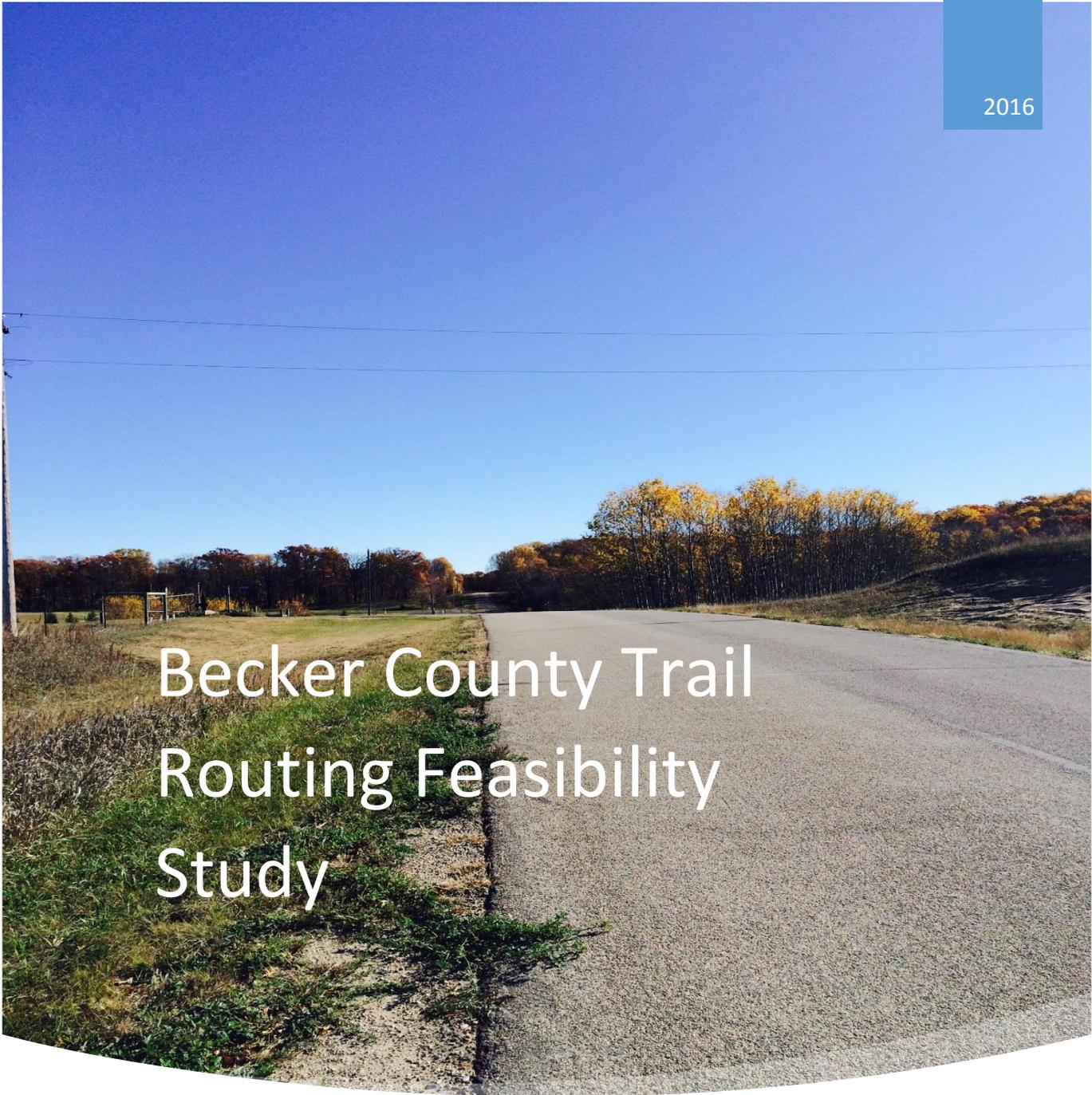


2016



# Becker County Trail Routing Feasibility Study

CONNECTING DETROIT MOUNTAIN AND MOUNTAIN VIEW  
RECREATIONAL AREA TO THE HEARTLAND TRAIL

BECKER COUNTY  
ULTEIG ENGINEERS

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## Acknowledgements

Becker County

PartnerSHIP 4 Health

Minnesota Department of Transportation

City of Detroit Lakes

Detroit Mountain Recreational Area

# INTRODUCTION

## Project Background

The Becker County Trail Routing Feasibility Study examines the potential alignments for creating a bituminous paved trail connecting the Heartland Trail to both the Detroit Mountain Recreational Area and the Mountain View Recreational Area. The purpose of the study is to provide the preliminary foundation needed to plan, design, and construct the trail. This study examines the benefits of the project, the existing conditions along the corridor, describes and evaluates alignment options and provides information regarding the design of the trail.

The Minnesota Department of Natural Resources (DNR) completed the Master Plan for the Heartland Trail Extension from Park Rapids, MN to Moorhead, MN in 2011. This master plan identified preliminary routes for the multiuse trail through Becker County. In 2013, the initial construction of the Heartland Trail began in Becker County with the completion of the MN Highway 10 underpass. In 2014, the construction continued with extending the portion within the City of Detroit Lakes system to the underpass. Currently in 2016, the DNR is working on designing the Heartland Trail segment from the underpass, east to Frazee, Minnesota.

In addition to the Heartland Trail construction and planning, the Detroit Mountain Recreation Area (DMRA), owned by the City of Detroit Lakes, re-opened for the winter of 2014-2015, once again supporting the winter activities of downhill skiing, cross country skiing snowboarding and winter mountain biking. In addition to the winter activities, DMRA has constructed numerous mountain biking trails supporting all levels of ability, thus making the DMRA a year-round recreation destination.

Becker County also owns the Mountain View Recreation Area (MVRA) which is located approximately 0.75 miles to the south east of DMRA. The MVRA offers 3 miles of cross country ski trails, and approximately 4 miles of single track mountain bike trails. Due to the close proximity, the city and the county have joined forces to look at options to expand and connect the recreational opportunities of the DMRA and MVRA. One of those options is to connect the recreational areas to the existing bike trail system that currently exists within the City of Detroit Lakes. This feasibility study will help in determining the best option to do so.

## Project Process

The process for this project encompassed technical research, numerous meetings and field review. It included the following steps:

- Field review of the corridor
- Research on the corridor ownership
- Meetings with representatives from Becker County, DMRA, City of Detroit Lakes, Minnesota Department of Transportation (MnDOT)

- Meetings with Burlington, Detroit, Erie and Lakeview township officials
- General Public Open House

## Project Goals

This study was commissioned to examine the feasibility and routing for constructing a multi-purpose trail connecting the Heartland Trail to the DMRA and the MVRA. To guide the process, the project team evaluated a range of alternate routes to meet the goals of the project. The goals were as follows:

1. Develop a safe, continuous regional trail connecting the Heartland Trail to the DMRA and MVRA.
2. Serve local and regional non-motorized transportation needs and provide access to the trail for the residents of Becker County.
3. Provide a route that is family friendly to ensure that the trail provides an enjoyable recreational experience for all ages and abilities.
4. Highlight the rolling terrain and diverse features in the area, thus minimizing the effects on wetlands and enhancing the experience for the users.
5. Minimize the encroachment on adjacent properties, to ensure both the users and the residents along the project enjoy the project in the future.

## Trail Definition

The proposed trail is a shared-use paved trail that provides recreational opportunities and enhances mobility and travel for the region. This facility will meet the guidelines set forth by the Minnesota Department of Natural Resources for Trail Planning, Design and Development Guidelines. It will also meet the guidelines set forth by the Minnesota Department of Transportation Bikeway Facility Design Manual for size, grade, and other characteristics and will be suitable for non-motorized uses such as bicycling, hiking, jogging, rollerblading and other similar activities.

This trail will consist of an entirely new trail alignment. Where possible, the road rights of way will be utilized to lessen the impacts on adjoining properties. In these areas, a variety of alignment schemes will be looked at. Some of these schemes may include off-road two-way paths located adjacent to the roadway, wider paved shoulders, or shared uses with motor vehicles. The choice of scheme layout will depend on the amount of right of way available, the number of driveways and roads crossed, traffic sight distances and other safety factors.

## Preferred Route Selection Criteria

At the beginning of the project Ulteig met with the interested stakeholders in the project. Which included:

- Becker County Officials and Commissioners
- City of Detroit Lakes Officials
- MnDOT
- DMRA
- PartnerSHIP 4 Health

At the completion of the meeting several common core interests were found such as:

- Where available, the preferred alternative would be a two-way paved multi-use path separated as much as possible from roadway traffic and conflicts such as driveways.
- The trail must be designed to accommodate all ages and abilities
- Routes were selected that generally required less known property conflicts and/or have a lower cost to construct, thus utilizing the existing road right of way will be necessary.

## Trail Alignment Options

### Overview of the Alignments

As a decision-making tool, this feasibility analysis evaluated trail segments which connected the Heartland Trail to the DMRA and MVRA recreational areas. The criteria to determine the trail alignments are:

- Ability to minimize the amount of rights of way required to be acquired, while working with willing land owners to be able to provide a buffer from Becker County 54 and Tower Road.
- Minimize trail user exposure to vehicular traffic
- Minimize impacts to wetlands and avoid steep slopes

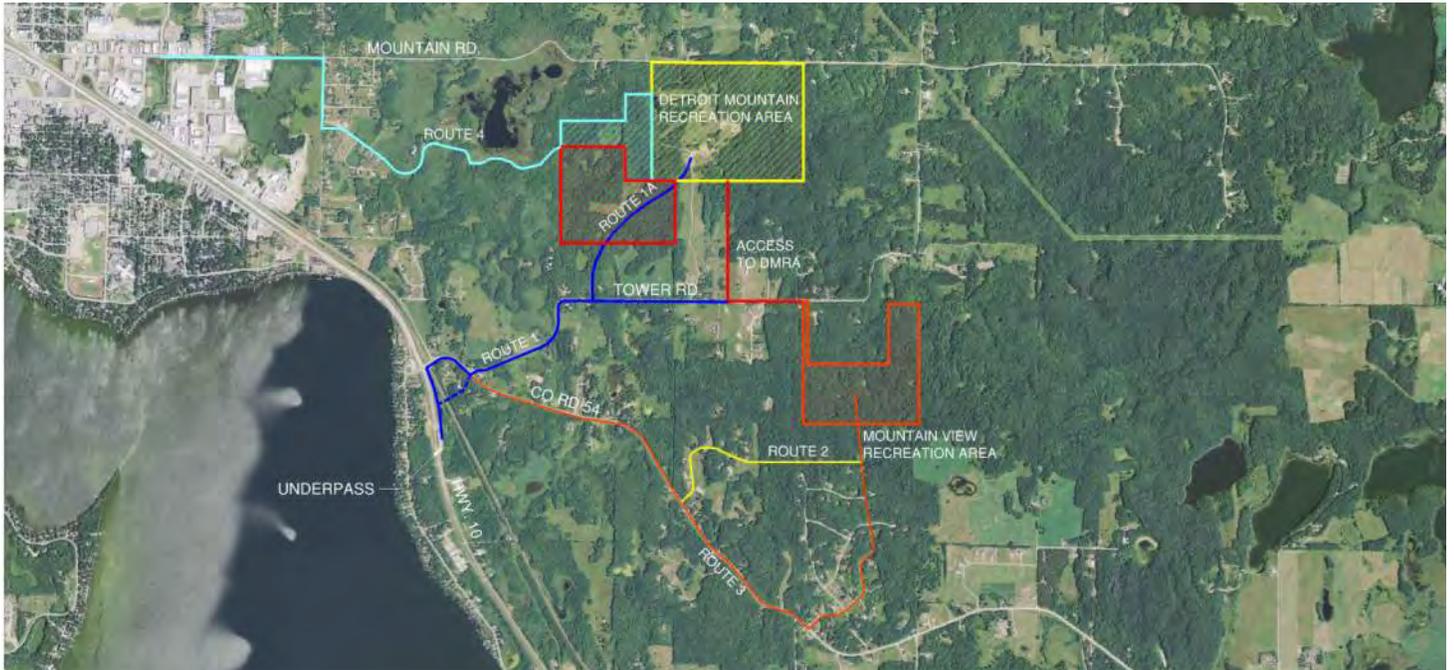


Figure 1

### Route 1 and 1a (Preferred Alternative)

The overall preferred route has been split up in four segments

- Segment 1 – Heartland Trail Underpass to the intersection of County 54 and Tower Road
- Segment 2 – Tower Road from County 54 to the existing single track mountain bike trail intersection
- Segment 3 – The access connecting the DMRA to MVRA
- Segment 4 – From Tower Road to DMRA via the old “ox cart trail” shown on the exhibits as Route 1A

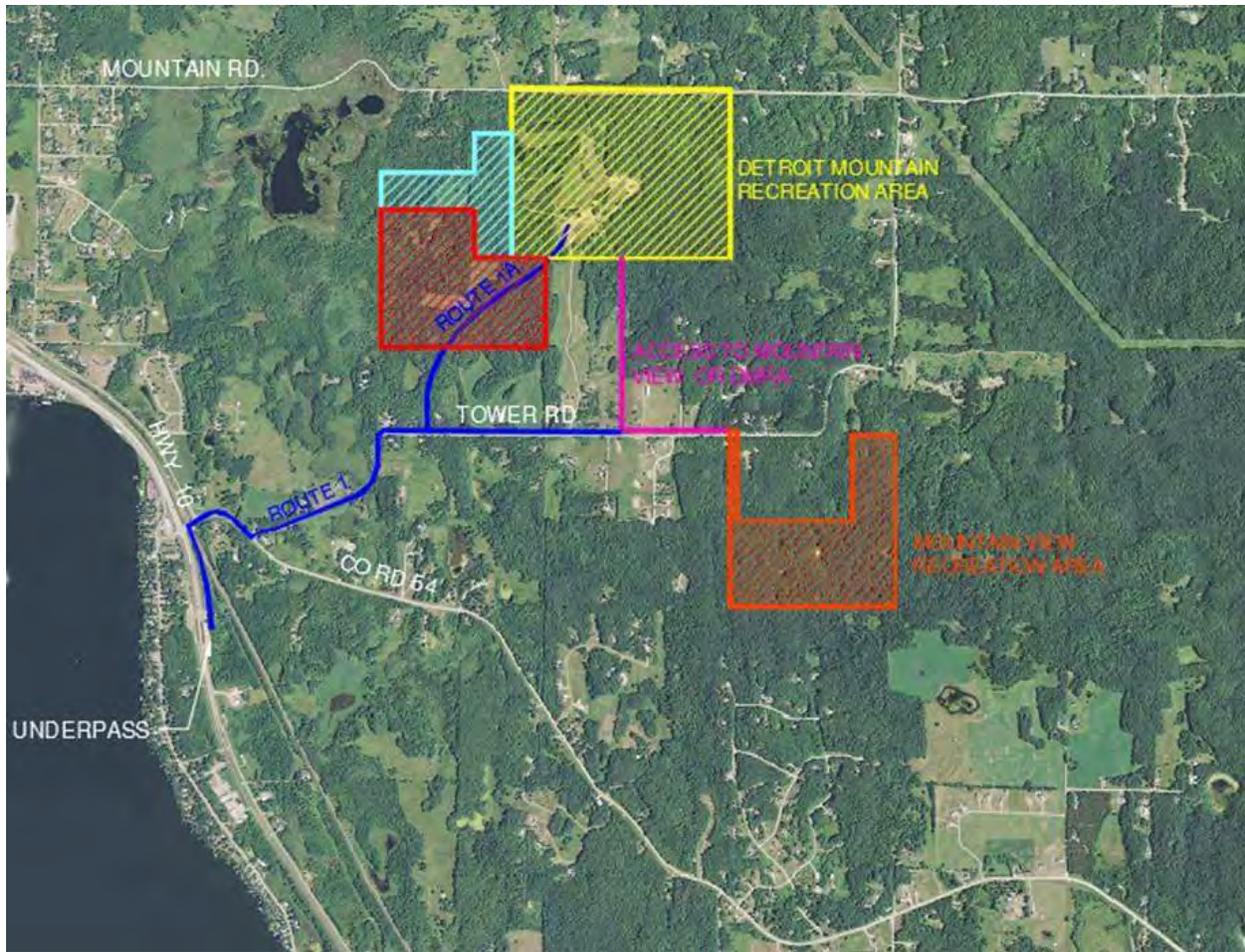


Figure 2

### Segment 1

Segment 1 includes connecting to the Heartland Trail Underpass which was constructed in 2013. From the connection point, the proposed trail will run along the east side of the right of way of MN Highway 10 approximately 0.3 miles north to the intersection of County Road 54. It is not anticipated that the trail will be located within the Burlington Northern Santa Fe (BNSF) railroad right of way. The design criteria through this area will meet the MnDOT Bike Manual, in addition to the MN DNR Trail Design Guide.

### County Road 54/Highway 10 Intersection

Currently, MnDOT is conducting an intersection study to determine the appropriate improvements to implement a signalized intersection at this location. The proposed multi-use path will be included in the study as an at-grade crossing at the railroad tracks. A more detailed intersection layout will be developed during the preliminary design of this project in cooperation with MnDOT.

To increase the safety at the railroad crossing, an elevated grade separation will also be investigated. The terrain relief adjacent to the proposed route does favor this alternative. Additional discussions with BNSF will be required to determine if it will be feasible to pursue this option to acquire easements from them and the adjacent landowners

### Segment 2

The trail will continue along the south side of County 54, within the current right of way. It is not anticipated that permanent easements will be required through this segment, however temporary construction easements are anticipated.

The trail will proceed approximately 0.2 miles along the south side to the intersection of Tower Road. Here the trail will cross county 54 via an at-grade crossing. This crossing will be signed appropriately to alert motor vehicles, as well as the trail users, to the crossing. A cross walk will be installed and advanced lighted warning signs may also be installed at this location.

### Segment 3

Currently, the preferred alternative continues east, from the intersection of County 54 along the south side of Tower Road 0.75 miles. By keeping the trail on the south side of Tower Road, the number of driveway conflicts drops from 7 crossings, to 5 crossings. This alignment also minimizes the amount of wetland impacts that will be encountered through this portion of the trail. It is anticipated that permanent easements will be required on four parcels along this portion of the route.

### Route 1A

At approximately 0.75 miles north of county 54, the trail will cross to the north side of Tower Road, leaving the right of way onto private property. A permanent twenty foot easement will be required on two properties for this option. This option is being investigated because:

1. It utilizes existing trails through the forest. Thus taking advantage of the natural landscape, as well as reducing the impacts to the area
2. It is the shortest distance to the DMRA
3. It reduces the number of easement impacts and increases user safety.

#### Segment 4

This 0.5 mile segment of the trail will serve as the link between DMRA and MVRA. This trail will run south from DMRA to Tower Road through a 40 foot corridor which currently is home to a single track mountain bike trail. Once the trail intersects Tower Road, the trail will run east within the right of way on the north side of the road to the parking area of MVRA. At this point the trail will cross Tower Road and enter the recreational area. Both permanent and temporary construction easements are anticipated.

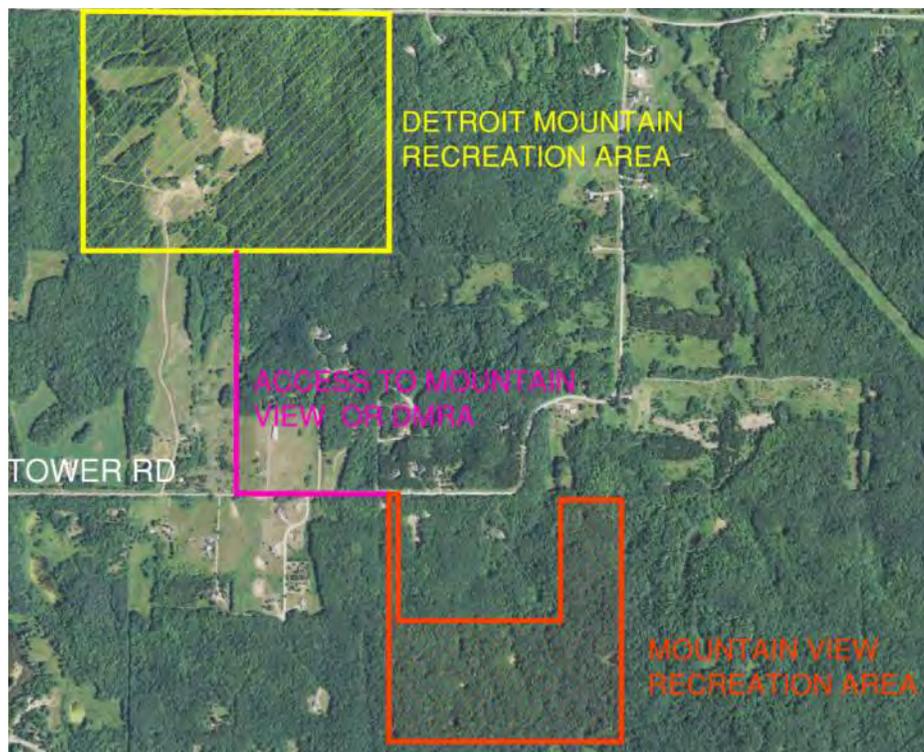


Figure 3

## Route 2

This trail route follows County Road 54 approximately 1.1 miles east of Tower Road to Lee Lane. At the intersection of Lee Lane the trail would cross via an at-grade intersection and follow Lee Lane to the north approximately 0.5 miles to the cul-de-sac at the end of the road. The trail would then enter private property for the last 0.4 miles to the MVRA.

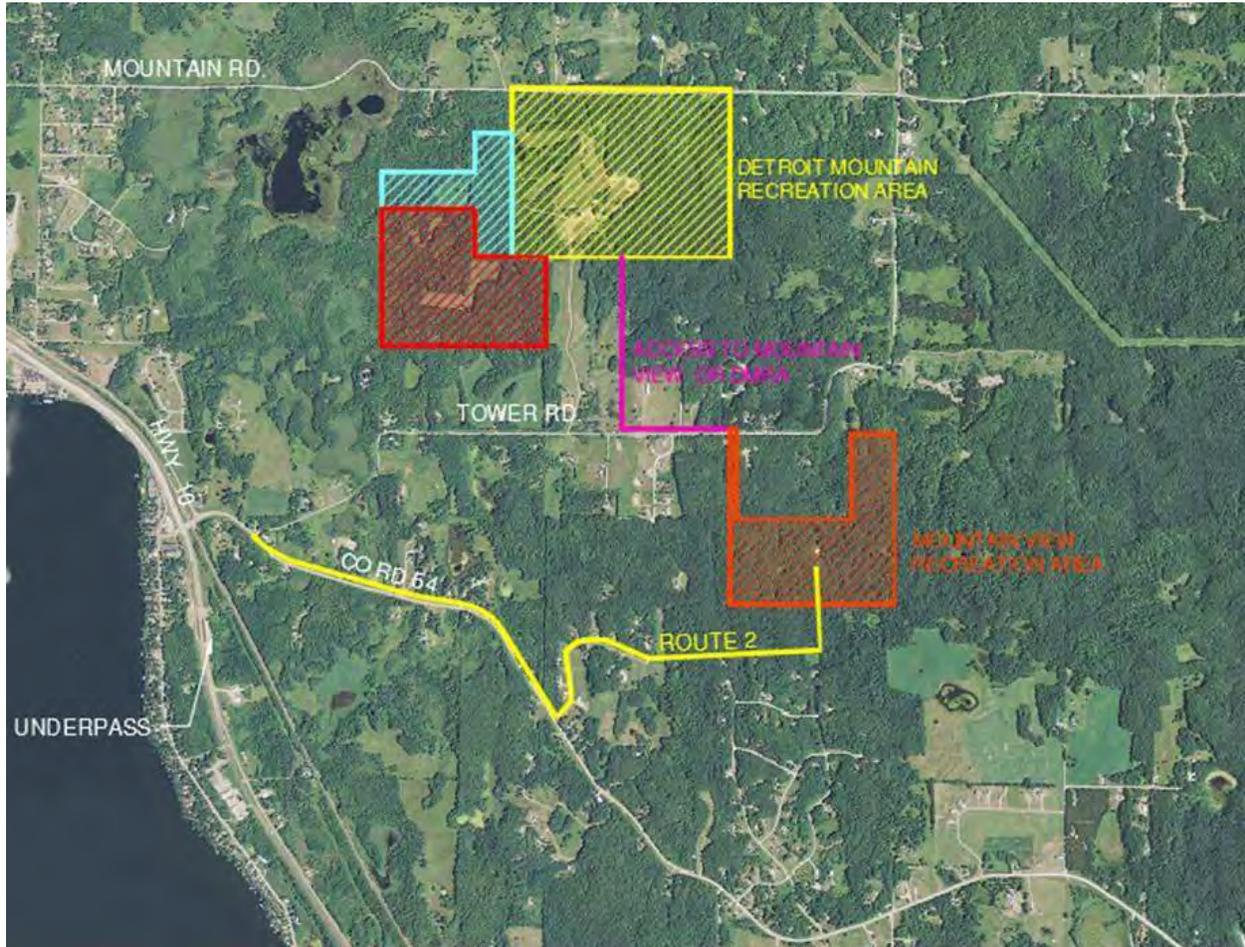


Figure 4

This route was not deemed feasible due to the amount of easement acquisition that would be required along County Road 54 to ensure compliance with the design standards. In addition to the easement acquisition along County 54, the acquisition of the easements along Lee Lane and through private property is anticipated to be difficult to obtain.

### Route 3

This trail alternative continues along County 54 0.8 miles beyond Lee Lane south east to the intersection of Leisure lane at the Hidden Hills Development. At the intersection of Leisure Lane an at-grade crossing would be installed. The trail would then proceed north along Leisure Lane approximately 0.7 miles to the intersection of Leisure Land and Oakland Drive. At this point the trail would leave the Leisure Lane right of way and proceed the final 0.5 miles through permanent easement acquisition to the sound side of the MVRA.

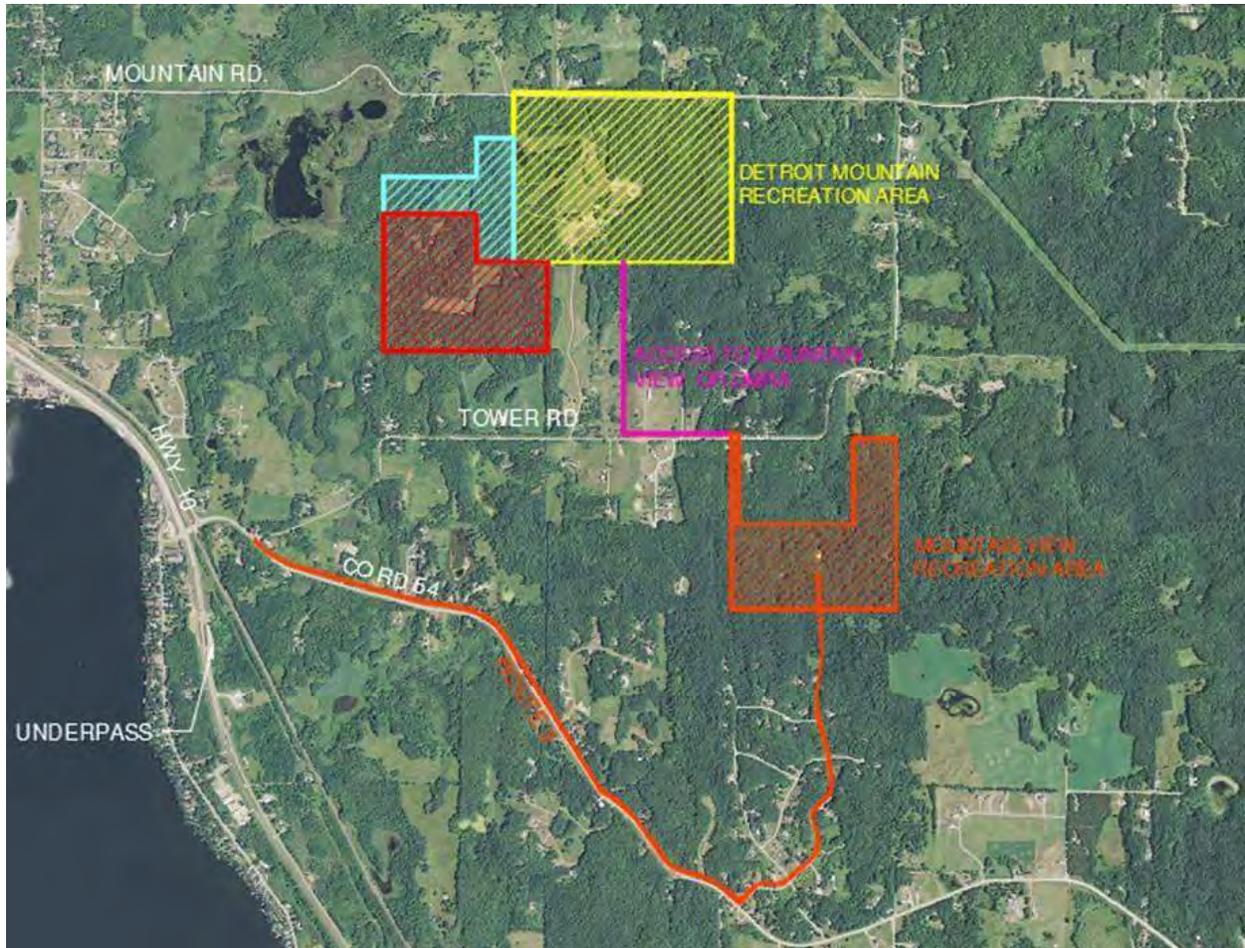


Figure 5

This route was identified because of the potential for the local residents of Hidden Hills and County 54 to utilize the trail network to travel not only to the recreational areas but also to the City of Detroit Lakes. However, due to the amount of easement acquisitions that would be required to properly design and construct the trail, this route is deemed unfeasible at this time.

## Route 4

In lieu of utilizing the existing underpass to connect directly to the Heartland Trail, this route begins at the City of Detroit Lakes designated bicycle trail network at the intersection of 8<sup>th</sup> Street South East and 11<sup>th</sup> Avenue. From this point, the multi-use trail would continue east along 8<sup>th</sup> Street 0.7 miles to the intersection of Highland Drive. The trail would then continue south along Highland Drive 0.3 miles to the intersection of Highland Drive and Meadow Drive. The trail would then continue east along Meadow Drive from approximately 0.8 miles to the end of the platted cul-de-sac. The trail would continue through private property requiring permanent easement acquisition along an existing trail to the west property boundary of the DMRA.

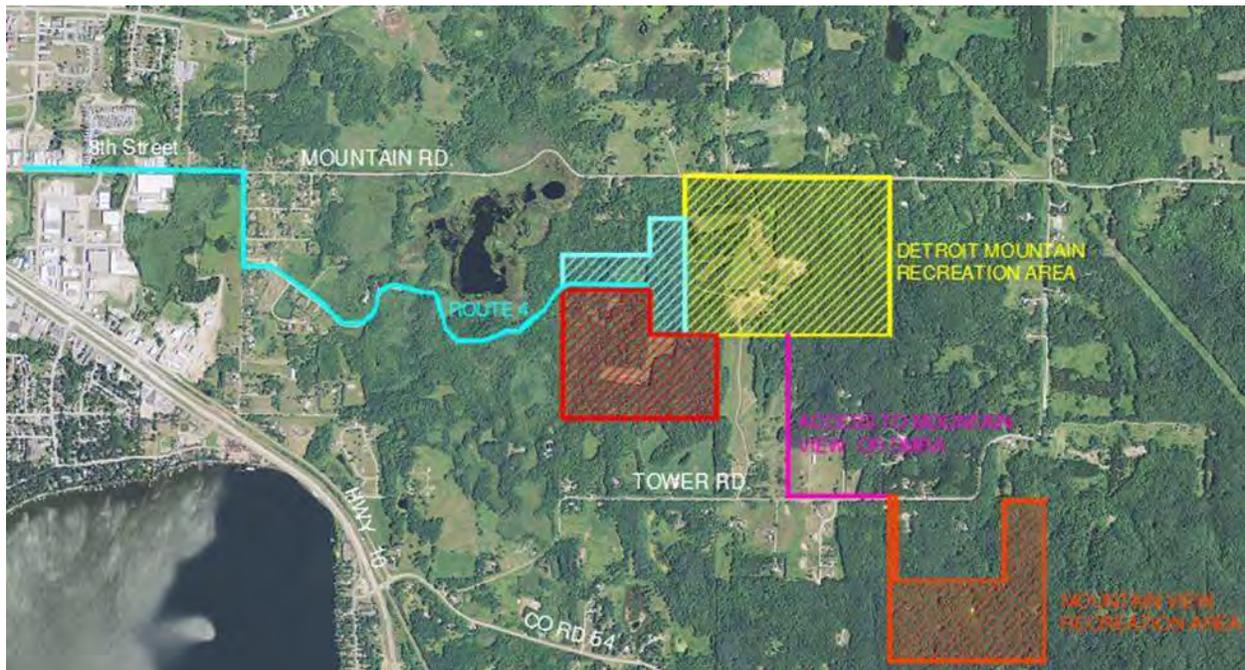


Figure 6

## Trail Design

This section provides specific design and implementation guidelines and standards to ensure that the multi-use trail is constructed to a consistent set of standards and specifications currently available. Ultimately, the trail must be designed to meet both the needs of the County and safety of the trail users. The challenge will be to provide an economical design that will not compromise the safety of the users or functionality of the trail.

Planning, design and implementation standards are derived from the following sources:

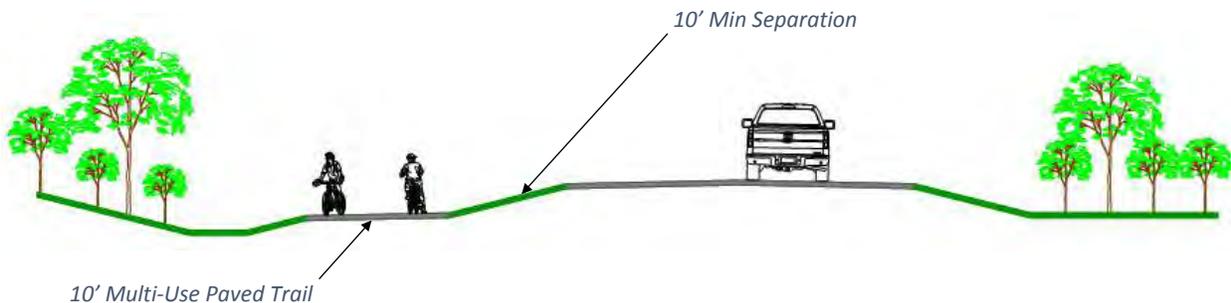
- Minnesota Department of Transportation (MnDOT) Bikeway Facility Design Manual, 2007

- Minnesota Department of Natural Resources Trail Planning, Design, and Development Guidelines, 2006
- Manual of Uniform Traffic Control Devices (MUTCD), 2009

The sources listed above provide details on many aspects of the trail that are not, in most cases, officially recognized “requirements” and also do not consider all conditions that will be met on the trail route. The provided design guidelines must be supplemented by the professional judgement of the trail designers and engineers.

### Recommended Width

The recommended width for a paved multi-use trail for two-way bicycle travel with light pedestrian use is a minimum of 10 feet, with a 2-3 foot unpaved shoulder.



*Tower Road and County 54 Typical*

### Easements

Acquisition of temporary and permanent easements will be required along the proposed corridor. It is anticipated that the temporary construction easements will be secured in the instance where the trail will be within the existing road right-of-way, but areas outside of the right-of-way will be disturbed during the construction of the trail. Permanent easements will be secured where the trail must leave the existing right of way in order to comply with the proposed design standards which will be discussed later in the document and in the future preliminary engineering report. The estimated amount of easement acquisitions can be found in Appendix A.

## Intersections and Crossings

The at-grade crossings should establish the right of way for the motorist and trail user through the use of signing (yield or stop), or traffic signals that can be activated by trail users. Trail approaches at intersections should have Stop or Yield signs to minimize conflicts with vehicles. Bicycle crossing stencils may be placed in advance to alert the oncoming vehicle traffic.

## Design Speed

Actual travel speeds on paved trails vary due to trail width, alignment and trail user expectations. The design speeds for a paved trail vary between 8 – 20 miles per hour (mph). Due to the width of the trail, sightlines and expected gradients this trail will be designed for 20 mph.

## Gradients

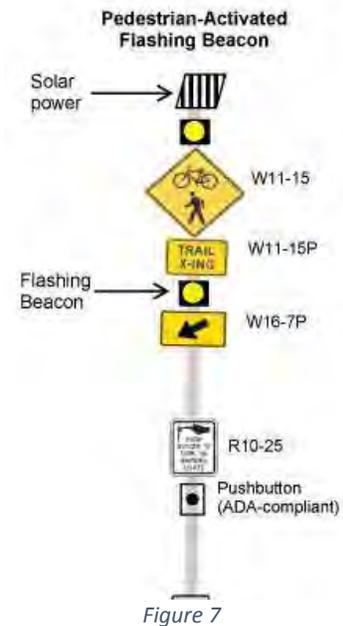
Trail gradient is one of the most important factors in designing a shared-use trail for recreational use. The overall gradient will often determine if trail users will become frequent users or not return due to the difficulty related to the steep gradients. Steep grades should be avoided, with a recommended 5% maximum gradient. Steeper slopes can be tolerated for short distances, for instance a 7% grade for 400 feet. The rolling terrain along the corridor will make fulfilling this requirement one of the determining factors of the final alignment and the amount of easement acquisition.

## Vertical and Horizontal Curvature

Stopping sight distance on horizontal curves and lateral clearance can be calculated using the equations in the American Association of State Highway and Transportation Officials (AASHTO) Guide. A minimum of a 100 foot horizontal curve and a 120 foot vertical curve is recommended at this time.

## Signing, Marking and Traffic Control Devices

Bike path, and bike route signing and markings should generally follow the guidelines as developed in the Manual on Uniform Traffic Control Devices (MUTCD). This includes advisory, warning, directional, and informational signs for bicyclists, pedestrians, and motorists. The final striping, marking, and signing plan for the trail will be resolved in the design phase of the trail, and should be reviewed and approved by a licensed traffic engineer or civil engineer.



## Public Outreach

Public Involvement included presenting the preliminary routes to the affected townships of Detroit, Erie, Lakeview and Burlington. Generally speaking all four townships were in favor of moving the project forward. Some of the concerns expressed are as follows:

- Allowing motorized vehicles on the trail such as all-terrain vehicles (ATVs) and snowmobiles. Erie Township has experienced problems with erosion damage on the in-slopes of the road due to ATVs and was concerned this project would increase those problems.
- All were concerned with project funding and if the townships would be asked to participate.
- Lakeview Township was concerned about where parking would occur for the potential trail users.

A public meeting was also held on March 22, 2016 to present the routing options to affected property owners along the preferred route as well as the general public. Similar to the township meetings, the general consensus was in favor of moving forward with the project. The complete meeting summary is located in Appendix B of this report. The major takeaways from the public meeting were:

- Safety along the proposed trail and at the intersections is the highest priority
- The portion along State Highway 10 from the underpass north to the CR 54 intersection will impact the existing snowmobile trail. Discussions will be had to come to an agreement to not impact the snowmobile trail.
- The purpose of this trail is to connect the recreational areas to the Heartland Trail, therefore it was their belief that the preferred route should be the shortest, and easiest route available.
- Out of the four routes that were shown, the preferred route was Route 1/1A.

## Phasing and Cost

The options outlined previously have been analyzed with the following criteria in mind:

- a) Width available in the right-of-way;
- b) Impacts on property owners and the ability to secure easements on their property;
- c) Functionality for users;
- d) Wetland impacts;
- e) Integration into existing bikeway routes;
- f) minimization of road-trail crossings.

## Phasing Strategy

To maximize the ability of Becker County to build the multi-use trail, phasing is proposed. The county can approach the construction of the trail in phases based on financing, ease of construction, easement acquisition, physical constraints, and other issues. One phasing strategy is outlined below:

Phase 1: The connection link between DMRA and MVRA. Minimal easement acquisition is required.

Phase 2: County 54, Tower Road alignment – Permanent and temporary easements will be require along a majority of the corridor.

Phase 3: Grade separated railroad crossing at County 54 – Requires cooperation with BNSF.

## Cost

The overall cost of the trail includes several components:

- Trail construction cost (not including fencing and trail/roadway intersection improvements)
- Trail design cost

The table below provides a breakdown of the anticipated trail construction costs. The estimated cost includes clearing a 20-foot wide area for trail development. A 14-foot wide area would be excavated to a depth of 6 to 8 inches with the material spread to the sides of the path. The trail would be 10 feet wide with a structure consisting of an 8-inch Class 5 gravel base and a 3-inch asphalt surface course. The shoulders would be 2 feet wide and consist of Class 5 material. No existing material would be removed from the site.

Segment Number	Length of Trail (Ft)	Total Cost
Segment 1	1,584	\$125,000
Segment 2	1,056	\$85,000
Segment 3	3,950	\$300,000
Segment 4	2,640	\$200,000
<b>Grand Total</b>	<b>9,230</b>	<b>\$710,000</b>

To develop an overall project cost, design fees of 8% and construction oversight fees of 7% of the estimated construction costs have been added as well as a construction contingency of 30%. This contingency is used to accommodate unforeseen conditions that arise during detailed design as well as construction. Because of the complexity of the corridor involved, it is recommended that a thorough, itemized design fee be developed once a concept has been chosen to provide a more accurate cost.

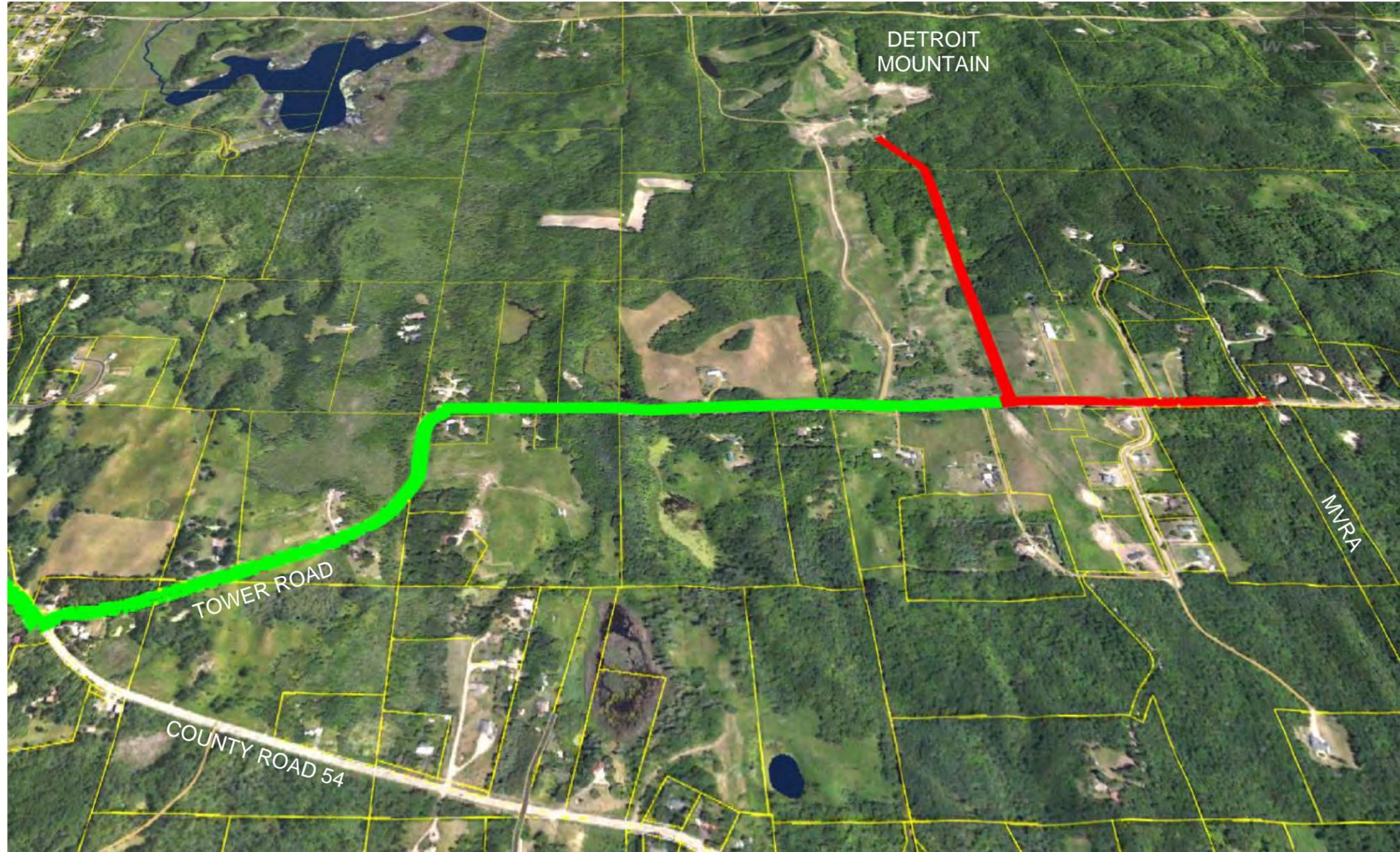
Costs related to easement acquisitions are not included in this estimate and would be developed at such time as the trail development moves forward.

## Next Steps

1. Work with property owners to ensure that the required easement acquisitions are possible and will not delay the future creation of the trail.
2. Confirm the status of the Heartland Trail alignment and design
3. Conduct a preliminary survey and engineering design to determine the best alignments to aid in easement acquisition.

4. Investigate funding opportunities for creating the trail, in a phased approach, or as a whole should an opportunity become available.

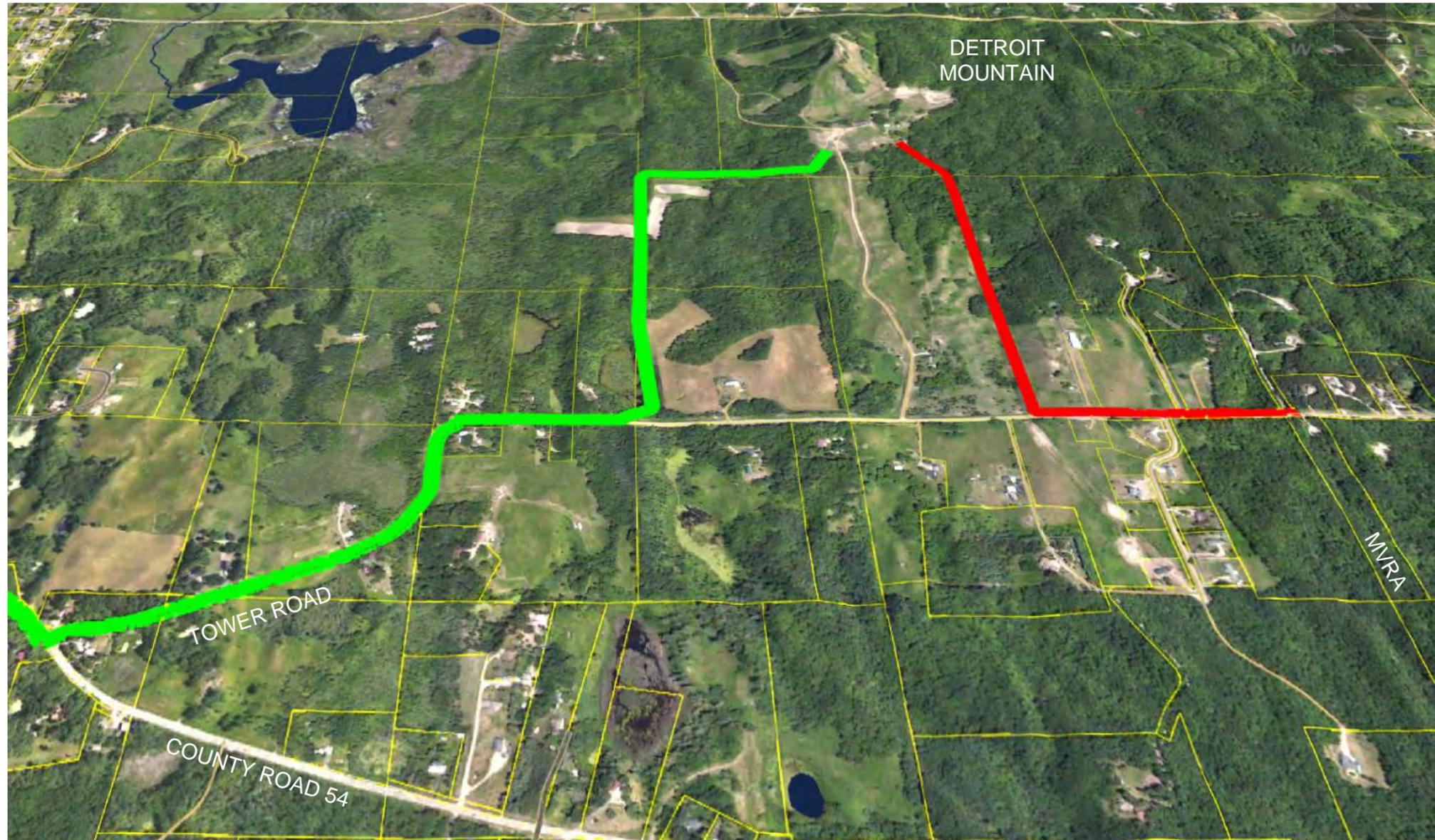
## Appendix A



**Ulteig**  
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**TRAIL FEASIBILITY STUDY  
 ROUTE 1  
 BECKER COUNTY, MINNESOTA**

DRAWN BY: CJB	SCALE:
CHECKED BY: BJK	NO SCALE
APPROVED BY: BJK	
DATE: Mar 23, 2016	UEI PROJ. NO: 15.01112



**Ulteig**  
 1041 Hawk Street  
 Detroit Lakes, Minnesota 56502  
 Phone: 218.846.7760  
 Fax: 218.847.2791  
 Web: www.ulteig.com

**TRAIL FEASIBILITY STUDY  
 ROUTE 1A  
 BECKER COUNTY, MINNESOTA**

DRAWN BY: CJB	SCALE:
CHECKED BY: BJK	NO SCALE
APPROVED BY: BJK	
DATE: Mar 23, 2016	UEI PROJ. NO: 15.01112

## Appendix B

**Becker County Shared-Use Trail Connecting DMRA & MVRA to the Heartland Trail  
Meeting Summary  
UEI Project No. 15.01112  
March 22, 2016**

**1. Attendees**

The Presenters were:

Guy Fischer – Becker County  
Tom Lundberg – MnDOT  
Brian King – Ulteig  
Casey Bekkerus – Ulteig

17 people attended the open house. The attendee list/sign-in sheet is attached to the end of the document.

**2. Comment Sheets**

Comment Sheets were provided to gather feedback. One comment sheet was completed and returned during the Open House. It was an anonymous submittal that read “Safety for families is critical along the entire route AND at the road crossings.”

**3. Public’s Questions & Concerns**

- Concerns were raised about the “Big Picture” and the intent of the connecting trail. The overall concern was that the MVRA would become private and passes would be required. *This study is only intended to connect the two recreational areas to each other and the Heartland Trail in the most efficient way. This study does not intend to change any of the uses inside the actual recreational areas.* The questions about if cross country skiing and the motorized electric wheelchair/scooter would fall under the definition of “shared-use” was asked. *The cross country skiing answer is not known at this time due to that agreements that would be required for grooming during the ski season. The trail will be ADA accessible so it is presumed that motorized electric wheelchair/scooters would be allowed.*
- Will horseback riding be allowed on the path? *At this time horseback riding will not be allowed on the paved trail.*
- The speed limit on County 54 in the area where the trail would cross County 54 onto Tower road is 45 MPH.
- Permanent and temporary Easements will be required for this project.
- Wetlands will be avoided where possible.
- Will this project eliminate the snowmobile trail access along Hwy 10 from the underpass to the County 54 RR Crossing?
- *At this time the is belief that an agreement will be reached for that portion of the trail that the two trails can coexist and snowmobile access will not be impacted by this project.*
- 

**4. Public Comments on Route Options**

- Route 3 through Hidden Hills was deemed unfeasible due to the length and the anticipated resistance to acquiring the permanent easements required to connect to MVRA.
- Route 3 would be the most expensive to build and maintain.
- The county commissioners agreed that the consideration of maintaining and repairing the trail in the future needs to be made when identifying the preferred route.
- The comment was made that since the purpose of this trail is to get to the Heartland trail, the shortest route to the destination was recommended, which is Route 1 and/or Route 1A.

- The comment was made that resale values of the homes with direct access to the trail will go up. That has been seen in other parts of the City of Detroit Lakes; another comment suggested that property values would go down (Hidden Hills - route 3 discussion).
- It appeared that Route 4 impacted the most wetlands and also US Fish and Wildlife Service Land, so people did not prefer that option.
- People agreed that the shortest route would be preferred for families wanting to make a quick family outing.
- Route 1 is approximately 2 Miles
- Comment made about the proposed trail surface crossing of Co. 54 from Tower Road per Route 1. Staff responded that a variety of options existed to increase the safety of that crossing including flashers. Comments made about current speed along 54 (40mph) and that it was fast.
- The question was asked about how many miles of existing bike trails exist within the city limits. *Approximately 23 miles.*
- The project cost, not include acquisition, is approximately \$710,000. Submission for the next Greater MN Regional Parks and Trails Commission (GMRPTC) funding cycle is June/July. The goal is to apply for all, or part, of the trail system.
- Questions were asked about the status of the Heartland Trail.

#### **5. Public Comment on the increase of Traffic on 305<sup>th</sup> Ave**

- One of the residents asked if any road/safety improvements were going to be made on 305<sup>th</sup> Ave. He was wondering if traffic counts were completed. A combination of the rolling terrain, the condition of the gravel road and the increase in traffic has made that stretch of road more dangerous. *He was urged to bring this to the attention of the township since it is a township road so they can approach the county.*



**OPEN HOUSE**  
**Becker County Shared-Use Trail Connecting DMRA & MVRA**  
**to the Heartland Trail**  
**Ulteig Project # R15.01112**  
**March 22, 2016**

NAME

COMMENTS AND CONCERNS

*Safety for families is critical along the entire route and at crossings*