

# Mosquito Creek Trail Design 2017

Michigan's EDGE Mountain Bike Club



Prepared by Dirt Artisans



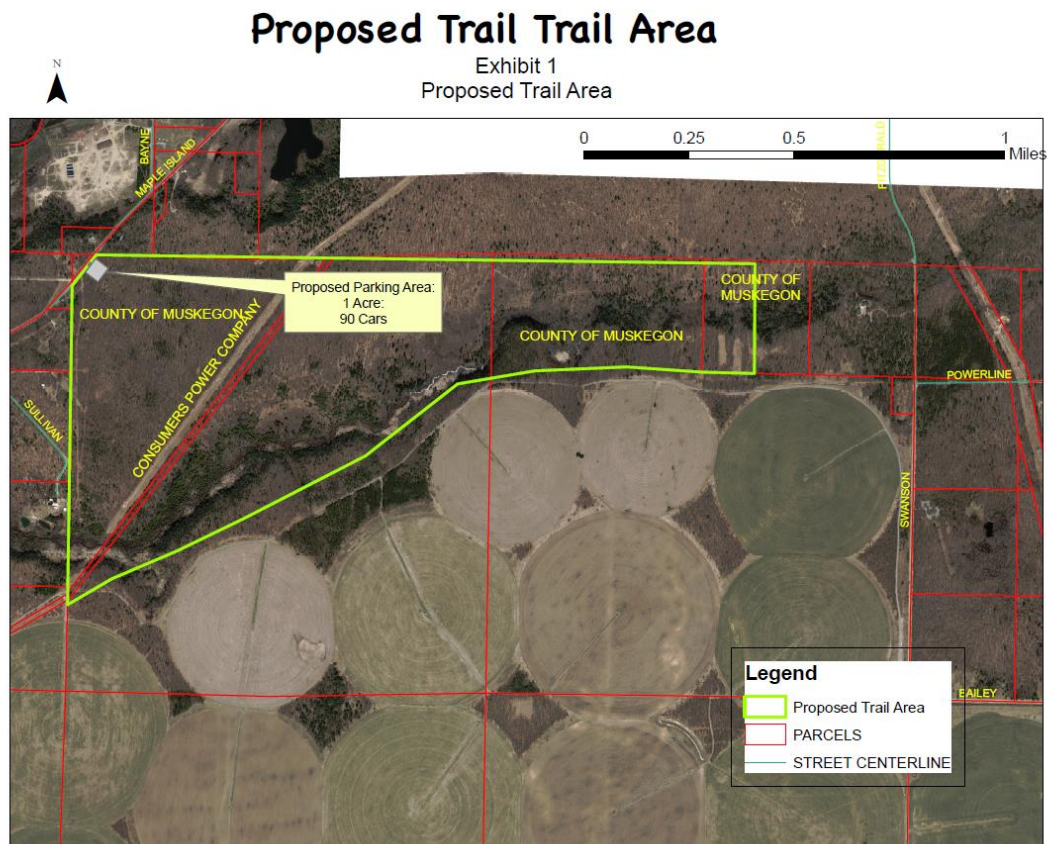
With Assistance from Applied Trails Research



**April 22<sup>nd</sup>, 2017**

## Project Overview

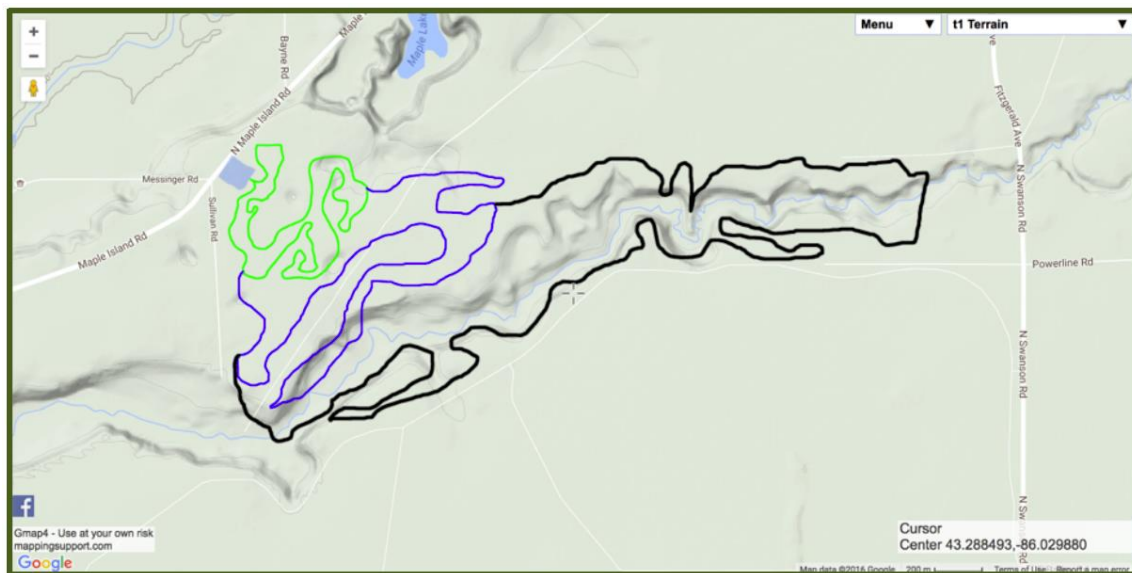
Michigan's EDGE mountain bike club contracted Dirt Artisans of Covington, KY to develop a design and to flag corridors for mountain bike trail development on the Mosquito Creek Parcel in Muskegon County, Michigan. The property is roughly 500 acres and straddles Mosquito Creek. The property contains a power line – utility corridor managed by Consumers Power Company.



*Michigan's EDGE Mountain Bike Club provided map for the Mosquito Creek project.*

The property is a mix of steep side slopes along the flanks of Mosquito Creek, and flat to rolling uplands. Michigan's EDGE mountain bike club coordinated access to the property with the county and determined the location of a single trailhead and parking lot in the Northeast corner of the property. This trailhead is to be developed and will be accessed from Maple Island Road.

A preliminary concept plan was provided by Michigan's' EDGE mountain bike club containing a mix of trail difficulties totaling around 10 miles. An initial site visit with representatives from EDGE and the Dirt Artisans' team confirmed the feasibility of the desired mountain bike trail on the property, and provided a framework for trail design and related deliverables for this project.



*Preliminary trail concept from Michigan's' EDGE Mountain Bike Club*

Dirt Artisans' team conducted field design on the property during the week of March 27<sup>th</sup>. The team flagged trail corridors and collected photos and GPS data to detail stream crossings and structures needed for trail construction and cost estimation. Table 1 summarizes the trails designed on the property, including 3.3 miles of beginner trail, 6.1 miles of intermediate trail, and 1.5 miles of advanced trail.

Trail Type	Description	Feet	Miles	% of system
Green	Beginner trail	17,666	3.35	31%
Blue	Intermediate trail	32,279	6.11	56%
Black	Advanced trail	7,893	1.49	14%
<b>Total</b>		<b>57,838</b>	<b>10.95</b>	<b>100%</b>

*Table 1: Trail Mileage by type*



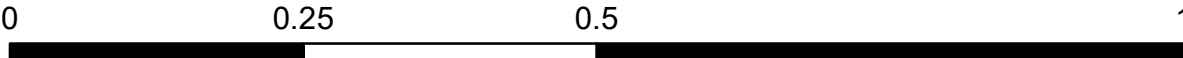
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## Flagged Corridors

### Trail Types

- Green - beginner
- Blue - intermediate
- Black - advanced

Trailhead





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## Flagged Corridors

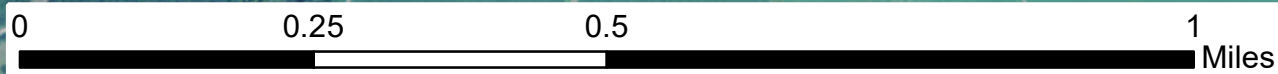
### Trail Types

- Green - beginner
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Trailhead



Newaygo  
Muskegon





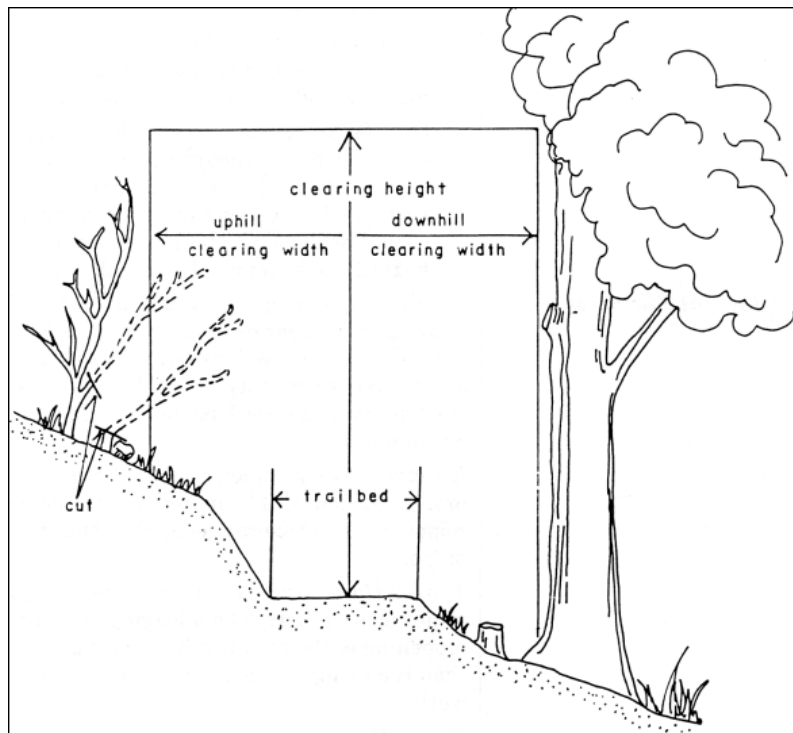
## Trail Design and Specifications

Trails were flagged with fluorescent orange, red or pink flagging with black polka dots. Flags were placed on trees and vegetation to demarcate the centerline of a trail corridor for construction. Final design and construction of the actual trail tread will be within +/- 50' from the hang flags. This process allows for final design and construction to accommodate site conditions discovered during excavation, and allows the builder to create varied and playful trails for maximum enjoyment by trail users.

To ensure a variety of experiences on the property the Dirt Artisans' team flagged corridors to support three unique specifications of trail on the Mosquito Creek project. Specifications for each of these three types of trail are also varied to create multiple levels and types of experience for a diverse set of mountain bike trail users. Table 2 provides a summary of the trail specifications by trail type.

Trail Type	Description	Tread Width	Average Grade	Maximum Grade
Green	Beginner trail	36-48"	1-3%	8%
Blue	Intermediate trail	24-36"	3-6%	12%
Black	Advanced trail	18-28"	5-8%	15%

Table 2: Trail specifications by type



## Cost Estimate

Costs for trail construction are shown in Table 3. These were developed by Dirt Artisans based on field design work, and previous work in the greater Michigan Area. Additional items for construction include bridges and puncheon (boardwalk) at the 2 crossings of Mosquito Creek. It is recommended that for initial construction these crossings are created as fords, requiring trail users to cross the creek without a bridge. Fundraising for the bridges and associated engineering and permitting can be conducted at a later date as these costs and timelines are larger than the EDGE representatives indicate are desired for initial construction of the trails at Mosquito Creek. Cost estimates for structures and bridges are shown in Table 3.

Item	Notes	Cost Per	Qty	Cost
Green Trail: Flat terrain 0%-10% side slopes	Lift and tilt construction to optimize visitor experience	\$4.50	17,666	\$79,497.00
Blue Trail: 10%-40% average side slopes	Narrower more playful trail	\$3.75	32,279	\$121,046.25
Black Trail: 40% and above average sideslopes	Steep side slopes and narrow tread add user interest and challenge	\$4.50	7,893	\$35,518.50
<b>Trail Tread Construction Costs</b>				<b>\$236,061.75</b>
Ford	Entry and exit construction.	\$750.00	2	\$1,500.00
Puncheon	Approach for lower stream crossing, and others	\$120.00	250	\$30,000.00
<b>Structure Costs</b>				<b>\$31,500.00</b>
<b>Trail Construction Estimated Total</b>				<b>\$267,561.75</b>
Bridges (2 crossings of Mosquito Creek)	Engineering will determine final estimate.	\$20,000.00-\$45,000.00		\$40-90K
<b>Bridge Costs</b>				<b>\$40-90K</b>

*Table 3 Mosquito Creek Trail Construction Cost Estimates*

## **Permitting**

The Muskegon County Conservation District is the first stop for permitting assistance and review: <http://www.muskegoncd.org/> .The conservation district should advise on any necessary permits for trail construction and related stream crossings.

Additional review of the project prior to excavation should include MISS Dig: <http://www.missdig.org/> . This 811 service will coordinate marking of any underground utilities on the property.