



**Meeting of the  
BOYNE CITY  
PARKS AND RECREATION COMMISSION  
Thursday, February 4 2016  
6:00 p.m. at City Hall**



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1. CALL TO ORDER
2. ROLL CALL
3. APPROVAL OF MINUTES
  - A. Approval of the December 3, 2015 meeting minutes
4. CITIZENS COMMENTS (non-agenda items – limit to 5 minutes)
5. DIRECTOR’S REPORT
6. CORRESPONDENCE
7. REPORTS OF OFFICERS, BOARDS, AND STANDING COMMITTEES
  - A. Park Inspection Reports
  - B. Disc Golf Update
  - C. Trail(s) update (Boyne City/Charlevoix and Boyne Valley)
8. UNFINISHED BUSINESS
  - A. Top of Michigan Mountain Bike Association (TOMMBA) – Avalanche Mountain Bike Trail Proposal
  - B. Avalanche Resource Inventory and Management Plan Review
9. NEW BUSINESS
  - A. FY 2016/17 Budget
10. GOOD OF THE ORDER
11. ANNOUNCEMENTS
  - A. Next meeting is scheduled for **March 10**, 2016 @ 6 p.m.
12. ADJOURNMENT

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Cindy Grice, City Clerk, 319 North Lake Street, Boyne City, Michigan 49712 (231) 582-0334*

ATTENDANCE RECORD  
Parks & Recreation Commission  
FY 2015- 2016

<b>Member</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>Aug</b>	<b>Sept</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Jan</b>	<b>Feb</b>	<b>March</b>	<b>April</b>
Bowman, Jo	P	P	X	P	P	P	X	E	P			
Meeder, Heath	P	P	X	P	P	P	X	P	P			
Parish, Darryl	P	P	X	P	P	P	X	P	E			
Patoka, Patrick	P	P	X	P	P	P	X	E	P			
Sheean, Mike	P	P	X	P	P	P	X	P	E			
Sheets, Marie	P	P	X	P	X	E	X	P	P			
Swift, Jerry	P	P	X	P	P	P	X	E	P			
	P	P	X	X	P	E	X	P	-	-	-	-

P=Present  
A=Absent  
E=Excused

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Approved:

**MEETING OF  
JANUARY 7, 2016**

**RECORD OF THE PROCEEDINGS OF THE REGULAR BOYNE CITY  
PARKS AND RECREATION COMMISSION MEETING HELD AT  
6:00 P.M. AT CITY HALL ON THURSDAY, JANUARY 7, 2016.**

**CALL TO ORDER**

Meeting was called to order by Vice Chair Swift at 6:02 p.m.

**ROLL CALL**

Present: Jerry Swift, Heath Meeder, Patrick Patoka and Marie Sheets  
Absent: Mike Sheean, Darryl Parish and Jo Bowman (arrived at 6:09)  
City Staff: Streets/Parks & Recreation Superintendent Andy Kovolski  
and Recording Secretary Barb Brooks  
Public Present: Nine

**MEETING  
ATTENDANCE**

**APPROVAL OF  
MINUTES \*\*MOTION**

**Meeder moved, Sheets seconded, PASSED UNANIMOUSLY,** a motion approving the December 3, 2015 meeting minutes as presented.

**CITIZENS COMMENTS  
(on non-agenda items)**

Michelle Cortright asked the board to consider new signage for Avalanche as a possible project for the Charlevoix County Parks Millage Allocation. Kovolski informed the board that the City would be applying for funds for other projects.

**DIRECTOR'S REPORT**

Kovolski reported the warming house is open at Avalanche and there is enough snow for sledding but the temperatures have not been consistently cold enough to make ice for the rink. Staff will start working on it as soon as the weather cooperates. Kovolski reminded the board that we are going into budget season.

**CORRESPONDENCE**

The board received a thank you card from the dog park users (human and canine) for the outstanding park facility that has been created. It is well used and much appreciated.

**REPORTS OF  
OFFICERS, BOARDS  
AND STANDING  
COMMITTEES**

**Park Inspection Reports -**

- There are more trees down on the trail at Avalanche due to the recent wind. It was also reported that there is a tree down on the Boyne River Nature Trail.
- **Disc Golf Update** - None
- **Trail(s) Update** (Board Chair Sheean) - None
- **Veterans Park Play Structure** - Woodchips have been removed, the structure will be sealed in the spring and we will perform continued testing.

## UNFINISHED BUSINESS

### Avalanche Inventory and Management Plan

Richard Deuell gave a presentation and overview of the Avalanche Inventory and Management Plan he conducted. The plan identifies the natural resources that can be found and discusses options to preserve, care for and improve those resources. No action was taken on the Inventory and Management Plan but it will be given further discussion and consideration at future meetings.

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## NEW BUSINESS

### Born Learning Trail Proposal from Leadership Charlevoix County Participants

Members of the Leadership Charlevoix County (LCC) program (Charity Gee, Jennifer McAndrew, Kim MacNaughton, John Cool, Liane Hangerman, Molly Hauxwell-Currier & Barb Brooks) presented a proposal to install a "Born Learning" trail at Rotary Park. The project is a joint effort between LCC and Char-Em United Way. Born Learning trails are geared towards early childhood education, providing a learning opportunity for caregivers to share with young children in an outdoor setting. The LCC participants considered many locations in the community and felt that Rotary Park provided the best fit; a place where families currently gather with their kids, a natural setting and an abandoned trail that could be repurposed. Board discussion: The board inquired as to the amount of maintenance for the project and discussed possible expansion of playing fields. LCC members stated that there would be little maintenance, maybe some annual brush clearing for the path, touch up paint and replace signage as needed. They added that it was possible to coordinate with United Way during their volunteer day of caring might be a good fit to address some of the maintenance. Also the project would be designed to be somewhat portable in case it ever had to be moved. The general consensus of the board was that it was a good project and Rotary Park seemed like a good fit.

### **\*\*MOTION**

**Patoka Moved, Bowman Seconded, PASSED UNANIMOUSLY** to recommend that City Commission consider the installation of the Born Learning Trail at Rotary Park and for the LCC participants work with City staff to implement the project.

### M Parks PILOT Program

M Parks, formerly know and the Michigan Recreation & Park Association (MRPA) has selected Boyne City to participate in program named "Building Health Communities" to measure the effects of recreation on children and seniors through a pilot program being rolled out throughout Michigan. M Parks will provide the financial backing to institute the program, provide support throughout and provide funds to make improvements to the park the program is based in. Kovolski stated that staff recommends approving this and park locations being discussed were Rotary Park and the area around the 1910 Waterworks building and south towards Avalanche; those are details that can be worked out later. The general consensus of the board was that it sounded like a good program, were flattered they chose Boyne City and

**\*\*MOTION**

that we had nothing to lose by participating. **Bowman moved, Sheets seconded, PASSED UNANIMOUSLY** to recommend accepting the proposal from the Michigan Recreation and Parks Association (aka M Parks) to sign up as one of the five communities selected in the northern Michigan region for their “Building Health Communities” PILOT program.

**NEXT MEETING**

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The next regular meeting of the Parks and Recreation Board is scheduled for Thursday, February 4, 2016 at 6 pm at City Hall.

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**ADJOURNMENT**

The January 7, 2015 meeting of the Parks and Recreation Board adjourned at 8:07 p.m.

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Barb Brooks, Recording Secretary

draft



## **Top of Michigan Mountain Bike Association** **A Chapter of the** **International Mountain Bicycling Association**

The Top of Michigan Mountain Bike Association (TOMMBA) working with professional trail building company Dirt Artisans has prepared the attached proposal to improve and expand the multi-use trail system at Avalanche Preserve. Dirt Artisans spent one week on site gathering information, thoroughly mapping Avalanche and meeting with local trail users and city officials before preparing their proposal. In addition, TOMMBA and Dirt Artisans met with Rick Deuell who recently prepared the Resource Inventory and Management Plan for Avalanche.

After sharing the proposal with local mountain bikers and other trail users, TOMMBA recommends leaving the existing trail in place with some maintenance done where most needed while adding the new trail laid out in the proposal. After two to three years it should become clear how much of the existing trail is still in use and this can be maintained accordingly. A map showing both the existing and proposed trail is attached.

The new trail would be constructed using current best practices for sustainable trail development providing many years of use with little requirement for ongoing maintenance. The trail design by Dirt Artisans is laid out to take into account other users of Avalanche (such as disc golfers and people who enjoy the existing walking trail) and keeps overlap to a minimum.

Avalanche Preserve is an amazing community resource and TOMMBA believes this proposal would enhance its value for everyone who enjoys the preserve, ensure that everyone can continue to enjoy it for many years to come and act as a draw to visitors providing a significant economic benefit to the community.

# Avalanche Preserve Construction Documents



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- A8. Details 2: Puncheon and Bridge



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**For:**  
Top of Michigan  
Mountain Bike  
Association

**ISSUE**  
12.16.15

**PROJECT**  
Avalanche Preserve  
Mountain Bike Trails

# Trail System Overview

Sidewinder/Floridgenal



Knifeplay Trail



Beeches Trail



Hemlocked Trail



Rally Trail



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# Green Trail System

**Trail Names:** Rally, Hemlocked  
**Difficulty Rating:** Less Difficult/Green Circle

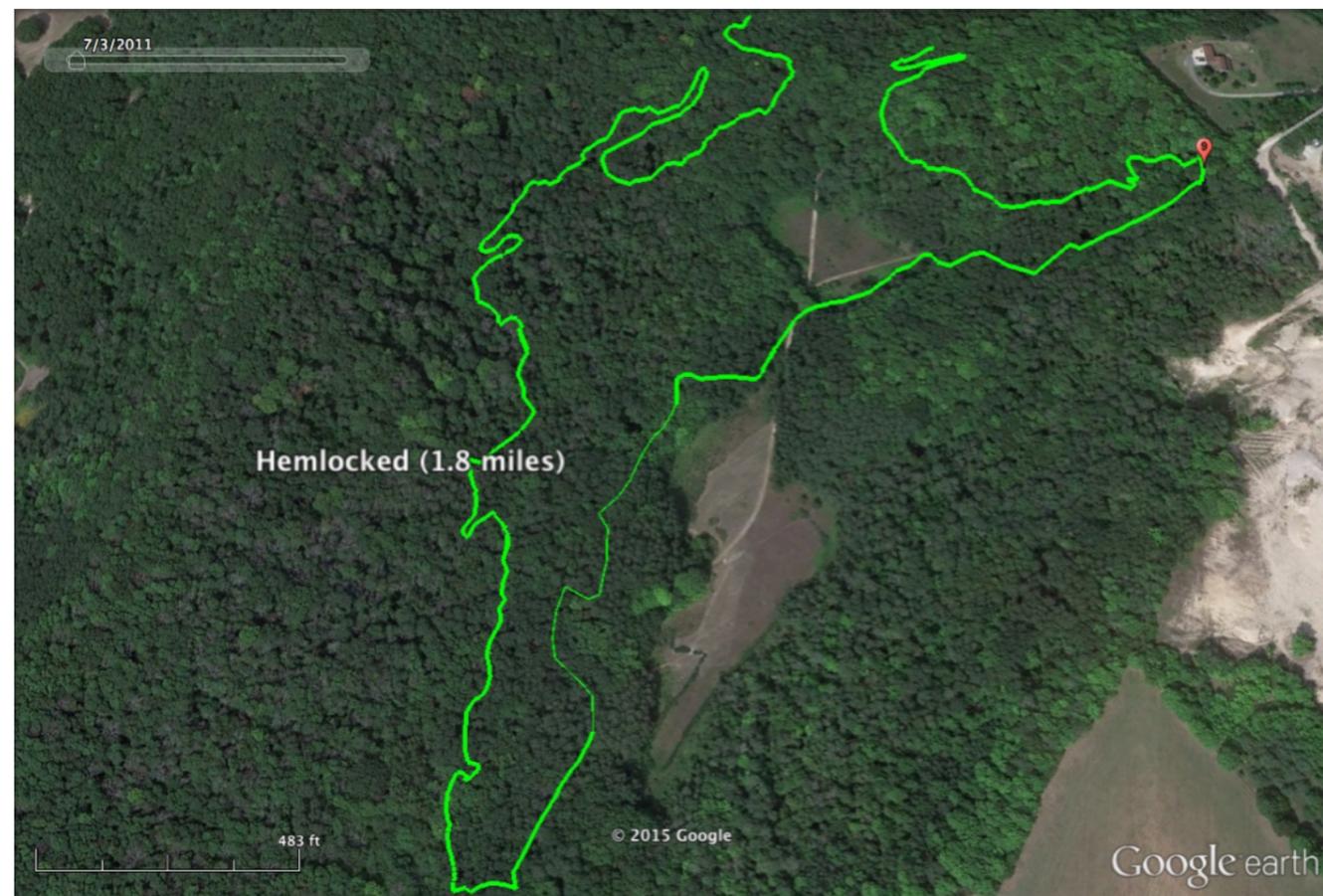
**Typical Tread Width:** 30"-48"  
**Typical Corridor Width:** 40"-60"  
**Tread Rugosity:** Relatively smooth, some roots or rocks, protrusions <3" above trail tread

**Average Gradient:** <5%  
**Maximum Sustained Grade:** 8%  
**Maximum Grade:** 12%  
**Typical Tread Materials:** Native mineral soil and rock materials. Excavated material, free of rocks, to be used to create small rollers and insloped turns  
**Sideslope Steepness:** Flat to 45%

**Turn Radius:** Wide and open, superelevated (< 2') with grade reversals before and after  
**Trail/Feature Formality:** Formal, 48" width  
**Duty of Care:** High

**Intended Experience:** The less difficult mountain bike trail should provide a constantly reversing grade and low sinuosity. The trail tread will be well defined and contain avoidable obstructions that can be easily rolled over without advanced bike handling skills. Excavated soil material will be utilized to form small rollers, slightly insloped trail segments on outside turns, and low superelevated turns. All trail segments that are insloped will have broad grade reversals (6-15') prior to and following the constructed feature. The trail should be routed adjacent to fresh downed hardwoods and/or larger rock features where alternate riding lines can be constructed at a later date.

Feature Number	Description	Length
1	Low bridge- straight	32'
2	Banked turn	24'
3	Double wave bridge (12" high)	32'
4	A-frame bridge (18" high)	32'
5	Curved bridge (around hardwood)	40'
6	Skinny bridge (alt. line, 12" wide)	32'
7	Banked turn	24'
8	Low bridge- straight	32'
9	Low bridge- straight	40'



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# Blue Trail System

**Trail Names:** Sidewinder, Floridgenal

**Difficulty Rating:** More Difficult/Blue Square

**Typical Tread Width:** 12" - 36"

**Typical Corridor Width:** 36"-48"

**Tread Rugosity:** Potentially uneven with root protrusions, <6" above trail tread

**Average Gradient:** < 7%

**Maximum Sustained Grade:** 12%

**Maximum Grade:** 15%, with armored tread

**Typical Tread Materials:** Natural surface

**Sideslope Steepness:** 20 to 60%

**Turn Radius:** Tighter turns and numerous switchbacks

**Trail/Feature Formality:** Low formality, 12" minimum width and height not more than structure width

**Duty of Care:** Low

**Intended Experience:** The more difficult mountain biking trail will provide a constantly reversing grade and moderate sinuosity. Tread is intended to have a "backcountry" feel, incorporating large roots in place and log-over features where fresh, native hardwoods can be secured in the corridor. Floridgenal should retain the personality of the existing trail, ideally being hand constructed at a 12-18" width. Sidewinder, being located on steeper slopes should be machine constructed with tread width increasing with increasing exposure.



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# Black Trail System

**Trail Type Name:** Beeches, Knifeplay  
**Difficulty Rating:** Most Difficult/Black Diamond

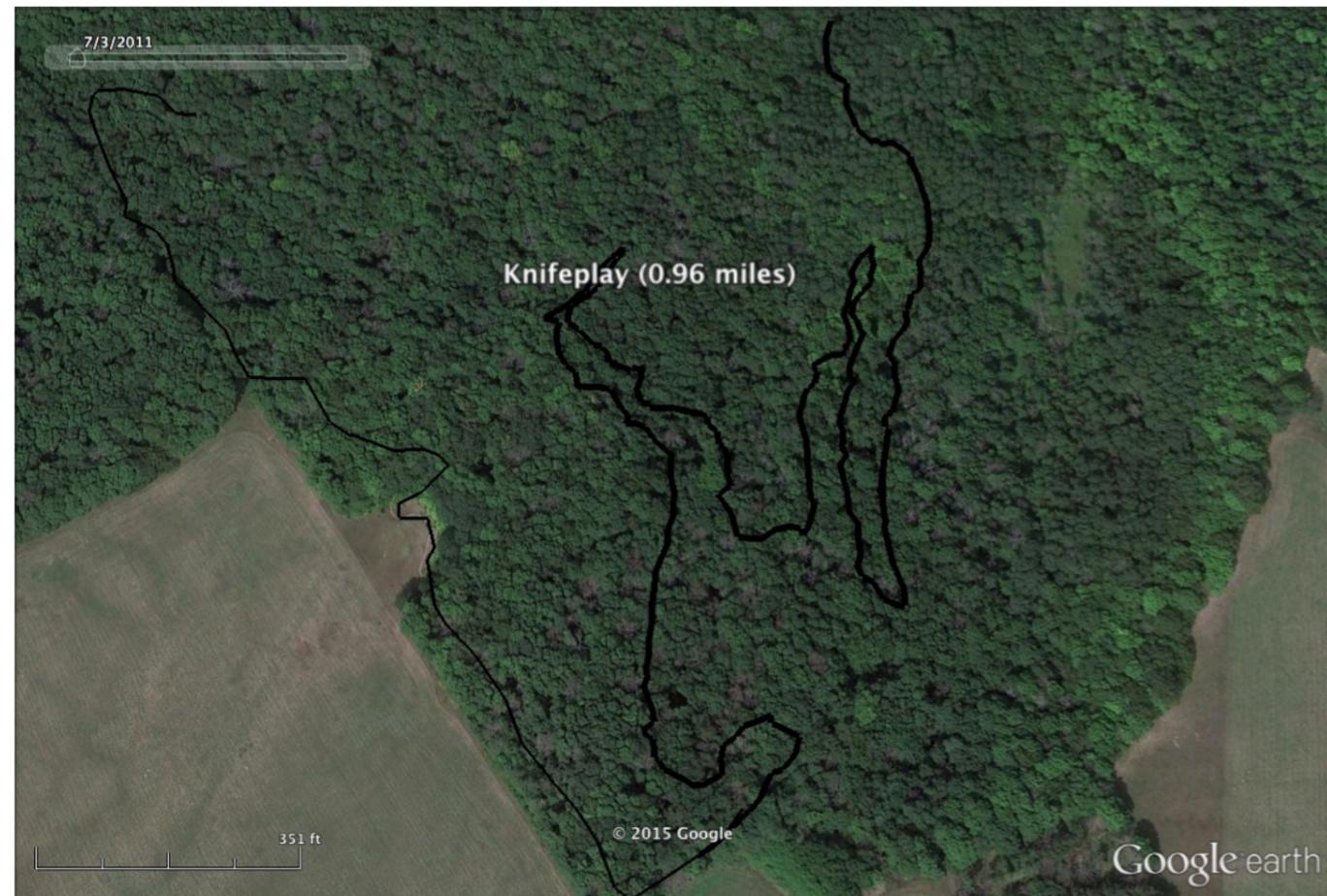
**Tread Width:** 12- 36" (active tread, fill for features will be wider)  
**Corridor Width:** 36"  
**Tread Rugosity:** Potentially uneven with root protrusions, <6" above trail tread

**Average Gradient:** <10%, downhill direction use only  
**Maximum Sustained Grade:** 15%  
**Maximum Grade:** 20%

**Typical Tread Materials:** Natural surface, full bench cut.  
**Sideslope Steepness:** 20 to 75%

**Turn Radius:** Broad radius, super elevated  
**Trail/Feature Formality:** Medium formality, 6" minimum feature width with height not more than 2X width  
**Duty of Care:** Medium

**Intended Experience:** The one-way trail will be oriented for downhill directional use. Grade reversals will be larger and enhanced as rollers. Sinuosity of the trail will be optimized for higher speeds. All turns will be insloped or superelevated to keep riders on the trail and sized accordingly. Trail feature entrances will be smooth and in-line with higher speed line of travel. Trail feature exits will have drops of 12" to 36" from edge of feature to the potential front wheel landing zone.



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# Construction Notes

## SEQUENCE OF CONSTRUCTION:

### Trail Construction Notes:

1. Trail construction will be conducted by a professional firm that can demonstrate significant and successful experience in the field of mountain bike-optimized natural surface trail development.
2. Construction of trail tread and attendant features (i.e. puncheon, bridge, and rock armored segments) will be in accordance with the general specifications presented within this document and fundamentally based on sustainable trail design principles promulgated by credible, recognized printed source material, including the International Mountain Bicycling Association's handbooks, *Trail Solutions* and *Managing Mountain Biking*, and the USDA Forest Service's *Trail Construction and Maintenance Notebook*.
3. Trail corridor will be cleared to a width in accordance with the specifications. Stems larger than 6" dbh will not be removed until approved by the construction manager. All materials longer than 5' in length will be bucked to less than 5' and utilized with nearby native materials to stabilize excavated spoils. All vegetative materials will be removed from the corridor. Any stumps developed in the corridor development will be excavated and removed from the corridor.
4. Trail tread development will consist of full bench trail construction, devoid of fill material for use in the tread surface (berms and roller features excepted), and mechanically compacted following construction. Acceptable protrusion height above the trail tread for natural features such as rocks or roots will be in accordance with the specifications of the particular trail type (i.e. least difficult, more difficult, most difficult) being constructed. Tread will be constructed with a 3-7% cross slope, except where features are constructed for the purpose of keeping riders on the trail (i.e. berms, insloped corners, and constructed features).
5. Grade reversals will be located at less than 100' intervals and should have broad drains (6-10') with cross slopes of 10-15%. Subsequent reversals in grade should also be broad (10-25') and compacted with leading face and transition field-fit to match the desired trail experience (i.e. low and rolling on least difficult trails, rollable with the ability to jump on more difficult trails, and jump-optimized on most difficult trails).
6. Backslopes should blend with surrounding hillslope gradient and finished to tread specifications. In the case of inside turns, backslope should be optimized for utility as a riding/tread surface and blended with trail tread to provide smooth transitions.
7. Excavated spoil piles shall be distributed such that no berm is present on the downslope edge of the trail tread unless it is created for the purpose of a trail feature, in which case it will be preceded upslope by a grade reversal and compacted as trail tread.
8. Downslope spoil will be sufficiently distributed downslope a.) with a depth not greater than 4" and b.) shall not be deposited in active drainages (i.e. stream bed and bank structure or incised linear flow pattern) or locations demonstrating characteristics of standing water (i.e. presence of standing water during construction, darkened leaves or water lines on trees indicating standing water for significant portions of time). In these cases cannot be attained, spoil materials will be bucketed and dispersed in a nearby location that meets these conditions.

9. Following spoils dispersal, downslope and backslope areas will be immediately covered with native seed and mulch materials, created during trail corridor clearing activities.
10. Any borrow pits developed during the course of construction must be created within 50' of the trail centerline. After utilizing borrow pit areas, they are to be graded to a natural contour, with roots trimmed, and soils stabilized. The entire pit will be "naturalized" with nearby materials, preferably vegetative materials removed during trail corridor development.
11. Turns in the trail tread that result in crossing the fall-line of the hillslope will be constructed according to the trail tread specifications with the addition of a grade reversal upslope and prior to the turn, all fill and/or retaining walls necessary to stabilize the turn, drainage features necessary to remove water from the turn area (i.e. insloped drain or crowned turn platform), and a grade reversal downslope/ following the turn. Insloped and/or super-elevated turns shall be field-fit and constructed, where necessary to assist riders in remaining in the center of the trail tread and maintaining momentum.
12. Alternative riding lines and/or technical trail features, if developed, will be designed in a collaborative manner with approval necessary from the construction management team, and will be developed based on available time and funds. All features will adhere to standard construction best practices for dry stack masonry. Approaches to and exits from features will be field-fit to minimize vegetation and hydrologic impacts. Fall zones for features higher than 12" above the surrounding topography will be cleared of loose, sharp rocks or other materials that could focus rider impacts for a lateral distance of 10' from the feature.

## RECYCLING AND DISPOSAL OF CONSTRUCTION WASTE

1. Recycling and disposal of materials associated with this project shall be undertaken in accordance with local rules and regulations.
2. Except for items indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain on the property, demolished or excavated materials shall be removed from the site.
3. Materials slated for removal from the site shall be disposed of in accordance with any and all applicable municipal or other government agency current regulations.
4. Debris shall not be permitted to accumulate on the job site. Dust and dirt shall be held to a minimum during construction.
5. At the completion of work, the entire work area shall be clean and left in a neat condition, free of waste and debris.



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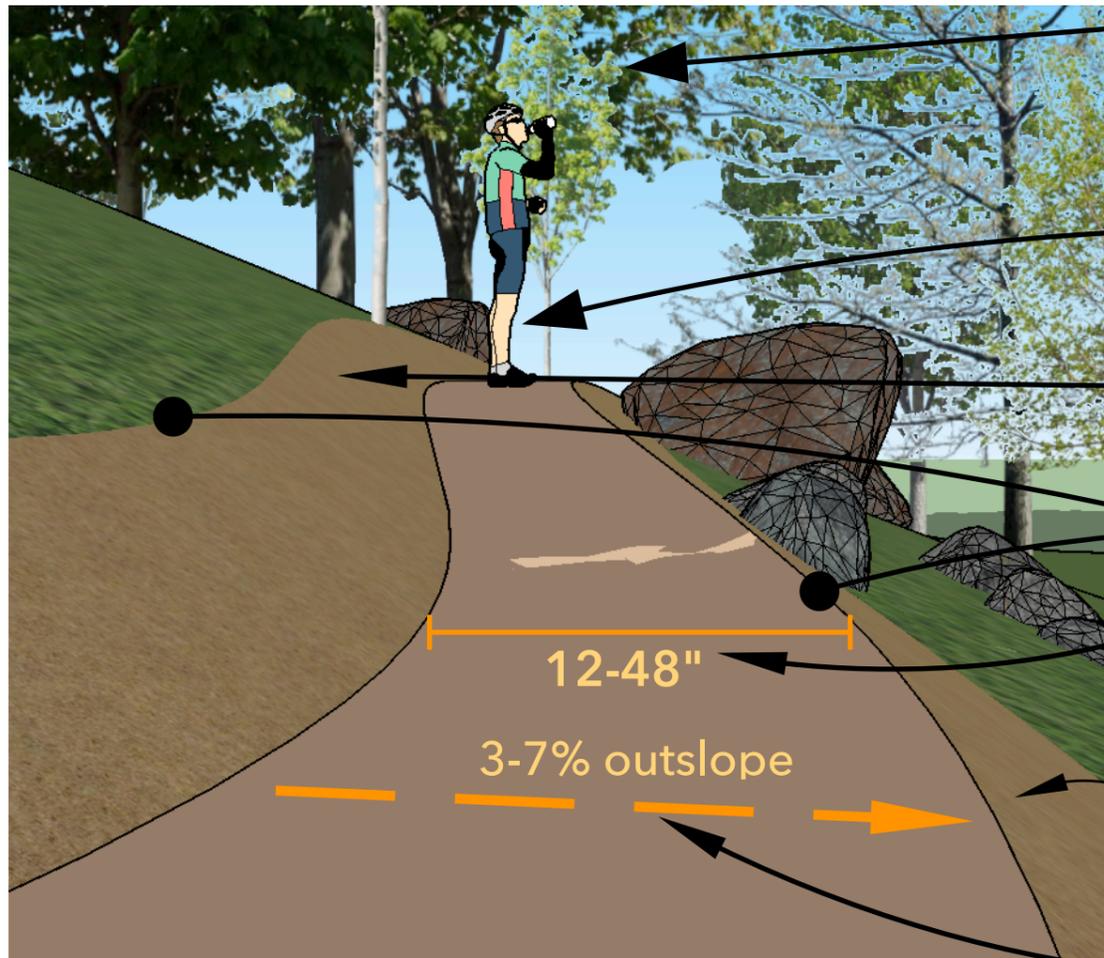
**PROJECT**  
Avalanche Preserve  
Mountain Bike Trails



# Details 1: Rolling Contour Trail

## Sequence of Construction

- A) Flag proposed trail corridors to confirm that there are no unforeseen stream/wetland impacts.
- B) Clear scrub vegetation, downed logs, and woody debris from trail rights-of-way only.
- C) Brush, organic soils, and vegetation removed from the trail shall be placed adjacent to and upslope of trail to revegetate and to assist in erosion and sediment control in Step F.
- D) Grade and outslope trail surface with grade reversals at intervals less than 100'.
- E) Disperse spoil material from trail excavation downslope of trail tread and evenly to a depth of 4" or less.
- F) Native seed and mulch (with materials from Step C) backslope and downslope spoill areas immediately upon reaching final grades.
- G) Contractor shall stabilize all constructed trail (Steps B through E) on a daily basis.



Retain entire forest canopy/riparian buffer, no tree greater than 6" DBH to be removed unless dead or diseased.

Rocks and trees used as trail anchors

Backslope blended into hillside, covered with leaf litter, native seed bank following construction

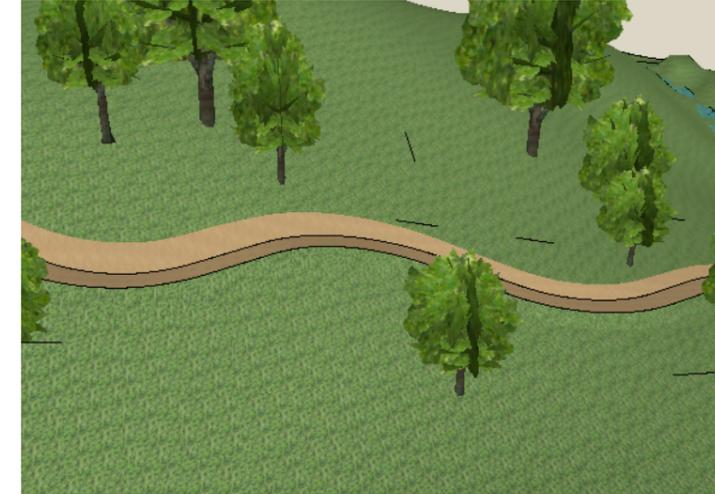
Critical point is rounded

Trail tread has gentle gradient (2-15%, not more than half prevailing hillslope grade), 12- 48" wide

Spoils dispersed evenly, less than 4" deep, covered with leaf litter, native seed bank

Trail tread is outsloped 3-7%, except where insloped.

**Rolling Contour - Outsloped Tread with frequent grade reversals** to force water to drain off the trail, maintaining natural hydrologic flow patterns and watersheds.



**Rolling Contour - Insloped Turn with Outsloped Grade Reversal** to keep riders on trail and reduce lateral displacement of soil.



Grade Reversal

Drain

Insloped Trail



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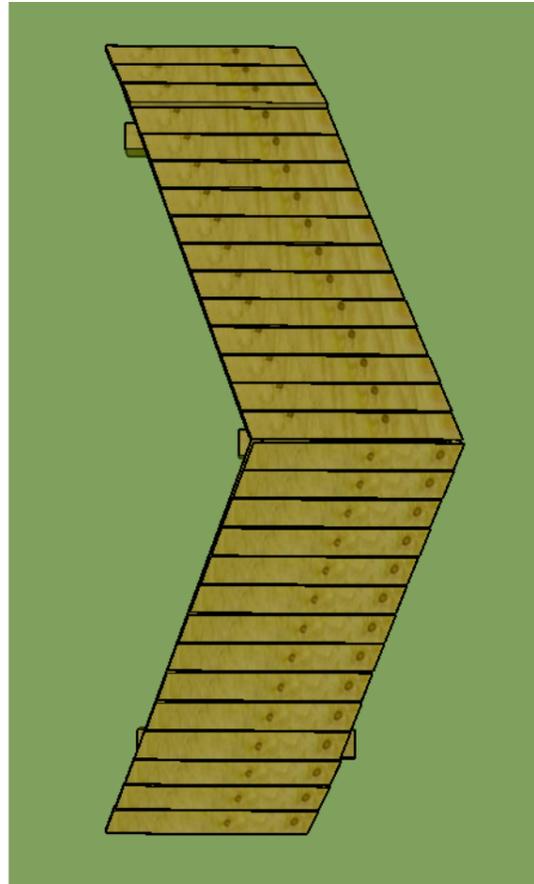
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# Details 2. Puncheon and Bridge

Top View



Bottom View

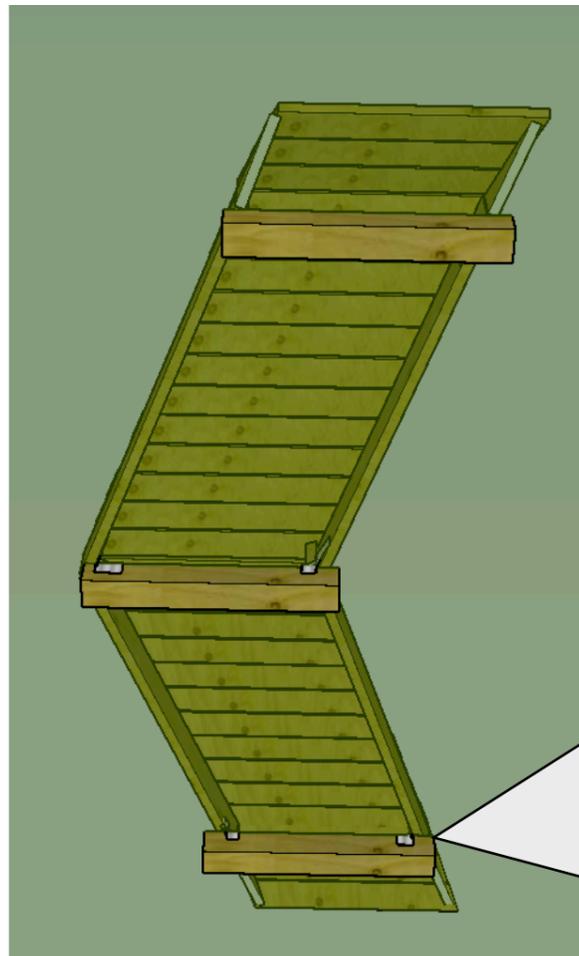


Figure 1.

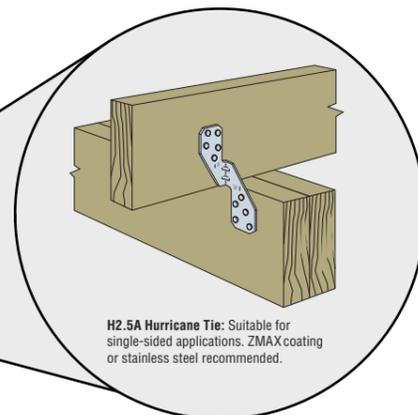
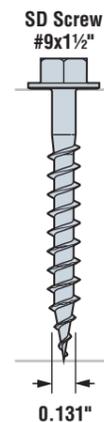
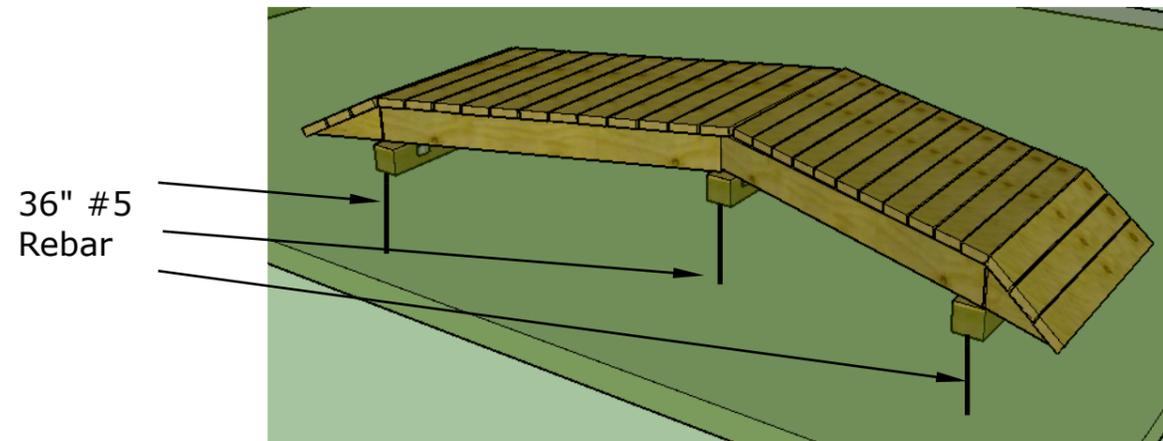


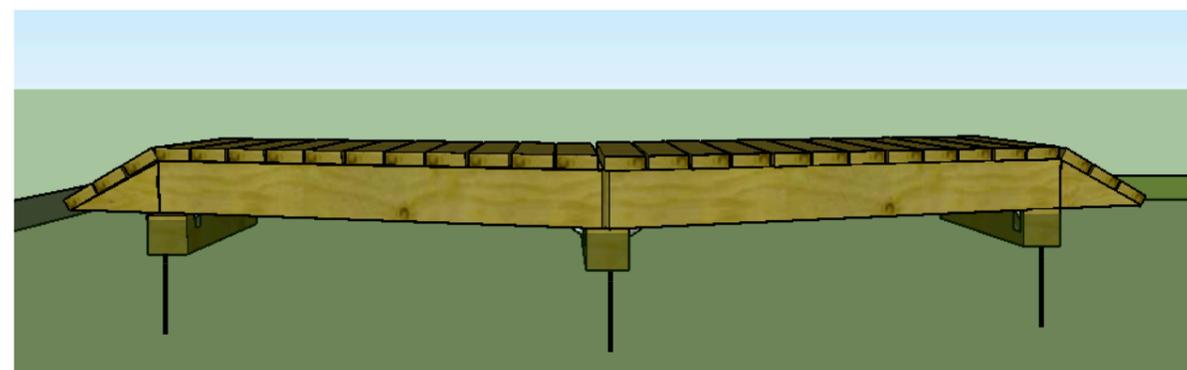
Figure 2.



Iso View



Side View



**Notes:**

1. 6X6 ground contact sills, flush with surrounding grade. 6" diameter 18" depth concrete footers for bridges greater than 18'.
2. 6x6 mud sills secured with 36" #5 rebar (~6" in from outside edge)
3. Stringers will be 2x8, pressure treated for puncheon.
4. Stringers will be 2X10 for bridges less than 12'; 2X12 for bridges 12'-17'; Glulam 2X16 for bridges 18'-23'. All pressure treated. For bridges, cross-bracing on 6' centers.
5. Hardware to connect stringers to mud sills: Simpson Strong Tie Hurricane Clips (H2.5 AZ) (Figure 1.), Tie Plates (TP47), and #9 1.5" hex drive screws (SD9112MB) (Figure 2).
6. Decking is 2x6 rough cut durable hardwood or marine grade pressure treated, fastened with 3.5" decking screws and 30-degree 3" ring shank framing nails.
7. Edges of deck materials should not extend more than 3" from edge of stringers
8. Fall zones cleared of woody and sharp debris 8' to all lateral surfaces of bridge.
9. Curvilinear construction of puncheon to blend with surrounding topography when possible



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Mountain Bike Trails



# AVALANCHE PRESERVE MOUNTAIN BIKE TRAIL DEVELOPMENT PLAN



## FUNDED BY:

**Top Of Michigan Mountain Bike  
Association (TOMMBA)  
Steve Schnell, President**

## PREPARED FOR:

**City of Boyne City  
Parks & Recreation Dept.  
Mr. Andy Kovolski, Superintendent  
231.582.0375  
maintenance@boynecity.com**

**and**

**Parks and Recreation Commission  
Michael Sheean, Chair**

## PREPARED BY:

**Scott Linnenburger  
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**Chad Irey  
Dirt Artisans**

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## PROJECT ACTIVITIES

### FIELD INVESTIGATION/TRAIL DESIGN

The Top Of Michigan Mountain Bike Association (TOMMBA) engaged Dirt Artisans to assist with the development of a retrofit and expansion of the mountain bike trail system at Avalanche Preserve on the south side of Boyne City, Michigan. Prior to visiting the site, Dirt Artisans reviewed pertinent reference material related to Avalanche Preserve, including the Avalanche Preserve Master Plan (2010), Boyne City Recreation Plan (Draft, 2015), Trail Town Master Plan (2014), and the IMBA Trail Solutions Conceptual Trail Design Report (2015).

Dirt Artisans' Chad Irej, with the assistance of Kay-Linn Enterprises' Scott Linnenburger, mobilized to Boyne City in early November, 2015 to undertake field investigation and sustainable trail corridor design for a diverse, sustainable, cost-effective mountain bike trail system in Avalanche Preserve. The team spent eight days on the ground in the preserve designing sustainable trail corridors and a diverse trail system. During this time, the team was able to witness current recreational use patterns in the preserve, including use of the archery range, disc golf course, and existing hiking/biking trails.

The team interfaced with TOMMBA regarding the types of trail experiences the organization desired at the preserve and led a tour of the developing trail corridors with interested TOMMBA members. Finally, the team met with Richard Duell regarding his ongoing work on the Avalanche Preserve Natural Resource Inventory and Management Plan.

This short report has been developed as a supplement to the construction documentation, which provides specifications for the trails and construction process.

## OPPORTUNITIES/CONSTRAINTS

### SUSTAINABLE TRAIL CORRIDORS

Trail sustainability is a multi-faceted concept. Natural surface trails must be durable and resist the erosive forces of water and human use. Through design, trails must also minimize potential conflicts between trail users and provide a variety of experiences in an easily navigable system. Trails must also be created in a manner that is manageable by the public entity and volunteers and their stewardship and doesn't conflict with other goals for the area.

#### **Physical Sustainability**

The existing singletrack trails in Avalanche Preserve provide a fun and relatively challenging mountain biking experience. Unfortunately much of the trail system is beginning to erode under increased use due to the trail alignments and gradients. Continued use of the existing trail system will lead to increased erosion over time until a condition is reached where the riding experience significantly suffers and many riders abandon using the trail. Many segments of trails are particularly difficult to ride in an uphill direction due to relatively steep trail grades and lack of traction in the sandy soils. Retrofitting the existing trails with reduced gradients and sidehill alignments will better protect the trails from future erosion and increase the bidirectional utility of the system, and thus the number of different ride options.

#### **Social Sustainability**

Avalanche Preserve is a highly utilized park, with many visitors playing disc golf, hiking, trail running, walking dogs, and exercising at all hours of the day. The existing hiking and mountain biking trails and disc golf fairways/travel patterns intersect many times, introducing points of potential use conflict via crowding, speed differential, and errant disc throws. The trails are also not signed. Combined with the multiple trail junctions, the current trail system is somewhat difficult to navigate. The need to retrofit the existing trails to provide improved navigability and reduced interaction points is paramount to minimizing potential future conflicts, especially with increased visitation.

#### **Managerial Sustainability**

Much of the mountain bike trails in the southeastern portion of the park are located in flat, wet terrain, which presents a resource management conflict and a major ongoing maintenance challenge. The current boardwalk through the wetland in the middle of the valley is degrading and would need to be replaced in the next few years. A retrofit of trails in this area to better draining sidehill locations will both improve the riding experience and decrease future resource impacts.

## OPPORTUNITIES/CONSTRAINTS

### DIVERSE TRAIL SYSTEM

Avalanche Preserve's current mountain bike trail system has utility to relatively adept mountain bikers. The climbs/descents are steep and the narrow nature of the trails, while appealing to good riders, limits the demographic that the park could be serving. The quality of trail options on the western side of the property is rather low and many TOMMBA members explained that many rides are out-and-back affairs. This lack of looped ride options, combined with the required riding capabilities and physical exertion necessary, make for a very uniform riding experience.

A diverse trail system is possible in Avalanche Preserve, including beginner-friendly trails, improved narrow backcountry trails, and descending-optimized trails. Providing these different trail types reduces congestion and potential conflicts, while offering trail users the opportunity to optimize their experience based on recreation time availability, group desires, and capabilities. In the northeastern portion of the property, increased utilization of the more gentle terrain will provide the location for trails that are accessible to riders with fewer skills, but will still be enjoyed by better riders. A more formal trail connection from the trailhead parking area up the western side of the property and above the archery range improvements will dramatically improve the loop ride options. Descending-optimized trails will help retain many of the qualities of the existing trails, but with lower rates of erosion over time.

### COST-EFFECTIVE TRAIL DEVELOPMENT

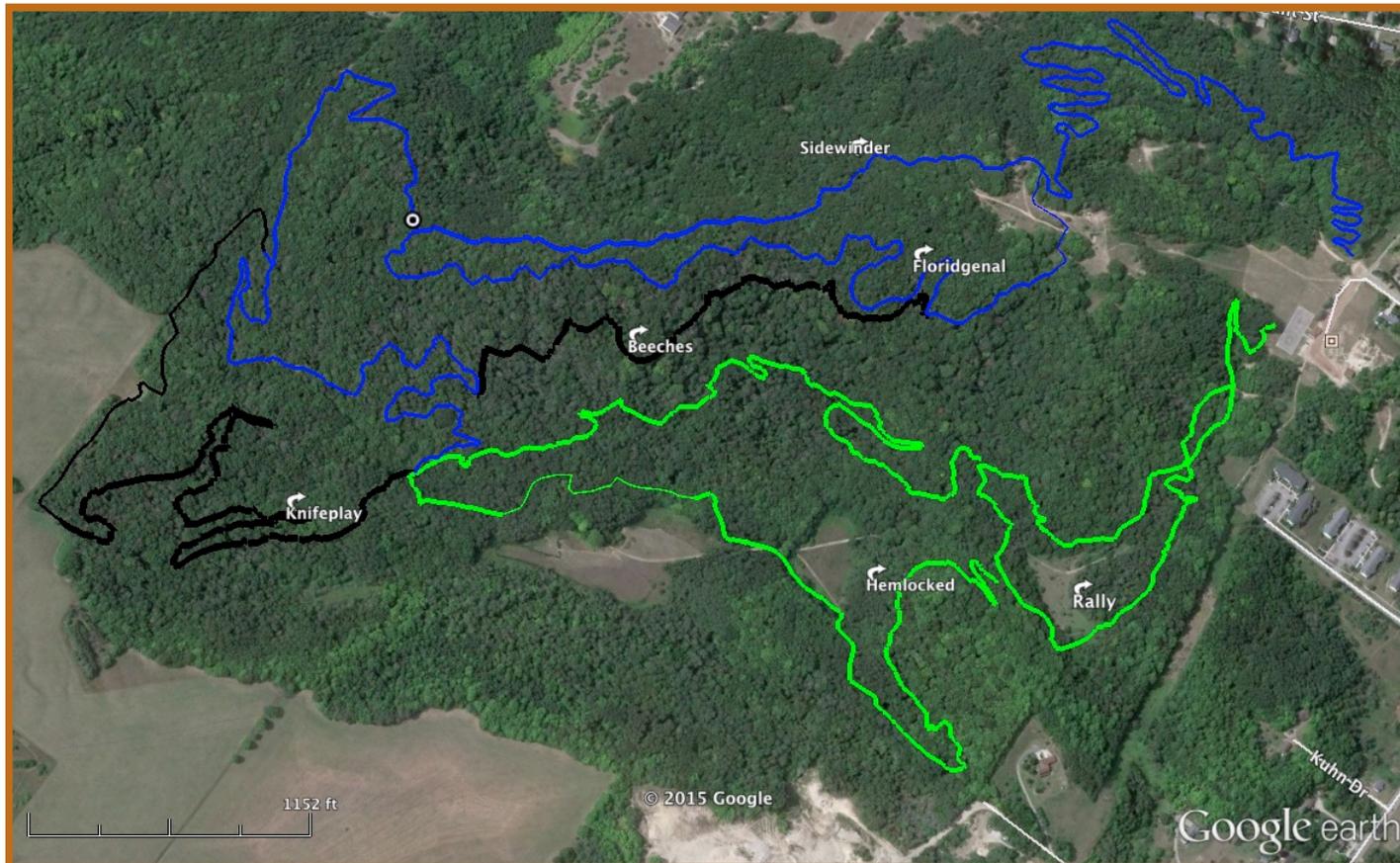
The cost of professionally developed trails is often surprising to many entities. The experience and expertise of professional trailbuilders vastly improve the quality and durability of the developed trails. This level of preparedness also dramatically expedites the trail development process, sometimes with more than a mile of trail constructed every week and an entire system in one season.

These costs can often be deferred to an extent through volunteer utilization and other locally donated or low cost resources. While this report provides a cost estimate for fully professionally constructed trails for perspective on the resource needs to realize this trail system, the Dirt Artisans team looks forward to strategizing with the City and TOMMBA on creative solutions for the project implementation.

The sandy soils and lack of significant rock in the preserve, while somewhat of a challenge for developing very challenging trails, reduce construction costs. Costs presented here fall onto the lower end of the spectrum relative to the estimates provided by IMBA in the conceptual planning document. From the standpoint of community impacts, the costs of trail development provide a rapid return in terms of per-user day investment and play a huge marketing role from the perspective of a Trails Town.

## POTENTIAL TRAIL SYSTEM

A total of 8.43 miles of sustainable trail corridor was ribbon flagged in early November, 2015. Accounting for rolling contour trail construction in this forest setting, the team has estimated that the total constructed trail distance would be approximately 7% longer than the gross corridor length. This equates to 9.02 total miles of trail construction. Utilizing small existing segments of sustainable trails, a 9.77 mile trail system can be developed at Avalanche Preserve.



### Less Difficult/Green Trails

The designed trail system would add just over 3 miles of family-friendly trails aligned in two loops and accessed from the eastern side of the trailhead parking area. The first trail out of the parking area, Rally, will be a skills development trail with many tight, banked turns, 8 low height skills features, and a length just over 1 mile. With little climbing involved, this length of trail will be ideal for kids and newcomers to mountain biking to take as many laps as they have time or energy while progressively developing the bike handling and balance skills necessary for confidently taking on longer, more challenging options. Connecting to the Rally trail in two different locations to create a larger stand-alone loop and access to the more challenging trails in the southern portion of the preserve, Hemlocked begins in either direction with short but more substantial climbs that will

## POTENTIAL TRAIL SYSTEM

initiate riders quickly to the preserve's steeper topography. A distance of just under 2 miles provides a continuous 3-mile loop for families or two optional 1.5-mile warm-up segments for riders with greater stamina.

A major trail junction has been designed at the approximate midway point of Hemlocked on the hiking trail between a disc golf hole/cage and subsequent tee off area. A rest area/meeting spot with trail navigation signage will direct riders either to the more challenging trails in the southern portion of the preserve and the most expedient path back to the trailhead. This 4-way trail junction will be the endpoint for the Knifeplay directional trail as well as the bi-directional Sidewinder.

### **Intermediate/Blue Trails**

From the western side of the trailhead parking area, Sidewinder trail will climb approximately 1.3 miles through a series of switchbacks on the western aspect of the preserve to the overlook at the top of the hill. A short existing segment of trail will take riders to the top of the main ridge to access Floridgenal. Sidewinder continues traversing along the near top of the western aspect of the ridge for approximately 0.7 miles to the second junction with Floridgenal at a saddle. This trail junction will be signed as a 3-way intersection with directional cues to the trails in the southeast portion of the property and the most expedient path back to the trailhead. Sidewinder continues to traverse for 0.5 miles around the knob in the southwest corner of the property to the junction with Knifeplay before descending 150 feet over 0.7 miles to the 4-way intersection.

Along the main ridge of the preserve, the existing singletrack has been retrofit to increase distance and place more of the trail in a sustainable sidehill location. The intention is to keep the riding experience very similar to the narrow, existing trail, but with better-linked turns and more durable "g-outs". With a number of short descents and climbs, this 0.9 mile trail can be linked with Sidewinder for a 1.75-mile loop around the preserve's primary ridge. Climbing Sidewinder, circling the ridge top loop, and descending Sidewinder to the parking area will provide an almost 4.5-mile ride.

### **Difficult/Black Trails**

Two downhill directional trails will round out the Avalanche Preserve trail system. Beeches drops off of Floridgenal, descending approximately 175 feet in 0.75 miles (0.55 miles of Beeches and 0.2 miles of Sidewinder) to the 4-way trail junction. The trail will be narrow and perched on some of the property's steeper slopes. The trail will encourage speed and trail gradients will be somewhat steeper than those on the intermediate trails, but will not have additional erosive potential due to the directional use combined with a rolling contour alignment on the sidehill. Narrow log features will provide the alternate opportunity for even greater exposure with mandatory drops off the downhill exit.

Knifeplay, in the southeast portion of the property, is aligned to take advantage of the exposure provided by the property's two narrowest ridges. The narrow trail will be perched on steep sideslopes and drops 125 feet in 0.75 miles before flattening out for a cruise back to the 4-way trail junction with a few challenge features along the way. As opposed to Beeches speed and flow focus, Knifeplay will focus on balance and rider control on narrow trail, sometimes with "blind" fall-away corners.

# COST ESTIMATE

Trail Name	Difficulty	Corridor Mileage	Estimated Constructed Tread*	Estimated Bridge Length	Estimated Number of Features
Rally	Easy/Green	1.03	1.10	252	8
Hemlocked	Easy/Green	1.8	1.93	40	3
Sidewinder	Int./Blue	3.19	3.41	0	4
Floridgenal	Int./Blue	0.9	0.96	0	5
Beeches	Difficult/Black	0.55	0.59	0	4
Knifeplay	Difficult/Black	0.96	1.03	0	3
Existing	NA	0.7	0.75	0	
			9.77	292	27

\* 7% addition for rolling contour construction

## LEAST DIFFICULT TRAILS

Trail Name	Estimated Constructed Tread	Linear Foot Cost	Estimated Bridge Length	Linear Foot Cost	Subtotal Cost
Rally	5,819	\$4.75	252	\$90.00	\$50,320.67
Hemlocked	10,169	\$4.75	40	\$90.00	\$51,904.08
				15,988	
				<b>Subtotal: \$102,224.75</b>	

## INTERMEDIATE TRAILS

Trail Name	Estimated Constructed Tread	Linear Foot Cost	Estimated Number of Features	Individual Feature Cost	Subtotal Cost
Floridgenal	5,085	\$4.25	5	\$500.00	\$24,109.72
Sidewinder	18,022	\$4.25	4	\$500.00	\$78,594.45
				23,107	
				<b>Subtotal: \$102,704.17</b>	

## DIFFICULT TRAILS

Trail Name	Estimated Constructed Tread	Linear Foot Cost	Estimated Number of Features	Individual Feature Cost	Subtotal Cost
Beeches	3,107	\$6.00	4	\$500.00	\$20,643.68
Knifeplay	5,424	\$6.00	3	\$500.00	\$34,041.70
				8,531	
				<b>Subtotal: \$54,685.38</b>	

**TOTAL  
COST: \$259,614.30  
MILEAGE: 9.02  
\$/MILE: \$28,781.75  
\$/FOOT: \$5.45**

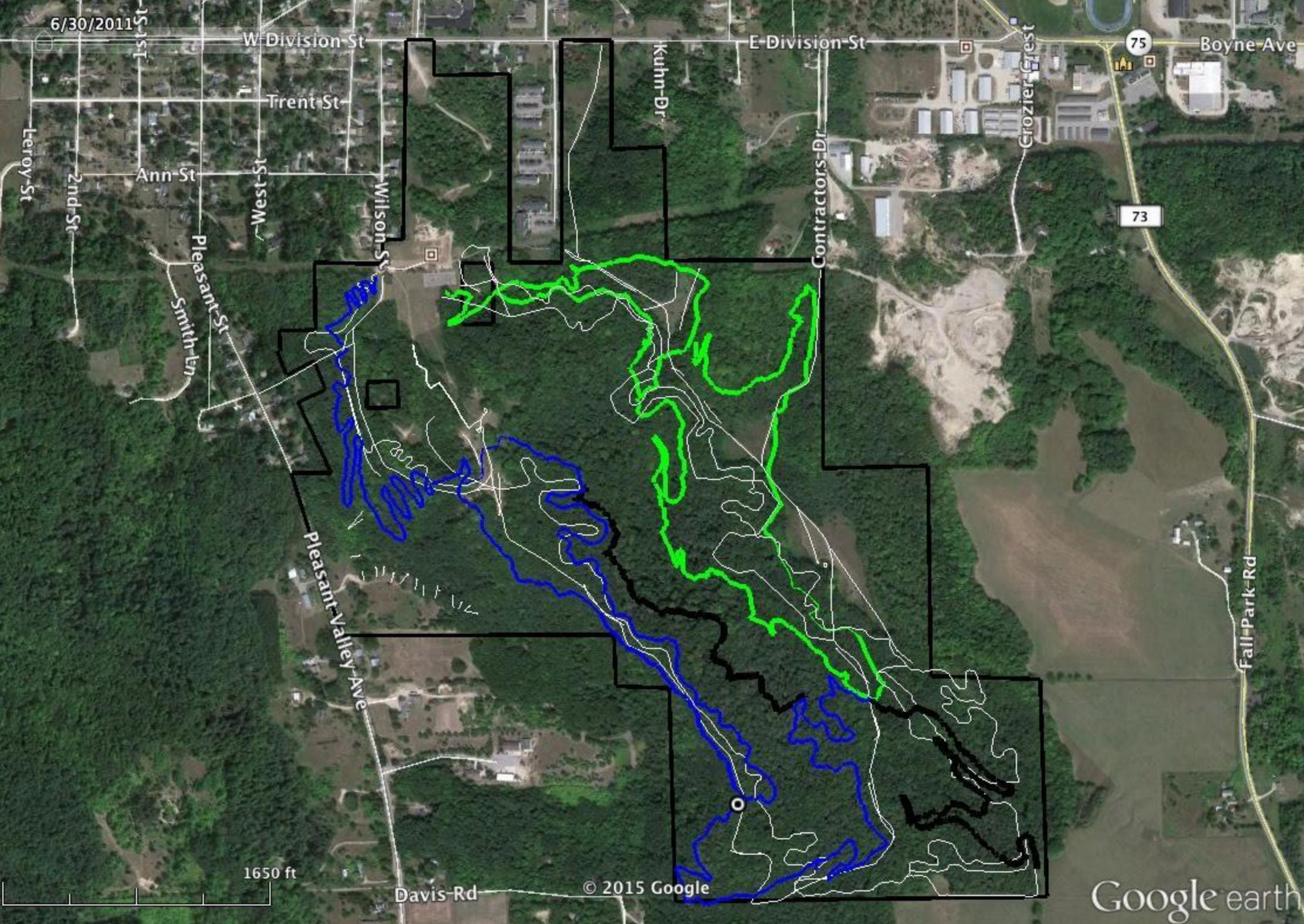
## ADDITIONAL FACILITIES

The Dirt Artisans team investigated the concept for a pumptrack on the flat area north of the trailhead parking lot. Typically these types of riding facilities receive high utilization when complemented by additional infrastructure that already draws children and families, and the addition picnic tables, playground equipment, or other developed park facilities.

The approximately 0.5-acre area depicted below is ideal for a pumptrack. The track could be created with imported clay or purchased prefabricated. The advantages of the former are lower cost (\$35,000 labor plus materials/transport), malleability, and the ability to remove the track easily through regrading. The disadvantages are a need for regular maintenance and, to some, the aesthetics of piles of clay/dirt. For a prefabricated pumptrack, the advantages are a much lower level of maintenance and polished aesthetic that can be more easily landscaped, while the disadvantages include a higher cost (\$15-20,000 labor and \$75,000 - \$100,000 for the track components) and lack of ability to alter the design over time.



6/30/2011



1650 ft

Davis Rd

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Google earth

1st St  
Leroy St  
2nd St

W Division St

Trent St

Ann St

Pleasant St  
Smith Ln

Wilson St

Kuhn Dr

E Division St

Contractors Dr

Grozier Crest

75

Boyne Ave

73

Pleasant Valley Ave

Fall Park Rd