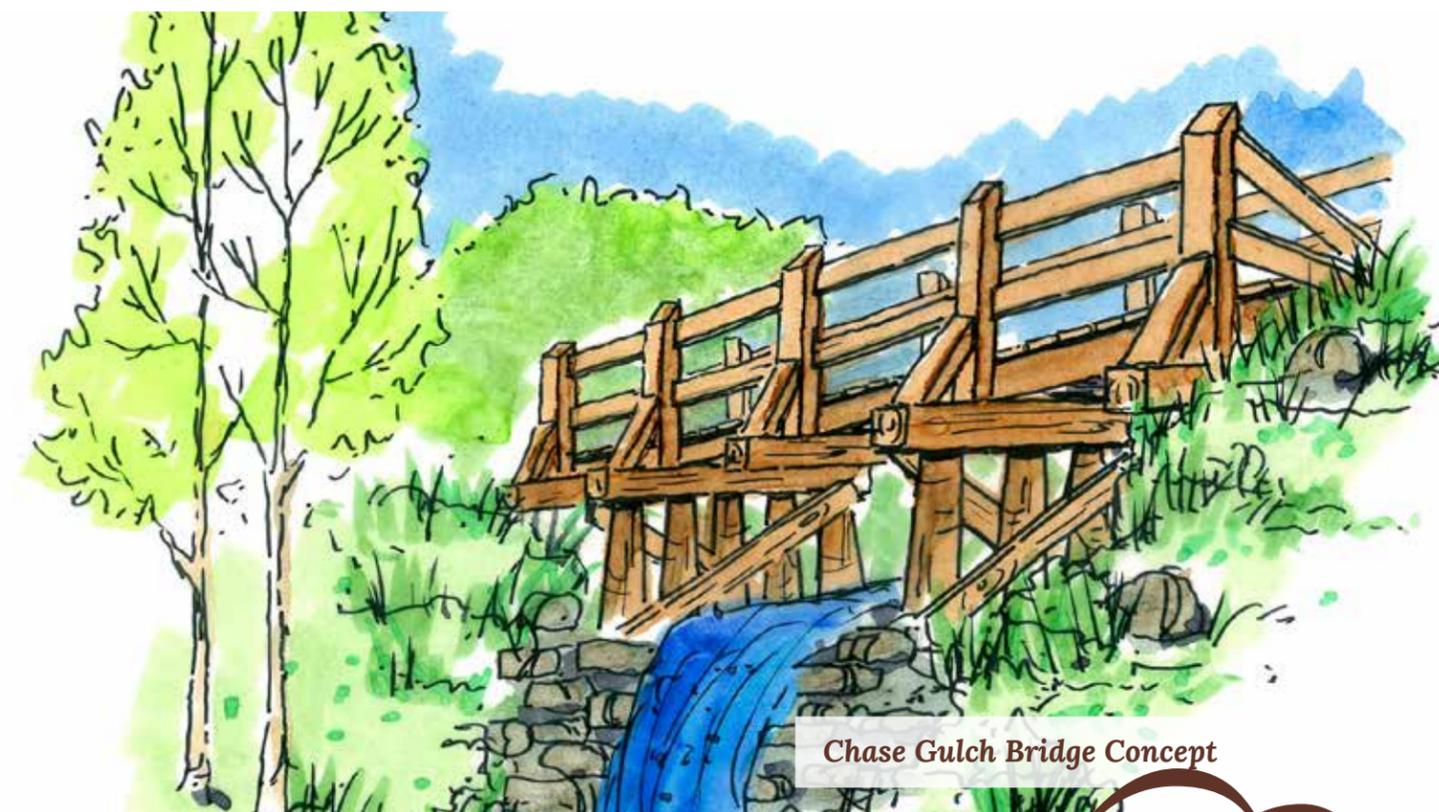


TRAIL BRIDGES:

Water and drainage crossings are minimized in the trail plan to the extent practical. Where crossing is necessary trail bridges may be used for crossing streams, ditches, and other places constituting a safety hazard or to protect the natural environment. Assessments of environmental damage, as well as evaluations of less obtrusive alternatives to bridges such as culverts, fords, and trail relocation, will be considered before bridge construction or replacement. Bridges will be kept to the minimum size needed to serve trail users and other maintenance and preservation needs, and designed in harmony with the surrounding natural environment.

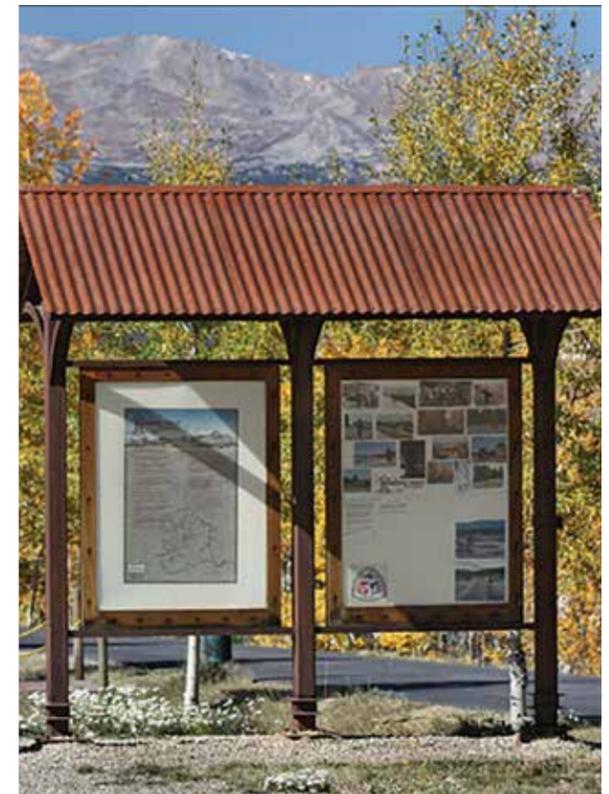
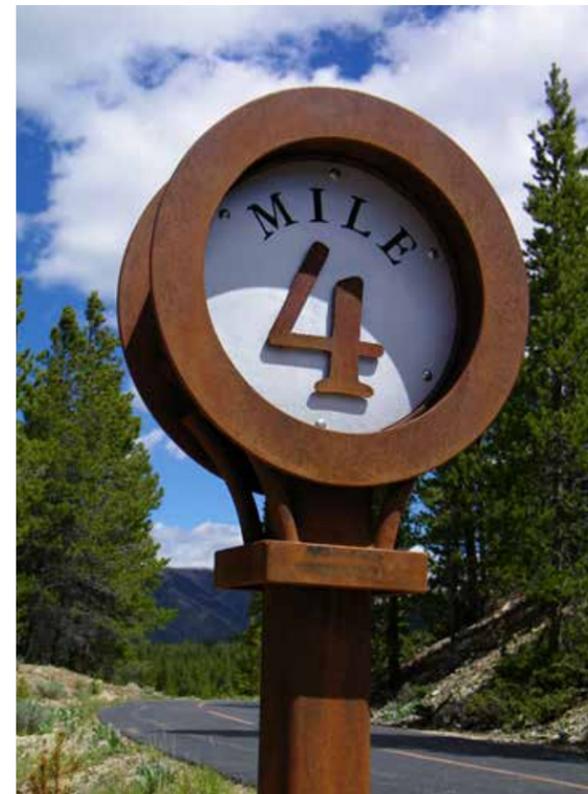
A new bridge concept at the Chase Creek crossing is contemplated to complement the character of the historical crossing. Historically, a bridge here provided a crossing for the tramway grade to access Winnebago Hill to the south. Trail users could cross Chase Creek at this point with a simple fording feature such as a log or boulders in the short term, however a concept for a new bridge is included here for future implementation.

A significant bridge is appropriate to create the safe grade separated crossing across Highway 119 from the Hidden Treasure Trailhead to the Tramway trail on the west side of Clear Creek. There would be opportunities to design the bridge to reflect historic railroad bridges and to create an attractive gateway feature to Black Hawk from the north.



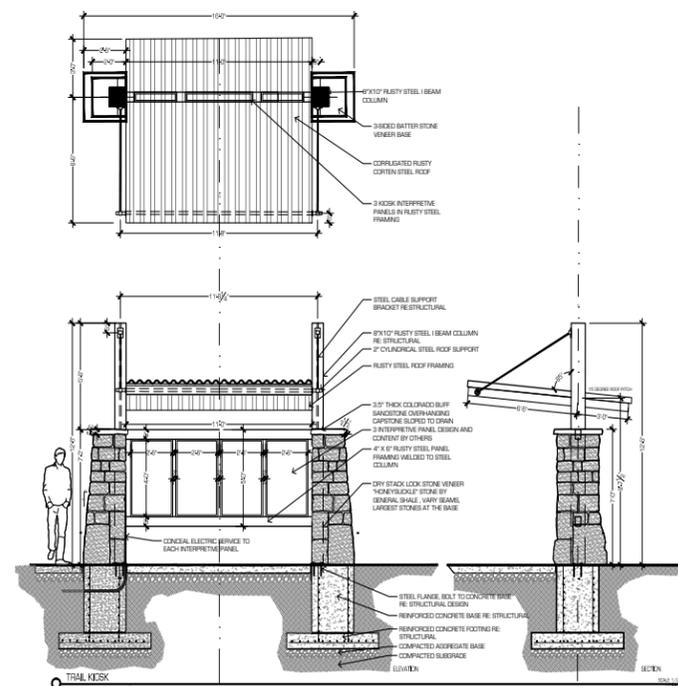
Chase Gulch Bridge Concept





Signage:

A comprehensive information, wayfinding and interpretive signage system should be designed and installed and Maryland Mountain Park. Trail maps should use IMBA sign and difficulty rating standards to help users understand trail lengths and challenges. It is recommended that all signs are designed and constructed in a context sensitive manner with the overall intent to minimize sign clutter. Below is a brief description of some of the various categories of signage and basic guidelines that should be used placing signage within Maryland Mountain Park.



Identity Signs. Identity signs provide a “welcome” message and announce the location of or arrival at a particular spot. These signs should be bold, simple, strong, and typically stand on their own. Possible materials could recall those used in mining such as heavy timber, stones or self-weathering steel.

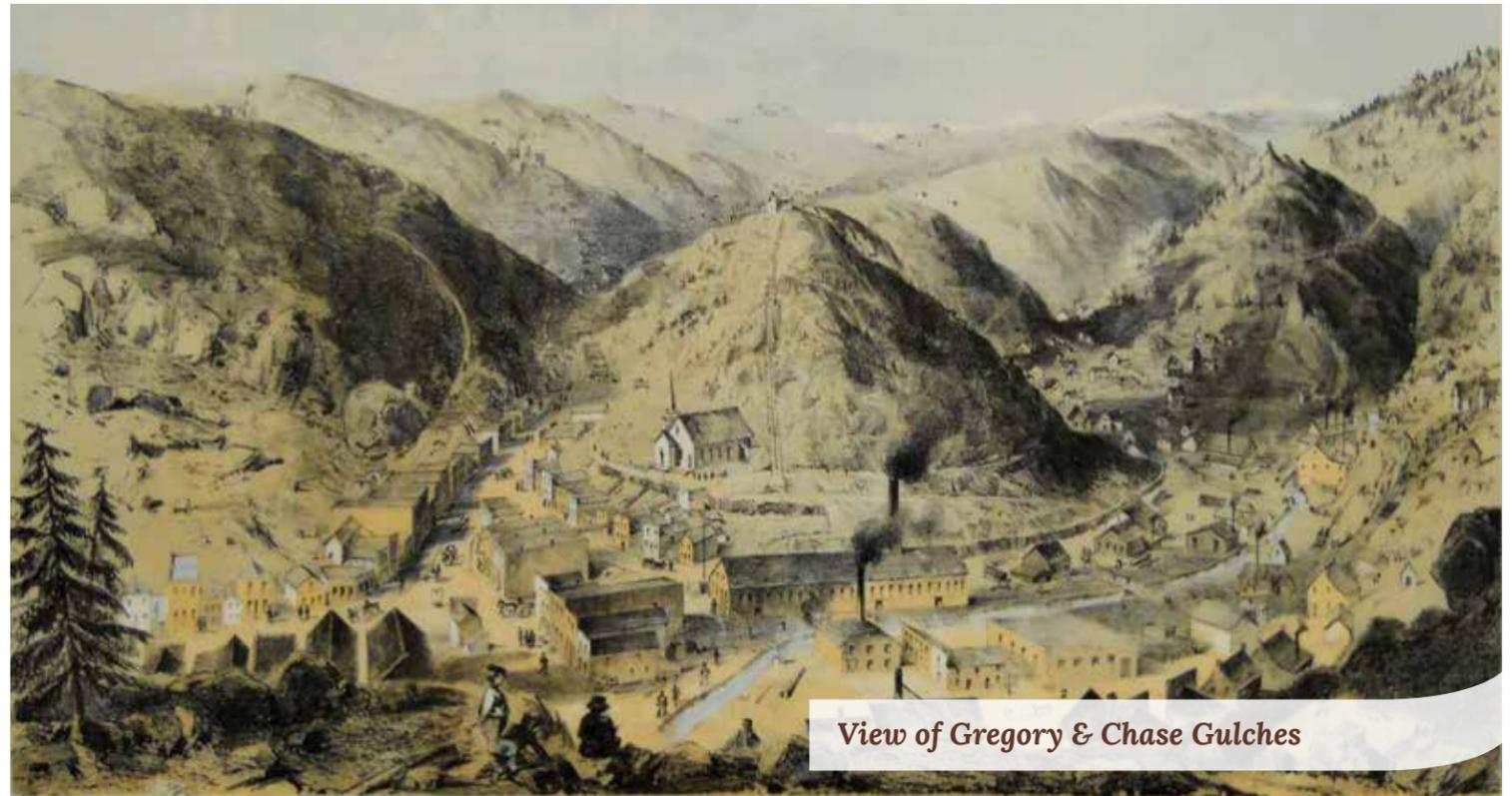
Orientation/Regulatory Signs. Orientation signs are generally concentrated at major user entry points such as trailheads and would include detailed orientation maps, rules, lists of appropriate and inappropriate uses ie: non-motorized, as well as other background information. Signs should convey important safety messages. Signage often plays an integral role in educating visitors about responsible use of open space resources, and should explain environment issues to keep potential for resource damage to a minimum. They can also foster an awareness of trail etiquette regarding right-of-way (i.e., between pedestrians, cyclists) and travel etiquette (i.e., encourage users to stay to the right side of the trail, yielding to climbers, etc). Trailhead orientation signage is also an opportunity to introduce users to what sort of interpretive experience they can expect on the trail and what themes are. These signs should be related in material and font to the identity signs.

Trail Wayfinding Signs. These signs provide trail names, trail difficulty and potentially mile markers to help visitors find trails they seek and keep them from getting lost. These signs should be low key, placed adjacent to the trail without creating a hazard, composed of natural materials that blend with the landscape, with messages large enough to be noticeable to trail users. Given the availability of free trail map apps to anyone with a smart phone (MTB Project, All Trails, etc.) it is recommended that trail wayfinding signs be kept to a minimum.





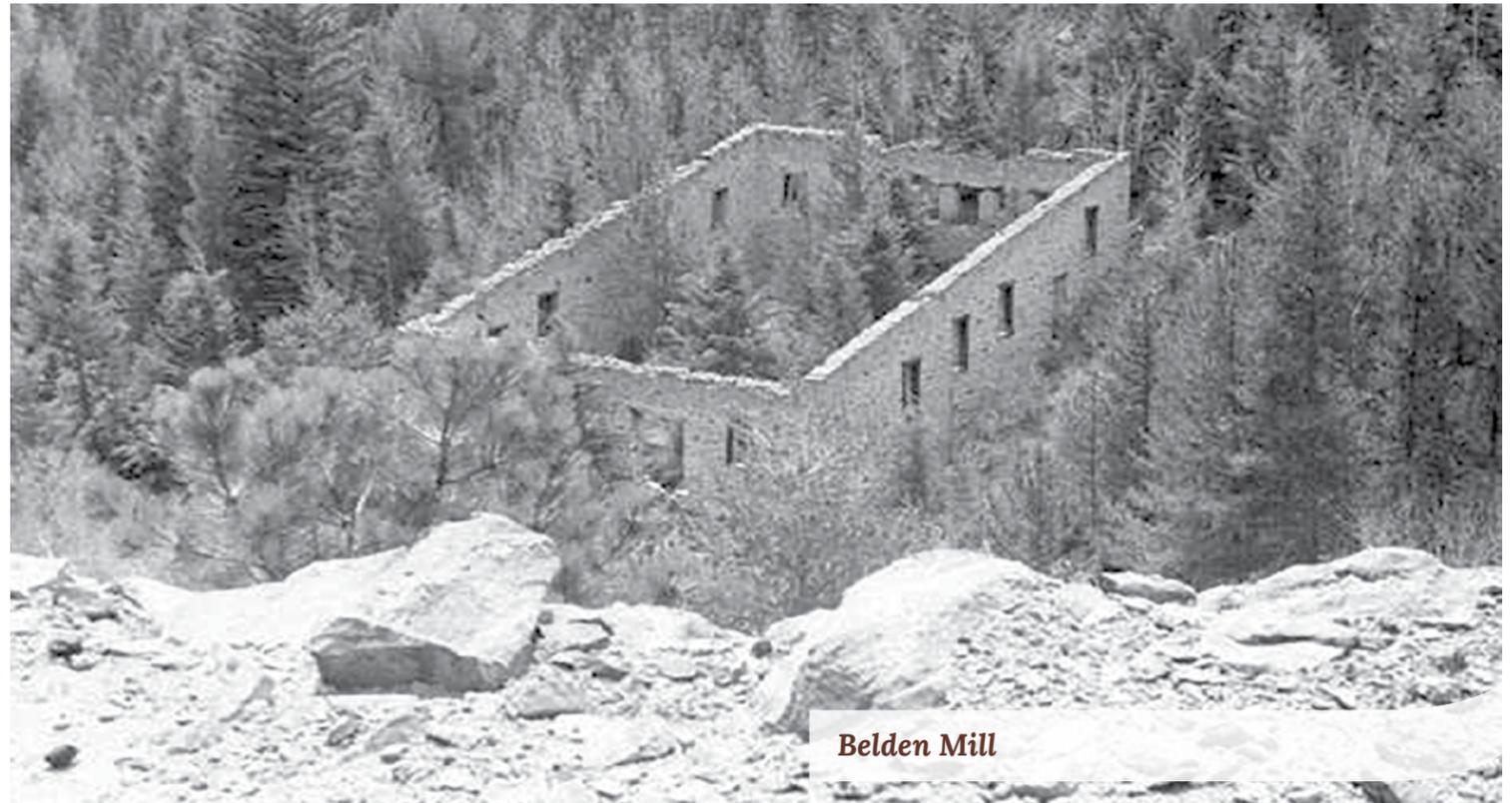
Chase Gulch, Castle Rock & Bridge



View of Gregory & Chase Gulches



Gilpin Tramway Depot



Belden Mill

Historical Interpretation

The City of Black Hawk has identified a community need/desire for development of historical interpretive opportunities at Maryland Mountain and Chase Gulch. Next steps would be to create a planning document to define interpretive objectives and themes, and guide the design and implementation of new interpretive media at Maryland Mountain. The process of this interpretive planning would be integrated with the further design of park amenities, emphasizing mining history and the relationship and importance of the Tramway Railroad. Additional interpretive opportunities would be to illuminate the links between mining and the environment including the ecological impacts of mining, how the landscape has changed through human use and how it has since recovered. The process would include analysis of the technical feasibility of implementing wireless delivery of interpretive content on the trail and recommendations for development of content for wireless delivery.

Recommendations for development of traditional interpretive media such as interpretive panels should also be considered. Panels could be used to present an interesting, engaging suite of historic photos and maps, and might be two types: Primary and Secondary. Primary interpretive signs convey the interpretive theme of the major interpretive sites while secondary interpretive signs convey a more detailed level of interpretive information and are often smaller versions of primary interpretive signs. Care should be taken to develop interpretive materials whose graphic vocabulary is compatible with other signs. Interpretive material that has been developed for trails can easily be repurposed for presentation on the internet, brochures, or other venues in order to leverage the material to produce value elsewhere in other ways.

Opportunities for highlighting Primary historical features include accessing the Bonanza Mill, creating a Belden Mill viewing area, and a potential reconstruction of a skeleton representing the Saratoga Mill. Secondary historical features might include the site of Engine 2 and 3 wrecks, deep mineshafts and the Robert Emmet Mine.



Belden Wall





Belden Wall

⇄ IMPLEMENTATION ⇄

Opinion of Possible Costs and Phasing

Phasing a project consists of breaking it down into more manageable steps and dealing with each one as a separate project. With the complexity and variety of all of the elements at Maryland Mountain Park, a phased approach to project implementation is recommended.

Trail phasing recommendations have been noted on the trail master plan map, with the Hidden Treasure Trailhead and Tramway Mainline improvements coming first, with a singletrack trail necessary to complete a loop is next. The construction of these trails could occur concurrently with the construction of the Hidden Treasure Trailhead, so that a Phase 1 opening could occur. Design of the interpretive features should happen concurrently with the design of the trail and amenity features.

Later phases would be implemented as funds and opportunity permits, and would include installation of additional trails, the Skills descent and additional hiking trails. Installation of interpretive elements might be included in this later phase.

Final phases might be installation of a trail construction to Gregory Street to enhance the visitor experience.

The following spreadsheet shows the potential phasing and possible costs broken down by phase and for each trail type noted in the specifications.

Maryland Mountain Park Opinion of Possible Costs - Black Hawk, CO							
Trail Type	Estimated Phase 1 Distance - Linear feet	Estimated Phase 2 Distance - Linear feet	Estimated Phase 3 Distance - Linear feet	Professional Trail Construction Cost/LF	Est. Phase 1 Cost	Est. Phase 2 Cost	Est. Phase 3 Cost
Hidden Treasure Trailhead and Bridge	1				\$ 3,500,000.00		
Type I - Tramway Mainline Trail	8,000		3,000	\$ 8.75	\$ 70,000.00		\$ 26,250.00
Type II - Machine Built Singletrack Trail		29,400	4,800	\$ 9.00		\$ 264,600.00	\$ 43,200.00
Type III - Singletrack Hand Build Trail		12,000		\$ 9.00		\$ 108,000.00	
Type IV - Hiking and Descent Trail		7,500	3,400	\$ 6.00		\$ 45,000.00	\$ 20,400.00
Mountain Bike Skills Trail- Machine build		2,100		\$ 10.00		\$ 21,000.00	
HikeaBike Connector		600		\$ 50.00		\$ 30,000.00	
Wall reconstruction			1				
Mainline culvert			1		\$ 10,000.00		
Signage						\$ 455.00	
Kiosks		2		\$ 5,000.00		\$ 10,000.00	
Total Trail System	8,000.00	51,600.00	11,200.00		\$ 3,580,000	\$ 479,055	\$ 89,850
10% Contingency						\$ 47,906	\$ 8,985
Subtotal by Phase					\$ 3,590,000	\$ 526,961	\$ 98,835
Project Totals	Trail length 70,800.00					Project cost \$ 4,215,796	

permitting, easements/purchases, trailhead development, erosion control, or project management. It is important to note that the actual length of a constructed trail may be 10-20 percent greater than the designed length, due to the turns and undulations of a trail tread on the landscape.

Costs vary greatly based upon a variety of factors, including: remote nature of the work, demand for trail contractors in a given year, availability of volunteer labor, terrain, vegetation, and length of the build season. This cost opinion is based on construction using a mix of trail machines and hand labor as noted.





Maryland Mountain Summit

Funding

Ongoing and potential future funding sources include:

- City budget line item. The City Council can provide funding support as community budgets allow or issue bonds for project implementation
- Regulatory sources such as Development Impact Mitigation Funds, Growth-Impact Ordinances, Special Improvement District, or Open Space Assessments that the City might implement
- Partnerships and co-sponsors (IMBA), including teams of volunteers
- Private donations
- Fundraising
- User fees
- Potential voter approved sales tax for creation of a dedicated revenue stream for trails
- Grants Sources such as People for Bikes
- Voluntary business collection of funds for trails (see www.1PercentForOpenSpace.org)

Federal Funding Sources

- Intermodal Surface Transportation Efficiency Act (ISTEA) (Colorado Department of Transportation)
- National Recreational Trails Trust Fund (US Department of Transportation)
- US Forest Service- Challenge-Cost Share Program.
- Bureau of Land Management Challenge-Cost Share Program
- National Park Service: Rivers and Trails Conservation Program
- Land and Water Conservation Fund
- Soil Conservation Service: Resource Conservation and Development Program

State funding sources

- Great Outdoors Colorado GOCO Grant program
- Colorado Parks and Wildlife State Recreational Trails Committee
- Department of Local Affairs: Energy Impact Assistance Program
- State Historical Society
- State University System programs
- Colorado State University Extension Program
- Colorado Center for Community Development





Tramway Trail

Trail Maintenance

It is intended that the City will be responsible for all future trail maintenance. Snow and ice should be planned to be removed from asphalt and concrete at trailheads.

Guidelines for a regular trail inspection schedule and maintenance program should be documented to maintain trails appropriately. A schedule for inspection should be established...repair trail treads or clear trails as needed with respect to erosion or debris caused by tree downfall, flooding, rain, or users. Some obstacles are appropriate to remain on intermediate or expert trails that mountain bikers assume as risks that are normal, obvious and inherent to the activity. However hidden, unexpected hazards should be addressed. Typically downed trees in forested sections will need to be sawn through seasonally.

No snow removal would occur on soft surface trails. The Tramway Mainline may see a naturally compacted snow surface created by use of winter hikers and snowbikers.

Maintain infrastructure at trailheads including paving, restrooms, signs, kiosks, and fences or gates.

Consider organizing a voluntary or paid trail patrol, providing education to visitors on responsible trail use, monitoring user conflict, and as a safety resource.





TRAIL DESIGN SPECIFICATIONS

Maryland Mountain Park Trail Construction Specifications

City of Black Hawk, CO | 8.25.14

General Standards for Mountain Bike Trails

- Trail slope will typically follow the “Half Rule” – that the tread grade is not greater than half the percentage of the slope it travels across
- Trail slope max target will be 15 % to prevent user based erosion, except if armored or surface is built of rock or wood
- Average trail grade for priority mountain biking trails to be 8% or less.
- Typically 5% outslope to be provided for drainage unless in a bermed condition.
- Grade reversals are to be installed at appropriate intervals to prevent erosion
- Incorporate transition measures to prevent abrupt changes of flow such as corral rocks, log chokes, grade reversals or turns

Type 1 Tramway Mainline Trail

- Machine Construction with maximum machine width of 48”
- Maximum average grade <6 % following existing tramway platform
- Corridor 6-8 feet width, trail ceiling 10-12 feet high
- Finished trail tread 48” wide natural compacted surface with outslope or crowning
- Clear corridor of existing trees, major trees at sides of corridor may remain and be limbed for height clearance. Tree material to be cut up into portable sections and dispersed.
- Cut trees and remove stump if necessary based on trail disturbance and structural integrity, trail tread to be free of obstructions
- Re-grade, re-cut sloughed material to provide a trail tread 48” wide
- Re-locate trail tread towards backslope area to provide a minimum 24” buffer zone to

fall hazards of existing edges of walls

- Construct drainage features where necessary
- Re-build walls to support trail platform where necessary. One wall is beyond most trailbuilders scope and may need to be engineered.

Type 1 = 14,200 lf

Crossings: Option for bridge crossing at Chase Gulch

Type II Multi-use, Singletrack Mountain Bike Trail

- Machine Construction with maximum machine width of 48”
- Maximum average grade 8-10%, maximum sustained grade 20% short distances
- Trail corridor 6 feet wide maximum, trail ceiling 10-12 feet high
- Finished trail tread intended to be 18”- 24” wide compacted outsloped natural surface trail, tread to be generally free of obstructions. Trail tread will be 36” to 48” wide until vegetation regrows narrowing the trail tread to 18” - 24”.
- Rolling grade designed with drainage features such as nicks where necessary, downslope berm material to be dispersed on site

Type III Singletrack Mountain Bike Trail

- Hand built construction
- Maximum average grade 10-12%, Maximum sustained grade 25% short distances
- Trail tread corridor 24”-30” width, trail ceiling 8-10 feet high
- Finished trail tread 18”-24” wide generally using full bench cut, compacted outsloped natural surface
- Clear corridor of existing trees, major trees at sides of corridor may remain and be limbed for height clearance. Tree material to be cut up into portable sections and dispersed on site.

↵ REFERENCES ↵

- Cut trees flush and/or remove based on trail disturbance and structural integrity, finished trail tread will have obstructions, rocks, roots etc that will remain as technical elements
- Rolling grade designed with drainage features such as nicks where necessary, downslope berm material to be dispersed on site
- Switchback radius maximized for terrain and ride ability, minimum 4-6 feet

Type IV Hiking Trail Only (or non-climbing mountain bike trail)

- Hand built construction
- Maximum average grade 15%, Maximum sustained grade 30% short distances
- Clear corridor of existing trees, major trees at sides of corridor may remain and be limbed for height clearance. Tree material to be cut up into portable sections and dispersed on site.
- Cut trees flush and/or remove based on trail disturbance and structural integrity, finished trail tread will have obstructions, rocks, roots etc that will remain as technical elements.
- Trail corridor maximum 4 feet wide, trail ceiling 8-10 feet high
- Finished trail tread 18-24" wide natural compacted outsloped surface
- Designed with drainage features where necessary
- Switchback radius' maximize for terrain, minimum 4 feet
- Incorporate rock steps if needed

Abbot, Dan and McCoy, Dell A. The Gilpin Railroad Era – Black Hawk, Central City, Nevadaville, Russel Gulch, Colorado's Baby Railroad. Denver, CO: Sundance Publications Ltd., 2009.

IMBA and Webber, Pete. Managing Mountain Biking: IMBA's Guide to Providing Great Riding. Boulder, CO: International Mountain Bike Association, 2007.

IMBA. Trail Solutions: IMBA's Guide to Building Sweet Singletrack. Boulder, CO: International Mountain Bike Association, 2007.

