TRIANGLE TRAILS PLAN

GALLATIN COUNTY • MT

ADOPTED
November 23, 2021

Triangle Trails Plan

Acknowledgments

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Chapter 1: Introduction

About This Plan

Project Area

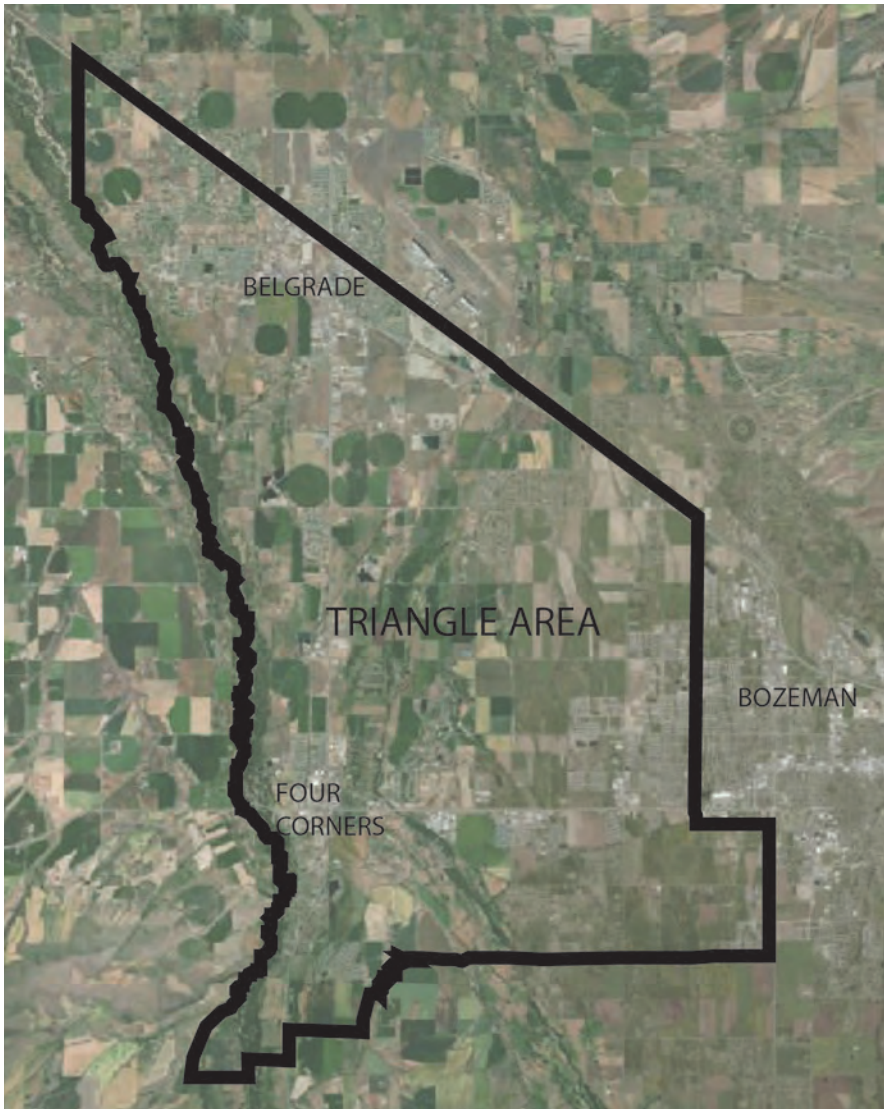
Gallatin County is one of the fastest growing counties in the western United States. According to the U.S. Census Bureau, Gallatin County's population was 67,831 in 2000, 89,513 in 2010, and 118,960 in 2020, the latest year for which population estimates are available. With an estimated 75% population growth since 2000, Gallatin County is rapidly changing.

The Triangle area of Gallatin County, which is generally the area between Bozeman, Four Corners, and Belgrade, is experiencing change as a direct result of this population growth. With its proximity to existing development and availability of public services, the Triangle area is expected to see a continued increase in development as Gallatin County's population grows. Recognizing its unique place in the County, the Triangle has been subject to several studies and plans over the past decade. Gallatin County, City of Belgrade, and the City of Bozeman all play a role in the development of the area. In 2016, these three jurisdictions created the Planning Coordination Committee (PCC) to focus on issues and opportunities within the Triangle.

The PCC was established through a Memorandum of Agreement (MOA) that outlined the need for coordination and communication between the City of Bozeman, the City of Belgrade, and Gallatin County, to support growth and development patterns as they expand in this area of the Gallatin Valley. The MOA identified issues around infrastructure, public safety, parks and trails, neighborhood design, and other land use concerns that would benefit from cooperative planning.

In 2019, the Planning Coordination Committee (PCC) developed the Triangle Community Plan to coordinate land use development patterns, deliver community services and infrastructure, and protect important environmental resources, all in a manner that supports community values and vision while responding to rapid growth pressures.

During the process to develop that plan, public comments highlighted the need to develop a coordinated trail plan for the area. The work to develop this Triangle Trails Plan is a direct result of the Triangle Community Plan.



Triangle Area

Plan Purpose

The Triangle Trails Plan will guide the development of non-motorized pedestrian and bicycle recreation and transportation infrastructure in future developments within the Triangle area. The communities of Belgrade and Bozeman have plans for trail connectivity, but the rapidly growing Triangle area of Gallatin County lacks a guiding document to ensure future trail development and connectivity. This plan serves as an extension and complement to the existing Belgrade Parks and Trails Master Plan and the soon-to-be-created and -adopted City of Bozeman Parks, Recreation, and Active Transportation Plan (PRAT).

Anticipating significant new public and private development in the Triangle Area, this plan creates the vision to ensure that a trail and pathway system for safe recreation and transportation is created over the long term. Developers, landowners, and homeowners will benefit from a clear, predictable, and inspiring vision for a trail, pathway, and linear park system.

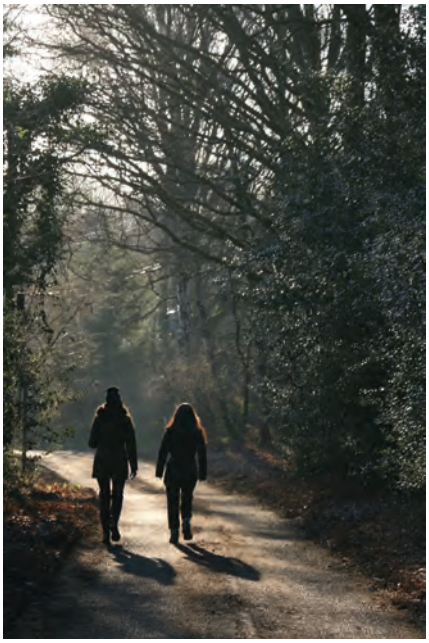
Project Goals

The project goals expand upon the purpose of the plan to further clarify the intent and anticipated outcomes of the planning process. The project goals are:

- Create a vision for guiding future trail development and connectivity
- Identify key corridor and connections within the Triangle area
- Provide clear and predictable expectations for developers, landowners, and homeowners for trail and pathway development
- Propose implementation strategies to guide Gallatin County, Belgrade, and Bozeman in the completion and maintenance of the proposed trail network

Partners

Gallatin County and the Gallatin Valley Land Trust are leading this effort with support from the City of



Belgrade and the City of Bozeman.

Plan Vision

The plan vision is an expression of the partners and community's desired future for trails in the Triangle Area. The five themes below capture what community members most value about trails, recreation and their community, and articulate a shared vision of what they want their trail system to become. During the fall of 2020, through a series of stakeholder meetings and a public virtual open house, the following themes emerged to create these vision statements.

Connected Network

The trail network should connect communities and neighborhoods to places people want to go with continuous routes and convenient connections. This includes destinations such as home, school, employment, shopping, recreation, public services and transit. The existing and proposed multi-use trails should connect seamlessly to the greater transportation and recreational trails networks.

Safe and Welcoming

Routes should be physically safe and perceived as safe and welcoming by all users. Safe means minimal conflicts with vehicular traffic and easy to navigate routes that are well marked.

Inclusive for All

Trails should accommodate the non-motorized mobility of residents of all ages and abilities. The network should employ principles of universal design.

Consistent Standards

The network should use consistent standards that span across jurisdictions.

Achievable Implementation

The plan should establish clear and economical methods for completing the network to complement adjacent private development.

Definitions of Terminology

Below are definitions of terminology as the words will be used in this plan. These definitions align with those found in state and local laws, widely accepted industry sources and technical manuals associated with trail and transportation systems.

ADA: The 1990 Americans with Disabilities Act (ADA) is a landmark piece of legislation designed to ensure a more inclusive America, where every person has the right to participate in all aspects of society. One aspect of the legislation is defining accessibility standards for public infrastructure such as sidewalks, crosswalks, and other transportation facilities like trails. The Trail Use Classification and Characteristics standards in Appendix D addresses ADA trail accessibility.

Active Transportation: Active transportation is a means of getting around that is powered by human energy, primarily walking and bicycling. As opposed to 'non-motorized transportation' the term 'active transportation' expresses the key connection between healthy, active living and our transportation choices.

Bicycle: Bicycles are a vehicle propelled primarily by human power on which any person may ride irrespective of the number of wheels, except scooters, wheelchairs, and similar devices. The term includes e-bike.

E-Bike: E-bike means an electronically assisted bicycle on which a person may ride that has two tandem wheels and an electric battery capable of propelling the bicycle and an average rider no faster than 20 miles an hour on a level surface.

Equestrian: Equestrians are skilled horseback riders. Equestrians generally use soft surface trails for traveling by horseback for the purpose of transportation or leisure.

Micromobility: Micromobility describes a category of transportation modes utilizing light weight devices operating at speeds below 15 mph, ideal for short trips. Devices include shared and personal scooters and bicycles (both human-powered and those with electric motors, both docked and dockless), skateboards (both human-powered or with electric motors), and hoverboards (electric powered one or two-wheeled boards like a Segway without a handle).

Multimodal Transportation: Multimodal transportation incorporates diverse transportation options, typically including walking, cycling, public transit and automobiles. Multimodal transportation planning accounts for the differing capabilities of various modes, including their availability, speed, density, costs, limitations, land use factors that affect accessibility, and therefore their most appropriate uses.

Natural Fines: Natural fines are a finely crushed stone mix that provides a user-friendly trail surface for all types and ages of visitors, including strollers, wheelchairs, and bikes. If built properly natural fines trails can meet the specification for a "firm and stable" surface as defined in current federal guidelines for accessible trails.

Trails are an integral part of the Gallatin Valley's quality of life

Non-Motorized Transportation: Non-motorized includes any form of transportation that provides personal mobility by methods other than a combustion motor.

Pedestrian: A pedestrian is any person on foot or any person in a manually or mechanically propelled wheelchair or other low-powered, mechanically propelled device designed specifically for use by a physically disabled person.

Shared Use Paths: Shared use paths are a type of trail designed to be part of the overall transportation system by providing dedicated and separated non-motorized travel routes for a variety of users.

Trails: Throughout this plan the terms 'trail' and 'trails' are used generally to reference any type of trail or path. When referring to a certain type of trail more specific names will be used such as "natural surface trail" or "shared-use path".

Universal Design: Universal design is the design of buildings, products or environments to make them accessible to all people, regardless of age, disability or other factors.

Walkable: The term 'walkable' refers to streets, trails, and places designed, constructed, or reconstructed to provide safe and comfortable facilities for pedestrians of all ages and abilities.

Wayfinding System: A wayfinding system is an integrated collection of user-friendly informational signage that convey consistent accurate information for trail users about navigation, direction, destinations, distances, and etiquette. A comprehensive wayfinding system is an essential element of a community trail network.

"Trails have been shown to improve quality of life, promote health, sense of community, and more. When communities invest in trails, they are also building a trail culture. Outdoor recreation opportunities attract new residents, new businesses, and create a sense of pride for the communities that build them.

Trails bring people together by building a social infrastructure that bonds its citizens by bringing them outdoors."

-- Why Trails? - American Trails

The Importance of Trails

Community Values

Trails were consistently prioritized as highly valued community amenities during public outreach for the Triangle Community Plan. As detailed later in this plan, trails for recreation and transportation are top community priorities identified in numerous local planning documents including Envision Gallatin, Belgrade Growth Policy and the Bozeman Community Plan.

"Walking is man's best medicine" – Hippocrates

Trails provide people an enjoyable, and healthy way to move throughout our communities. They are important safe routes to and from schools, parks, and playgrounds. Trails build social capital by connecting neighborhoods to one another. They provide efficient connections between commercial districts for work and commerce. Trails increase property values of adjacent homes and businesses.

A robust trail system promotes active transportation and delivers the community a triple-bottom line of socio-cultural benefits, public health benefits, and environmental benefits.

Inclusive and Accessible

To develop an inclusive trail system that serves the differing needs of trail users, consideration should be given to providing trails that serve various age groups, modes of travel, universal accessibility, and ability levels from beginners to advanced.

- Provide a diversity of trails and trail linkages to promote walking, biking, and micromobility as both a recreation activity and a transportation option.
- Provide staging and parking areas at neighborhood and regional parks with trail access for all users.
- Develop all new Commuter Trails and most Connector Trails to exceed the minimum ADA standards for accessibility to create a variety of exceptional active transportation and recreation opportunities for those with mobility challenges.

> "Trails, by their very nature, promote social, racial, gender, and economic equity. They are almost always free to use, are available 24/7/365, and provide transportation alternatives no matter what mode of travel you use."
>
> --Trails Move People Coalition

Healthier Lifestyles

The 2007 Bozeman PROST Plan established that the local trails are the City's most utilized recreation facilities. This is not unique to Bozeman, as throughout the country walking and biking on local trails are low-cost, low-impact recreation and exercise options for people of all ages and abilities.

In 2020 American Trails published a guide highlighting the health benefits of trails:

Mental Health Benefits of Trails

- *Spending even 20 minutes outside will have short term effects on the brain to reduce stress.*
- *Countless studies show people self-reporting reduced stress, clearer thought patterns, more optimism, and an overall heightened sense of well-being after being outdoors.*
- *We are now seeing more medical practitioners prescribe time in the outdoors as a way to combat depression, anxiety, and other health related issues.*

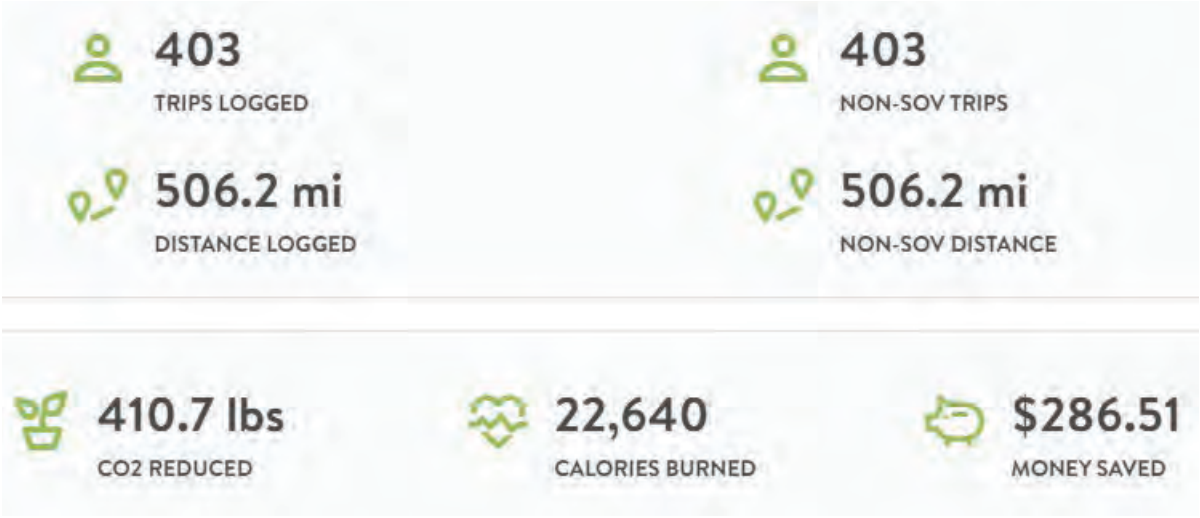
Physical Health Benefits of Trails

- *For every dollar spent on trails, there is a three-dollar savings in health care* costs.
- *More overall physical activity is measured in communities after trails are built.*
- *Cardiovascular benefits are seen across all trail user types. This means healthier hearts, and a reduction in preventable disease for trail users.*
- *Commuting by foot or bike gains popularity when trails go into a community. This both reduces traffic and creates a healthier, more physically active community.*

Transportation Choices

People make transportation choices based on a variety of issues like cost, convenience, environmental impacts, and personal health. Financial considerations include cost of owning (car loan, insurance) and operating (gas, maintenance, parking) a personal vehicle. For some it may be more convenient to drive because of the distance between destinations. While others may find it inconvenient to drive because of traffic. Choosing to commute by walking or bicycling is part of a healthy lifestyle for some.

A safe, well-maintained, connected trail system provides more residents with the option to walk or bicycle as a primary means of transportation. Whether for work or accessing goods and services, the better the trail network the more residents will choose active transportation as a less expensive, healthier, and environmentally friendly option over driving a personal vehicle.



Example of one Bozeman resident's annual cost savings, CO2 reduction, and health benefits from commuting by walking and biking as calculated by Go Gallatin www.gogallatin.org

What is Active Transportation?

"Active transportation is a means of getting around that is powered by human energy, primarily walking and bicycling. Often called "non-motorized transportation," we prefer the term "active transportation" since it is a more positive statement that expresses the key connection between healthy, active living and our transportation choices.

Communities that prioritize active transportation tend to be healthier by enabling residents to be more physically active in their daily routines and by having cleaner air to breathe. Active transportation systems also foster economic health by creating dynamic, connected communities with a high quality of life that catalyzes small business development, increases property values, sparks tourism and encourages corporate investment that attracts a talented, highly educated workforce."

--Partnership for Active Transportation

Chapter 2: Proposed Trail System

Overview

The proposed network outlined in this chapter was developed through input obtained during the virtual open house, meetings with project stakeholders, consideration of previous planning efforts, and the analysis of existing conditions and constraints within the Triangle. The existing land uses will guide how development of the trail network is completed. **For properties that are undeveloped and/or used for agricultural purposes, proposed trails will only be developed if the landowner chooses to build those trails. Otherwise, future trails will only be constructed with the development of the private property or as part of public right-of-way projects.**

This plan is intended to be used for future planning, as well as a resource in the development review process. This plan will guide community decision-makers when properties are proposed for subdivision and development. The plan maps show approximate locations of future trail corridors, based on ideal locations, that will meet the vision of the plan and serve existing and future residents if these properties are developed. However, trail network expansion and connectivity will be prioritized before strictly following the exact trail alignment depicted in this plan.

If property owners choose not to develop their land, the trails shown on the maps will not be created unless the property owners voluntarily agree to do so. Future trail corridors are not shown through areas that are already built out. If any of these areas are redeveloped at higher densities, trail connections should be considered. Because future growth patterns cannot be fully anticipated, future trails may need to be constructed in locations other than those shown on the plan maps. Additionally, trails within developments and neighborhoods are not shown on the map but should be included and designed as a best practice for developments. Only connectivity priorities are shown on the map.

Trails promote active transportation and healthy lifestyles

"Shared use paths should be thought of as a system of off-road transportation routes for bicyclists and other users that extends and complements the roadway network.

Shared use paths should not be used to preclude on-road bicycle facilities, but rather to supplement a network of on-road bike lanes, bicycle boulevards, and paved shoulders."

--AASHTO Guide for the Development of Bicycle Facilities

Guiding Principles

The overall vision of the Triangle Trail Plan is to develop an integrated, connected trail network and develop implementation strategies to construct and maintain the network. Key components of this visionary trail system include:

- Connectivity (between places people want to go)
- Safety (decrease conflicts between users and vehicles)
- Inclusivity (surfaces, abilities, user groups)
- Consistency (in and between jurisdictions)

User and Trail Typologies

Establishing clearly defined typologies of trail users and trail facilities is critical to identifying which trails best serve the intended uses and users. The typologies established below are intended to not only provide common nomenclature for this and future plans, but also to identify consistent characteristics. Appendix D: Trail Classifications and Design Standards establishes physical specifications for each trail type including width, grade, cross-sections, and materials.

User Typologies

To strategically plan a trail network, consideration must be given to the types of users based on activity, ability, and mode of mobility. Identifying and understanding the wide- ranging uses, differing abilities, and a variety of modes inform trail location, typology, design standards, associated amenities, and required maintenance.

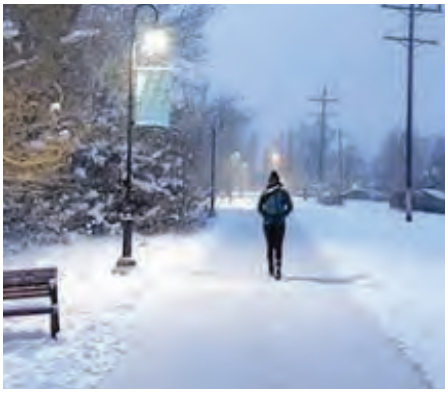
The primary trail users are pedestrians and bicyclists, both groups are categorized and described below in terms of utilitarian, recreational, and family characteristics. Defining attributes common between groups and categories include age, ability, and purpose.

People with disabilities are an essential user group that must be considered and accommodated with accessible trail design of commuter trails and most connector trails, maintenance standards, and trail etiquette.

To help ensure the safety of the listed user groups, motorized vehicles, including ATVs and snowmobiles, should not be permitted on any of the trails proposed in this plan. Regulation of users will ultimately be the responsibility of the appropriate jurisdiction for which the trail is located.

Pedestrians

Pedestrians are one of the primary users of the trail system. People walk for a variety of reasons which are generally described below. The needs of pedestrians for a safe and welcoming environment must be considered for each of the three trail types. Those needs are better understood by identifying the defining characteristics of the three types of pedestrians.

Utilitarian Pedestrians	Recreational Pedestrians	Family Pedestrians
		
People walk with the purpose of commuting to work or school, traveling for everyday services, or as a primary means of transportation. Often this kind of walking is done using the existing sidewalk system. But given the opportunity, utilitarian pedestrians will utilize connector and commuter trails. Utilitarian pedestrian trips typically involve a single individual and range in length from a quarter mile to two miles. Therefore, it is important that logical connections are made between trail and sidewalk networks to provide efficient and safe travel routes. A comprehensive wayfinding system is essential to communicate distance and directions.	Many people use the different trail types for recreational purposes which includes walking for enjoyment and exercise. This type of pedestrian utilizes both the trail and sidewalk networks but likely prefers trails if conveniently located and well maintained. Recreational walking involves single individuals or often pairs of people. Recreational outings vary from a quarter mile to many miles (particularly for exercise). Runners are included in this user typology and they travel at higher speeds and for longer distances than their walking peers. Recreational pedestrians need some comfort amenities, like benches, and benefit from a comprehensive wayfinding system.	Families include the widest range of age groups including small children and elderly walkers. Because of this diversity of ages, trails for family- oriented pedestrians should accommodate all ability levels. To be adequately inclusive, the trail system must include properly constructed and maintained connector trails and commuter shared-use paths. Family pedestrian groups usually number between two and six walkers that often move at a slower pace than the other pedestrian types. Trails intended for family pedestrian use should incorporate more amenities such as benches, trash- recycling receptacles, and adjacent places to linger, interact and rest.

Bicyclists

Bicyclists are the other primary user typology frequenting the trail network. The variety of cycling users can be characterized similarly to the pedestrian typologies. People of differing ages and abilities bike on each of the trail types requiring a range of needs to be considered when planning, constructing, and maintaining the trail system. Whereas the speeds at which pedestrians, including runners, is fairly uniform, bicyclists travel on trails at a wide range of speeds from 5 to 20 miles per hour.

Utilitarian Bicyclists	Recreational Bicyclists	Family Bicyclists
		
Many people commuting to work or school, traveling for everyday services, or choosing not to drive prefer the efficiency of biking. Utilitarian trips can be longer and completed more quickly by biking than walking. The increased mobility enjoyed by bicyclists often involves linking the street network and trail system for longer trips sometimes more than five miles. Commuter trails are critical infrastructure for utilitarian bicyclists and require a comprehensive wayfinding system that provides accurate directional and distance information.	People bike for recreational enjoyment and exercise on all the trail typologies. Recreational bicyclists often use the street network to access the nearest trails but are less comfortable riding on streets without bike lanes. Recreational bike trips can be a short as half a mile to well over ten miles when for exercise. This group of users often ride in groups of two or more, but do not need many trail amenities other than a comprehensive wayfinding system.	Bicycling is a popular family activity on the trail system involving children, parents, and grandparents. Considering the needs of the youngest and oldest bicyclists is essential to an inclusive community trail network. Ability level and group size vary greatly with family bicyclists so properly sized and surfaced connector and commuter trails are essential. These trails must also be supported by amenities including benches, trash- recycling receptacles, and generously sized areas adjacent to the trail where families can rest and socialize without blocking the trail itself.

Other User and Mobility Typologies

Trail users and their travel modes are more diverse than the utilitarian, recreational, and family typologies described above. Below are some additional users and modes that must also be considered. The best way to inclusively manage all these users and modes is by establishing a code of trail etiquette clearly educating, and prominently reminding, all trail users of the rules.

Electric Bicyclists	Rollers	Cross Country Skiers
		
Electric bikes are becoming more common for utilitarian uses. How the trail network accommodates e-bike and mitigates potential user conflicts need to be considered as part of planning, building, and operating a robust trail system. Gallatin County, the City of Belgrade and the City of Bozeman should develop unified standards for the use of e-bikes in order to create consistent expectations and safety through the greater trail network.	The trail system is also used by people using inline skates, skateboards, kick scooters, and electric scooters on commuter trails. Paved shared- use paths should be designed, constructed, and maintained to safely accommodate all these modes. People use these other modes on commuter trails for recreational and utilitarian purposes, just like pedestrians and bicyclists.	During the winter season, people commonly cross- country ski on neighborhood and connector trails. And like the other user types, cross country skiers range in ages and abilities.

Dog Walkers	Equestrian
	
Dogs may love trails more than their owners, so their needs and the dynamics they create should be considered when planning and maintaining an inclusive network of community trails. Most notable is the necessity to provide and maintain dog waste stations along all trail types. The number and frequency of dog waste stations are critically important to keeping trails clean for all users.	Equestrian and horseback riding have always had a presence in Gallatin County. Equestrian use would be appropriate for neighborhood trails, but not for commuter or connector trails. Subdivisions and neighborhoods that include equestrian facilities as part of their trail development will need to develop strategies for minimizing conflicts between users, appropriate trail maintenance and using signage for clarifying appropriate use of trails.

Trail Typologies

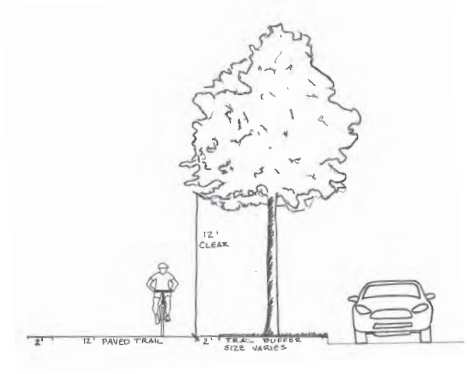
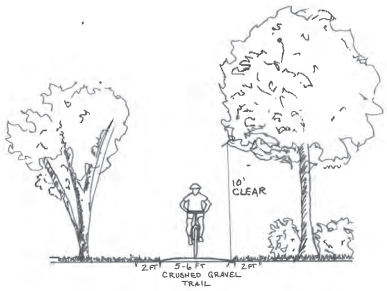
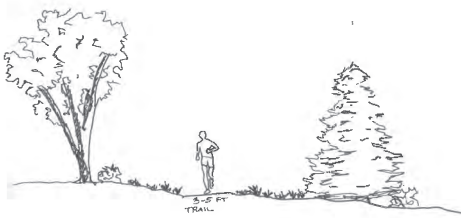
The 2017 Bozeman Transportation Master Plan recognizes two off-street active transportation facility types: shared-use paths and natural surface trails. The more recent Triangle Community Plan identifies three types of trails:

> "Non-motorized transportation systems will be a priority and developed at three levels: neighborhood trails that connect locally to parks and open space; connector trails that connect together meaningful destinations, such as neighborhoods, schools, and hubs of commercial activity; and commuter pathways that connect larger community nodes."

The Triangle Trails Plan adopts and perpetuates the three trail typologies from the Triangle Community Plan—neighborhood, connector, and commuter—as described in the following table. To reiterate, trails of all types are off-street transportation facilities and should not preclude on-street bicycle facilities such as bike lanes, bicycle boulevards, and paved roadway shoulders.

"A variety of trail types are essential to build a comprehensive multi-modal trail network"

	Commuter Trails	Connector Trails	Neighborhood Trails
			
Description	Commuter trails are wide with durable surfaces intended for higher speed travel between community destinations. Commuter trails are categorized as Class I trails that are between 10 and 12 feet wide shared-use path constructed of an impervious surface such as asphalt or concrete. Commuter trails are separated facilities from adjacent streets and roadways. Ideally a network of commuter trails would connect major points of origins, such as subdivisions, with primary destinations, such as commercial districts.	Connector trails are generous in size and constructed of natural materials that connect neighborhood destinations such as housing, schools, and commercial hubs. Connectors are classified as Class II trails that are 6-foot wide ADA accessible surfaces of natural fines or compacted crushed gravel. Connector trails provide critical access as network extensions to and from commuter trails.	Neighborhood trails are soft surfaced, local paths. These trails are classified as Class III trails that range between 4 and 6 feet wide and may be established over time by repeated use. Neighborhood trails are to be designed and constructed as part of future subdivisions. When possible, they should connect to neighborhood parks and the larger trail system.
Uses	This portion of the trail network is intended to facilitate traveling longer distances as efficiently as possible.	These multi-use trails are used for both recreation and commuting.	These trails provide connections within neighborhoods and connect to parks and nearby community amenities.

	Commuter Trails (cont.)	Connect Trails (cont.)	Neighborhood Trails (cont.)
Maintenance	For maximum utilization for commuting, shared-use paths need to be plowed in the winter and swept of debris in the spring. Otherwise, maintenance involves periodic asphalt sealing and patching. These trails accommodate heavy bi-directional multi-use in a safe manner.	Connectors need annual maintenance involving weeding, tree trimming, raking, and periodic application of additional surface materials.	The maintenance is minimal with occasional vegetation trimming.
Design Summary*	Trail Width: • 10-feet surface with 2-feet shoulders Grade: • Up to 5%, some short sections up to 12.5% Material: • Asphalt or concrete • Porous surfaces used in sensitive areas	Trail Width: • 6-8 feet surface with 2-feet clear area Grade: • Up to 5%, some short sections up to 10% Material: • ADA acceptable surface	Trail Width: • 4-6 feet surface Grade: • To follow natural topography and provide positive drainage Material: • Natural surfaces
			

Complete design recommendations are located in Appendix D

Proposed Network

The expansion of the trail network will provide recreation and transportation opportunities throughout the Triangle Area. The proposed network maps identify new Commuter and Connector trails. New neighborhood trails are not shown on the plan maps, as they are intended to be designed and built within future development.

Proposed trail alignments shown are a 'planning level' representation of intended routes, which provide connections between destination points, and desirable trail experiences for a variety of users. In the final implementation of proposed trails, adjustments and modifications to the alignments shown are expected. Such adjustments may be required to navigate environmental features, avoid wildlife habitat, accommodate landowner desires, jurisdictional requirements, and complement future land development projects. These adjustments should be expected and accommodated, so long as the adjustments do not compromise the original intent of the planning level alignment.

Commuter Trails (Class I)

Because commuter paths are generally designed for higher speeds and longer travel distances, these routes are generally shown to follow existing and future street corridors. When identifying which corridors were most suitable for commuter paths, emphasis was placed on the following:

- Existing multi-use paths
- Proximity to community facilities such as schools, parks, and commercial areas

The commuter trail network seeks to connect all portions of the Triangle area with the greater Gallatin Valley. Many of the routes shown on the plan maps extend beyond the boundaries of this plan and form the heart of a larger regional trail system. Where there are existing trails along the proposed routes, efforts should be made to improve trails for safety and accessibility as needed.

Connector Trails (Class II)

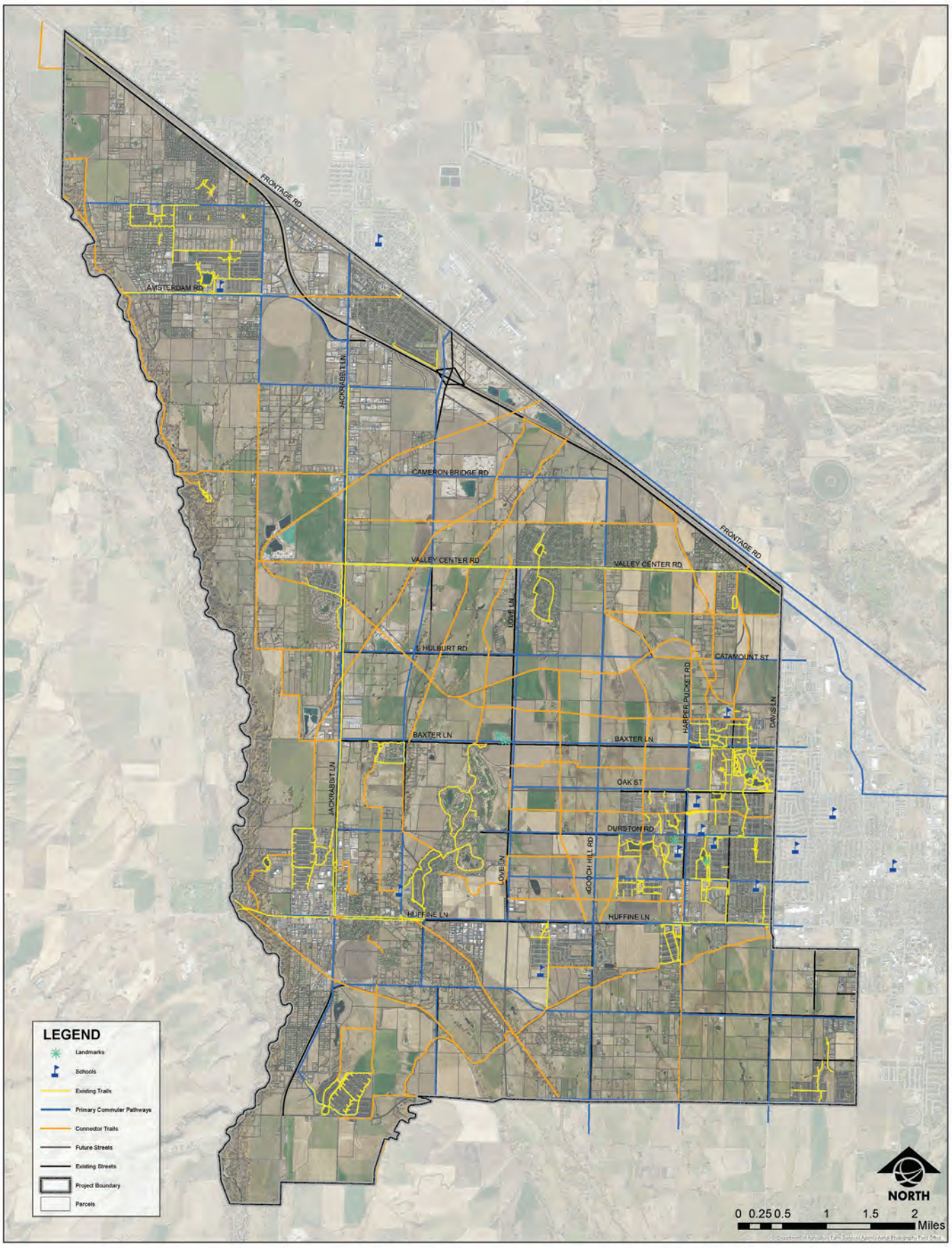
Connector trails are both transportation and recreation oriented and should provide connections to schools, neighborhoods, parks, points of interest, and other transportation nodes. These trails are typically natural surface trails and are independent of the road network. They may bisect parks and open space, as well as parallel natural features, such as streams and other watercourses.

Connector trails provide an important function within the Triangle. These trails can provide connections throughout the community and where possible, should be separated from the street network. These trails can be located in natural environments, enhancing the community's desire for livability and promote public health. As development occurs within the Triangle area, connector trails can be designed to limit street crossings, thus reducing conflicts, and increasing safety.

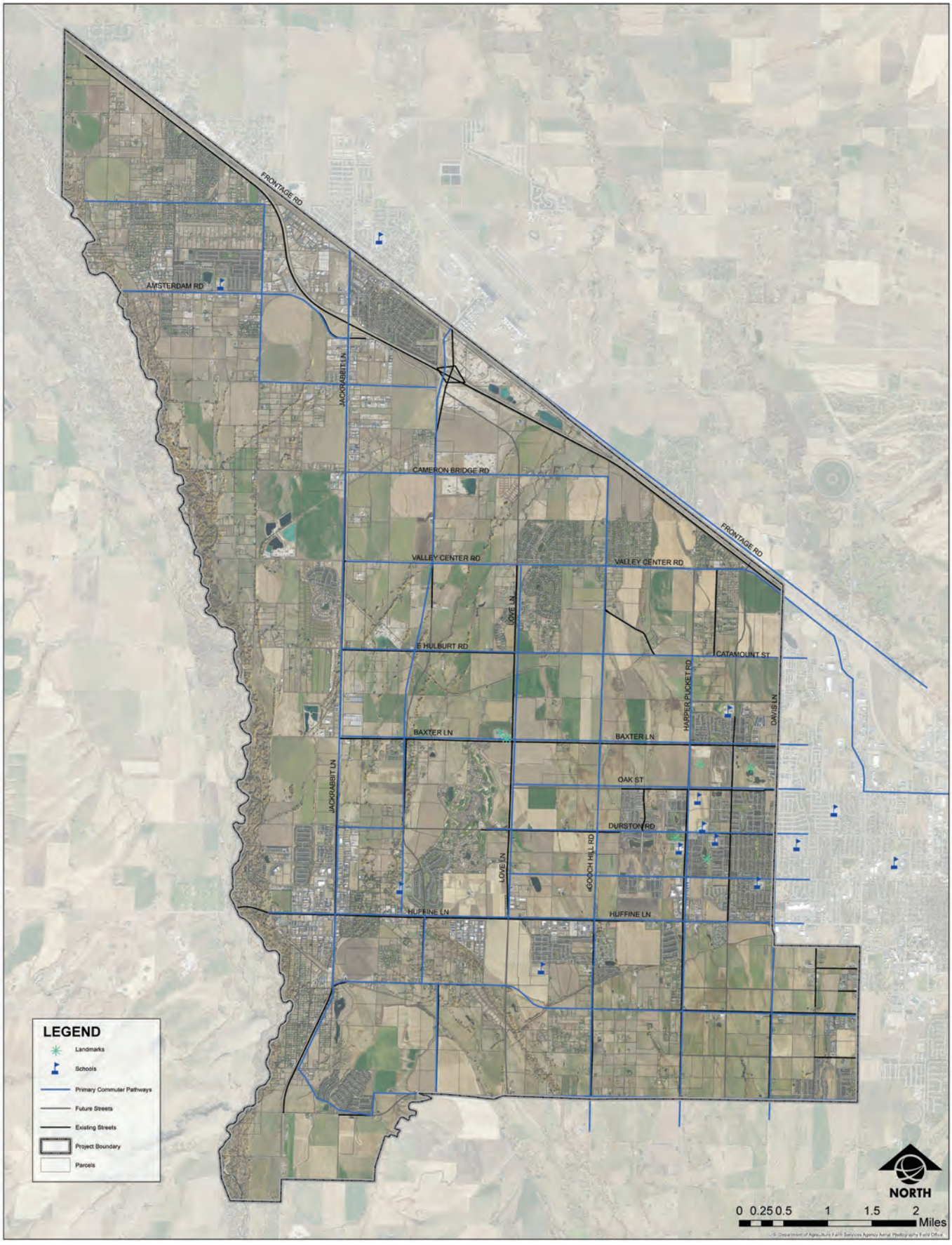
Neighborhood Trails (Class III)

Neighborhood trails connect community features within neighborhoods, such as nearby open spaces, commercial developments, parks, and schools. Neighborhood trails within future developments are not shown on the proposed trails maps because they should be designed and built as part of the neighborhood infrastructure. The following are key considerations for future neighborhood trails:

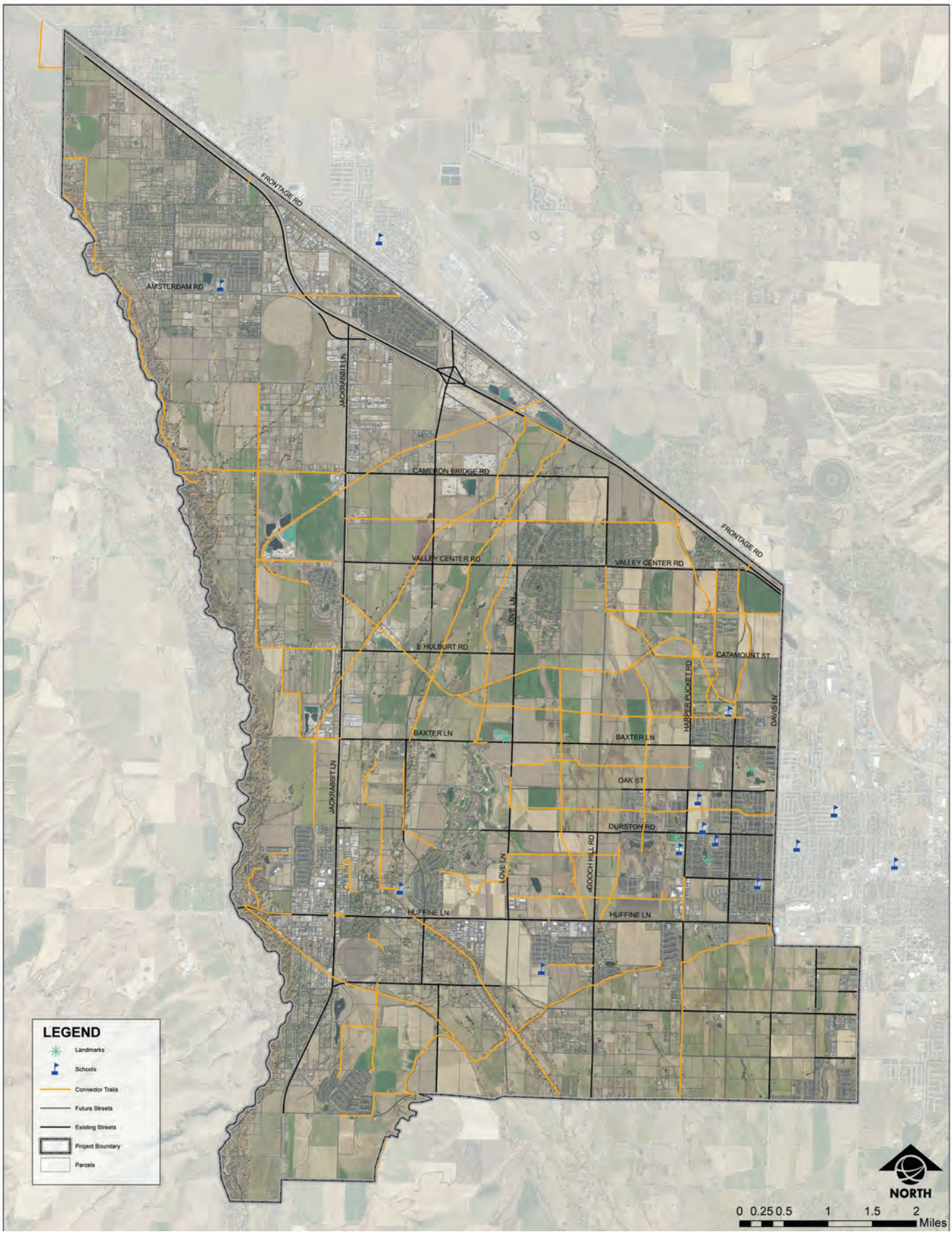
- Trails should be designed as part of a neighborhood's transportation system
- When combined with parks and open space, trails play a vital role in supporting the recreational needs of a neighborhood
- Trail should connect with adjoining neighborhoods, as well as adjacent Commuter and Connector Trails
- Trails should be designed to accommodate a variety of users
- Consider year-round trail use and plan appropriate maintenance
- Provide amenities suitable for the neighborhood and anticipated users



Proposed Triangle Trails Map



Proposed and Existing Triangle Trails Commuter Trails



Existing and Proposed Connector Trails

Chapter 3: Standards & Guidelines

Crossings and Roadway Interfaces

The Triangle area includes US Highway 191 (Huffine Lane), State Highway 85 (Jackrabbit Lane), I-90 Frontage Road and other significant arterials roads. These highways carry a significant volume of semi-trucks and passenger vehicles, which makes crossing these roads a challenge. To improve user safety and trail connectivity between communities within the Triangle, at-grade and grade separated crossing improvements need to be considered at trail and arterial intersections.

At-Grade Crossings

Of the three crossing options, building an at-grade crossing may be the least expensive. As many of the trails in the Triangle area cross arterials and major collectors that carry high volumes of traffic, these crossings may be a cost-effective solution since they can be used at signalized intersections. To maximize the safety of at-grade crossings for trail users, crossings will include clear signage, curb cuts, highly visible crosswalks through the intersection, and minimized sight obstructions.

Grade Separated Crossings (Elevated or Underpass)

When trails need to cross higher speed roadways, grade separation is required for safety. Trail bridges can be expensive as additional property is needed to build the ramps and meet height requirements. Tunnels and underpasses are additional solutions to safely separate trails from high volume/high speed roadways. The viability of tunnels and underpasses is dependent on the number of underground utilities, the level groundwater in the area, and soil conditions. Several tunnels have been built recently within the Triangle area, including under Huffine Lane at Monforton School Road and under Jackrabbit Lane just north of North Star Lane.

Watercourses and Irrigation Ditch Protection

Gallatin County, the City of Belgrade and the City of Bozeman all require the protection of watercourse corridors through the provision of setbacks. These setbacks protect bank stabilization, reduce stream sediment and pollution, accommodate habitat conservation, and assist with flood management. While designated setbacks may vary based on the type of stream, water corridor, or wetland, the intent is to protect water quality and other ecological values. The following recommendations should be considered for protection of riparian areas when it is not feasible to meet the setbacks.

- Align trails along or near existing human-created edges or natural edges
- Consider critical habitat and ensure appropriate buffer and separation.
- Provide diverse trail experiences so that trail users are less inclined to create trails of their own.
- Ensure that trails do not impede the operation and maintenance of water conveyance facilities.

While new buffered trails along ditches are identified as priority routes within this plan, developers should be mindful of the important agricultural use of these conveyance systems in the Triangle Area and beyond. Trails along irrigation ditches should be located outside of the ditch and maintenance easement. Natural buffers of parkland or open space flanking trails along ditches can allow for regular maintenance access and mitigate potential adverse impacts from adjacent development. This approach will address potential safety concerns and reduce conflicts with regular ditch operations and maintenance. Projects that wish to build new trails parallel to ditches should consult with the ditch owners on an appropriate alignment and separation.

Trailheads

Trailheads provide an opportunity to offer amenities, provide wayfinding, and create trail access. The size and type of trailhead depends on location, need and expected user groups. Three levels of trailheads are outlined below, ranging from the smallest with limited amenities to the largest with the most amenities.

Small	Medium	Large
		
Small trailheads can be located at the beginning or connecting point to the trail system. The primary intent of small trailheads are to provide wayfinding and route finding. Recommended Amenities: • Identification Sign • Wayfinding Map or Orientation Exhibit Desired Amenities: • Benches • Trash Receptacle	Medium trailheads are to be located at destinations with trail connections. In addition to the wayfinding amenities of small trailheads, these locations should include additional amenities appropriate to the location and anticipated needs of the users. Recommended Amenities: • Identification Sign • Wayfinding Map or Orientation Exhibit • Benches • Trash Receptacle Desired Amenities: • Bike Racks • Dog Waste Stations	Large trailheads would be appropriate at parks or other public spaces with trail connections. In addition to the wayfinding amenities of medium trailheads, these locations should include additional amenities appropriate to the location and anticipated needs of the users Recommended Amenities: • Identification Sign • Wayfinding Map or Orientation Exhibit • Benches • Trash Receptacle • Bike Racks • Lighting • Dog Waste Stations Desired Amenities: • Water Fountain • Restrooms • Bike Repair Stations

Trail Amenities

Trails only make one part of a safe, user-friendly active transportation network. The trails and paths must be supported by a strategic mix of amenities. The table below outlines the various trail system amenities noting type, locations, and level of necessity.

TYPE	LOCATIONS	NECESSITY	NOTES
Bathrooms	Parks with trail connections and parking areas	Preferred	Providing bathrooms protects natural areas and water quality
Benches	Trail gateways, junctions, areas of interest (overlooks, scenic spots, next to water)	Expected	Important for families and elderly users
Bike racks	Parks with trail connections, parking areas	Desired	Strategically located where multi-use trails originate and end
Bike Repair Stations	Trail gateways, along long stretches of commuter trails	Desired	Includes tire pump and essential tools
Dog Waste Stations	Trailheads, parking areas, trail junctions	Expected	Helps protect aesthetics and cleanliness of trails
Lighting	Trailheads, parking areas, high volume trail junctions	Preferred	Lighting should be dark skies compliant, and installed at key location rather than along entire trails
Parking	As required with parks and open space	Desired	All parking areas are at trailheads
Trash & Recycling Receptacles	Parking areas, high volume trail junctions	Expected	Greatly reduces littering
Water Fountains	Parks, parking areas, major trail junctions	Desired	Fountains should accommodate human and dog use
Shade	Along trails	Expected	Align trails with existing trees to provide shade, also incorporate new tree planting for additional shade

Wayfinding

The most important trail amenity is wayfinding. In fact, wayfinding is functionally critical to a robust highly functioning community trail network. Although outside the scope of this plan, a comprehensive wayfinding plan should be developed, adopted and implemented by the City of Bozeman, City of Belgrade, and Gallatin County. One wayfinding plan for the entire Triangle trail system, and those in the greater Bozeman and Belgrade areas, would standardize and integrate consistent signage and information across the entire network.

Example of wayfinding on GVLT Main Street to Mountains trail system

The benefits to a comprehensive wayfinding system include:

- Effectively guides all users from place to place
- Simply identifies routes, directions, distances, and destinations.
- Improves safety by increasing visibility of trail users to motor vehicles.
- Helps reduce false perceptions that there is a lack safety, function, and convenience.
- Positively promotes inclusivity for all abilities, age groups, and mobility modes.
- Further legitimizes active transportation as a viable alternative to driving.

The elements of a comprehensive wayfinding system would include:

- Access Elements—monuments, informational kiosks at key locations
- Navigation Elements—direction, distance, intersection, and turn signs
- Enhancement Elements—pavement and mileage markers
- Digital Resource—wayfinding app or website that includes an interactive maps

A comprehensive wayfinding system would conform to the Manual of Uniform and Traffic Control Devices (MUTCD) where applicable and required such as at trail and road intersections.

Best Practices

There are a variety of resources that begin to establish best practices for trail design and construction standards, operations and maintenance guidelines, and user etiquette and safety rules. Each trail type, from dirt single tracks to paved shared use paths, have unique best practices.

A bicyclist demonstrating proper trail etiquette by yielding to a pedestrian

Trail Etiquette and Safety

Establishing clearly articulated rules about how to use the trails system creates a safer and more enjoyable experience for all users. It should not be assumed that everyone is familiar and comfortable using trails, therefore trail etiquette information and signage is an important component of ensuring the trail network is welcoming and inclusive. The same etiquette rules should be applied across the entire Triangle trail system to consistently establish expectations. Trail etiquette signage is an important part of a comprehensive wayfinding system.

The other key component of a safe and enjoyable trail system for both people and dogs is clearly established and respected canine etiquette rules which are the ultimately the responsibility of dog owners.

Additional guidance on e-bike and e-scooter use will be provided by individual jurisdictions.

Gallatin Valley Land Trust Trail Etiquette

EVERYONE:

- Stay on the trails
- Be respectful of wildlife
- Respect private property
- Be courteous to other trail users
- Stay right, except when passing
- Keep the trail litter free
- Watch for downed and falling trees
- Avoid using the trail in wet conditions
- Report trail maintenance needs
- Volunteer your time
- Pick up dog waste left by others
- Open to all non-motorized users

BICYCLISTS:

- Yield the right-of way to pedestrians
- Stay to the right & pass on the left
- Pass others with care & give courteous verbal notice
- Control your speed & be ready to stop if necessary

DOG OWNERS:

- Leash dogs except in designated off-leash areas
- Keep dogs in sight & under voice control in designated off-leash areas
- Pick up after your dog
- Avoid encounters with wildlife & livestock

Trail Maintenance

The required minimum levels of trail maintenance vary significantly by trail type. For instance, natural surface trails require regrading and erosion control, whereas paved paths necessitate sealing and crack repairs.

In addition to the annual and long-term tasks, seasonal maintenance of commuter trails is essential to accommodating year-round active transportation. Paved paths must have the snow removed frequently during the winter and be swept of grit and debris each spring.

As an example, the Denver Parks and Recreation Department has a robust trail maintenance program that includes ongoing scheduled tasks and 'as needed' work, identified below:

- *Ongoing scheduled tasks: inspections, sweeping, grading, trash removal, pruning, mowing, signage repair.*
- *As needed work: surface repairs, snow removal, weed control, drainage control, habitat enhancement, mapping updates, education, agency coordination, volunteer recruitment, employee/ volunteer training.*

Beyond establishing minimum maintenance requirements by trail type, it is critical to identify who is responsible for the work, coordinate efforts when possible, and secure funding sources. To ensure the proper maintenance is funded and performed a trail maintenance plan should be developed.

The maintenance management system utilized by the US Forest Service provides the framework to plan, prioritize, schedule, and track maintenance work, through the following efforts:

- *Setting specific maintenance goals and standards for levels of service.*
- *Developing the necessary maintenance programs which will provide those levels of service.*
- *Executing those programs using the most efficient combination of resources.*
- *Controlling and evaluating the effectiveness of the work in relation to the desired level of service.*
- *Furnishing cost data from which budgets can be built.*

Regular maintenance by volunteers, organizations, and government entities is critical to keep trails safe

Sustainability

Principles of sustainability should be applied to the development of all trail types in the Triangle area. While there are many aspects to sustainability, the National Park Service and US Forest Service define sustainable trail development to include:

- *Preserves area's natural or cultural resources*
- *Produces negligible soil loss while allowing native vegetation to inhabit the area*
- *Encourages users to stay on the trail by providing an enjoyable experience*
- *Accommodates existing use while allowing only appropriate future use*
- *Withstands the impacts of normal use & natural elements*
- *Requires little rerouting and minimal long-term maintenance*

Sustainable trail design and construction minimizes soil disruption, controls erosion, accommodates native vegetation, and minimizes maintenance needs.

Chapter 4: Understanding Current Conditions

Related Plans

Numerous existing county and local plans summarized below recognize the intrinsic values of developing and maintaining a strategic interconnected system of trails throughout Gallatin Valley. A complete review of related plans is provided in Appendix B.

The most relevant existing plan is the Triangle Community Plan which includes a policy directive to "support the creation and adoption of a trail plan specifically for the Triangle area that supplements and supports Bozeman, Belgrade, and community partner trail plans".

As recognized in the 2020 Triangle Community Plan, all the major rural and urban community plans (Four Corners Community Plan, Bozeman Community Plan, Gallatin County Growth Policy and Belgrade Growth Policy) establish goals related to trails:

- Establish and support plans and policy for parks, trails, and open space systems that integrate with other area planning documents.
- Establish open space, parks and trails along the Gallatin River and other waterways.
- Provide viable parks and trails, with plans for long-term maintenance.
- Provide a diversity of recreational facilities, activities, and parks.

Existing Land Use

While the land use in the Triangle area is diverse and evolving, it remains predominantly agrarian. The 2020 Triangle Community Plan provides these characterizations of the primary land uses:

Agriculture Land Use

"Agricultural operations support dairy and beef cattle, hay production, grain crops, local market vegetable produce, and other specialty products."

Commercial Land Use

"From industrial warehouses to retail to growing local businesses in technology and recreation, the Four Corners area and nodes along Huffine and Jackrabbit continue to be desired commercial locations and emerging community hubs. In addition, there are commercial gravel mining operations in the north end of the Triangle."

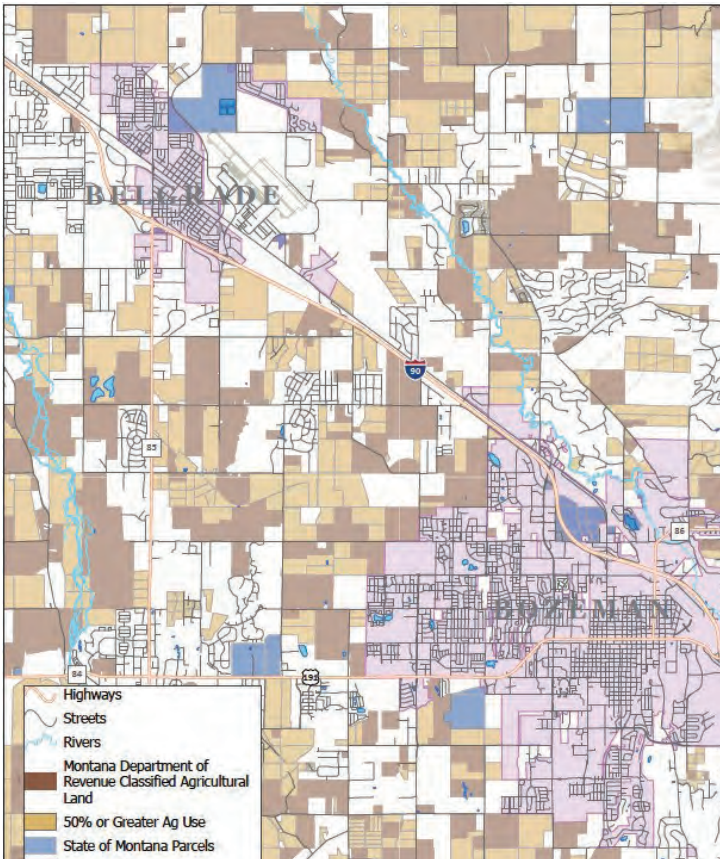
Residential Land Use

"Residential developments and larger, multi-phase subdivisions continue to populate the Triangle. The diversity of developments offers different housing options to the market from large country estate lots to multi-family housing."

Most of the existing trail network was constructed in conjunction with land development. Neighborhood trails are typically installed when a new subdivision is built, but these segments are often disconnected from one another and the larger network. More recently, some road construction projects include new trails along the right-of-way but separated from the vehicle lanes.

Geography of the Triangle

The geography of the Triangle is flat with the overall surface gradient of less than 100 feet per mile generally sloping from southeast to northwest. The altitude ranges from about 4,800 feet along Huffine Lane to approximately 4,500 feet near Interstate 90. The primary geographic features are a variety of waterways. Four tributaries of the East Gallatin River—Baxter, Aajker, Hyalite, and Dry Creeks—traverse the Triangle from south to north. Numerous irrigation ditches and intermittent drainage swales crisscross between the creeks providing water to agricultural properties. The near-surface geology of the Triangle is predominantly clay soils and alluvial gravels.

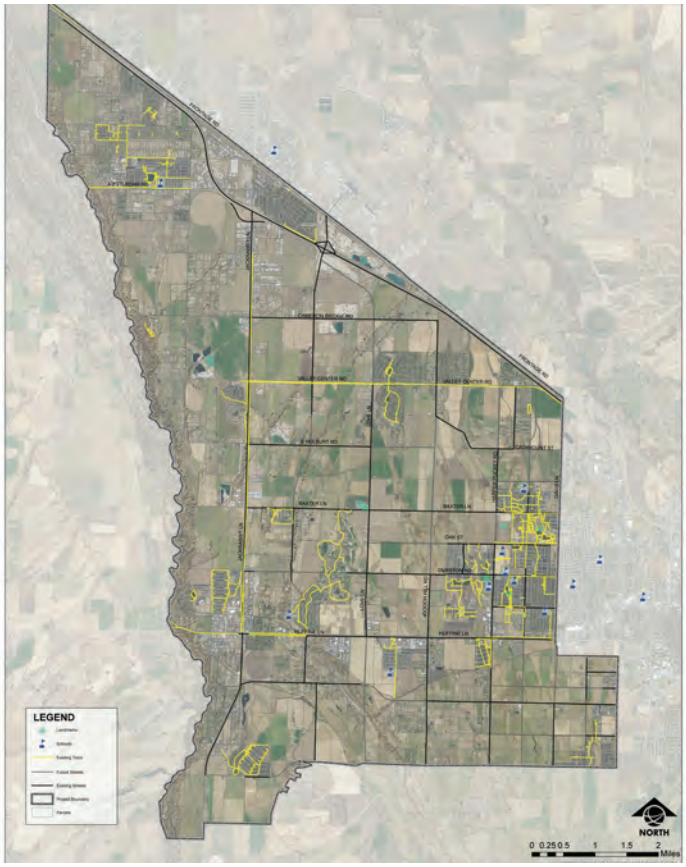


The Triangle area geography showing prime agriculture land, [source: Envision Gallatin]

Existing Trail System

There are approximately 58.29 miles of trails in the Triangle including 38.85 miles of natural surface trails, and 19.44 miles of paved shared use paths. Most of the trail segments are within subdivisions on the eastern side of the Triangle near Bozeman. The longest continuous trail (6.6 miles) is the shared use path along the east side of Jackrabbit Lane between Hulbert Road East and Shedhorn Drive. The longest east-west trail (4.5 miles) is the shared use path along the south side of East Valley Center Road between Valley Center Spur and Jackrabbit Lane.

The existing trail network has been built over decades in conjunction with private land development and public road projects. Most trails constructed during the development of residential subdivisions have been on a voluntary basis. Gallatin County, City of Bozeman, and City of Belgrade have differing regulations that determine if trails are a required component of private development projects. Recently a significant mileage of trails has been added to the system as part of municipal, county, and state road construction projects.



Existing Trails within the Triangle Area

Trail Management and Maintenance

Trail management and maintenance within the Triangle falls upon many different entities. Most neighborhood trails are maintained by homeowner associations. Trails within the City of Bozeman are maintained as part of the Bozeman Parks Maintenance District. Montana Department of Transportation maintains the paved shared use paths within their right-of- way such as those along East Valley Center Road and Jackrabbit Lane. The Gallatin Valley Land Trust helps with seasonal maintenance on some sections of trail. There is no coordinated management and maintenance plan for the entire network which results in some inconsistencies and inefficiencies.

Needs and Issues

The purpose of this plan is to identify the challenges of the current trail network and propose solutions. The list below of needs is based upon the public input received during the community engagement process and industry best practices. A complete summary is included in Appendix C.

- Develop a comprehensive plan to coordinate both on-going and long-term maintenance. This would include seasonal maintenance (sweeping and snow removal), annual tasks (grading, erosion control, vegetation trimming), and long- term maintenance (repair and resurfacing).
- Identify and secure funding for existing trail maintenance and future trail construction. Sources include local support, grant funding, government funding (local, state, and federal).
- Establish standard specifications for construction of new trails to be used across the entire Triangle.
- Create a comprehensive trail wayfinding system that includes prescribed sign typologies, standardized location specifications, and unified graphics. This system must be uniform along all trails in the Triangle.
- Plan and develop a complete trail network to provide transportation and recreation choices across the Triangle.
- Identify and connect the gaps between trail segments within the existing network.

This word cloud captures the key words from public input during the community engagement process in 2020.

Existing Commuter Path along Valley Center Road

Chapter 5: Community Engagement

Unique Conditions

The Triangle Trails Plan was initiated and completed during the COVID-19 pandemic. This unique circumstance created some challenges and demanded adaptations for public participation. The project designed opportunities for capturing ideas and concerns virtually and used the project website as the hub for all information and engagement (www.triangletrailplan.com). The website tracked over 1,500 engagements during the planning process. Appendix C contains a detailed summary of the public input received.

Building Awareness

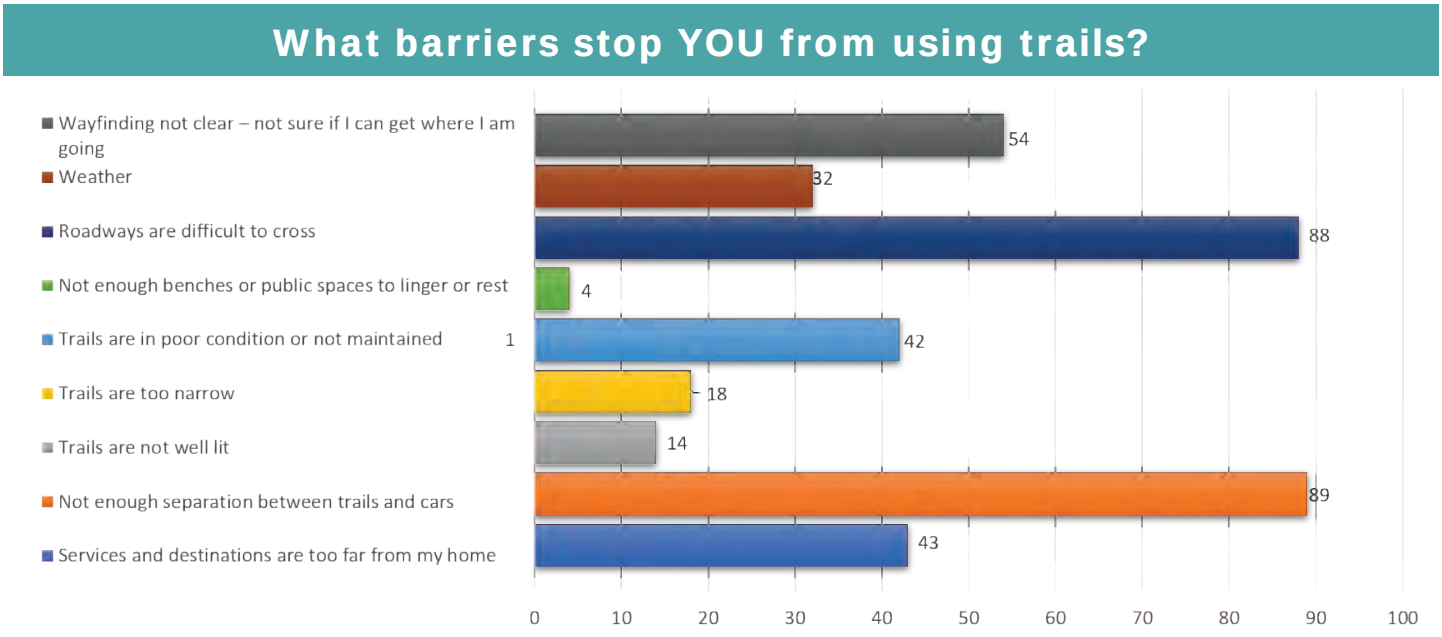
The project built on existing momentum and community engagement from the Triangle Community Plan that was adopted in 2020. The email distribution list developed through that planning process was expanded with additional businesses, homeowners' associations, community centers and organizations that have a recreation, development or transportation focus. The project also sent letters to all the large landowners in the project area that provided project information and contacts.

The project also utilized the reach of list serves, social media and websites of project partners, interested organizations and businesses. The email updates and social media posts alerted residents to new opportunities to participate and provide comment.

News releases to local media outlets launched the project. As the project advanced additional news releases, op eds and articles were published in the Bozeman Daily Chronicle and Belgrade News.

Steering Committee Guidance

A highly engaged Steering Committee with representatives from Gallatin Valley Land Trust, Belgrade, Bozeman, and Gallatin County met monthly to provide direction and respond to public input. The Steering Committee also organized three bike tours of the project area. These tours offered intimate experience of current conditions and identified opportunities the plan could highlight.



Critical public input was gathered during the 2020 community engagement process.

Engagement Opportunities

The website was the central focus for project information and opportunities to respond to polls and surveys. Having a stand-alone website made access easy and convenient. The website also included a sign up for the project mailing list which grew to over 350 contacts.

Community members were asked to help the project by providing information on a mapping platform. The community first identified existing trails in the project area, both official and unofficial. This crowd-sourcing provided a realistic base map of trail infrastructure and current travel routes. The second mapping exercise focused on where people would like future trails. Participants were able to map destination locations as well as preferred travel routes.

A dozen focus groups with over 50 total participants were organized and conducted over Zoom. These focus groups targeted diverse interests and sought to represent those voices that may not be as likely to participate through the website. Focus group categories included agriculture, recreation, diversity and minority voices, schools, transportation, community development, water resources, developers and real estate, health, and fish and wildlife.

A Virtual Open House was hosted on the website in November 2020 and provided an opportunity to comment on a variety of issues from trail design to location to funding and uses. This forum included multiple choice questions, open ended questions, mapping, and visioning opportunities. The input from the Virtual Open House was combined with the focus group and other website surveys to identify the core elements of the plan. A summary of the project's community engagement is included in Appendix C.

Reporting and Publishing

Progress reports were provided to local government boards and committees and published on the website. The focus group participants were also asked to review the draft plan and respond to a survey to indicate support and propose friendly amendments. The draft and final plans were presented to the Steering Committee, Gallatin County, and Gallatin Valley Land Trust, and posted on the website with a response sheet to record level of public support and recommended edits for each section of the plan.

Summary

By compiling and analyzing the feedback from the focus groups and open house, the following themes were identified and guided the development of this plan.

Trail System

- Connecting communities, neighborhoods, and places
- Tiered approach with commuter pathways, connector trails & neighborhood trails
- Completing missing segments of trails corridors
- Provide for equity and diversity of users with low user conflicts
- Create a system that can have year-round use

Safety

- Create opportunities to have trails separated from traffic
- Consider standards for road crossings, adequate sight distance and lighting
- Provisions for maintenance must include regular sweeping and snow removal
- Create trails that are safe and welcoming to all users, addressing the specific concerns of women and people of color

Inclusivity

- Consistent wayfinding for unity across jurisdictions
- Education signs for the types of uses / customs
- Maps, distances, and destinations
- Multiple languages – inclusion and welcoming
- Smart phone application integrated
- Benches, water, trash and recycling, interpretation, and toilets

Standards

- Consistent standards across jurisdictions for trail development
- Standard details for different trail types, intersections, and street crossings
- Stream and ditch setback standards
- Provide consistent wayfinding
- Include standards for amenities such as, benches, water, trash and recycling, and toilets
- Include standards for landscaping, aesthetics, nature, and gardens

Implementation

- Plan will establish priorities, recommended policies, and regulations
- Trail construction should be integrated with subdivision development
- Commuter and connector trails will need to be funded from a variety of sources
- Construction and maintenance funding sources should be identified

Chapter 6: Implementation

Overview

This chapter is structured to highlight implementation issues and opportunities that will lead to successful completion of the Trail Plan. The goal to build an interconnected network of trails and pathways throughout the Triangle Area is a commendable goal. However, there are fundamental questions that must be answered if the actual attainment of the trail network is to be realized. How will trails be established, who is responsible for prioritization, who pays for construction, and how will the trails be maintained?

This chapter contains recommendations that can move the plan from concept through completion. While this plan establishes the vision and provides guidance for trail development, successful implementation necessitates cooperation between Gallatin County, the Cities of Belgrade and Bozeman, private landowners, non-profit partners, and citizens to turn the vision into reality.

Project Coordination

There is an opportunity in the Triangle area to take steps towards implementing trail segments identified in this plan. Coordination between Gallatin County, the cities of Bozeman and Belgrade, non-profit organizations, and the private development community will be essential to the success of this trail system.

Commuter Pathways

The Commuter Paths shown on the trail plan maps are located parallel to existing or proposed roads. As the County considers future road improvements, adjacent trail improvements should be incorporated into road improvement plans.

Connector Pathways

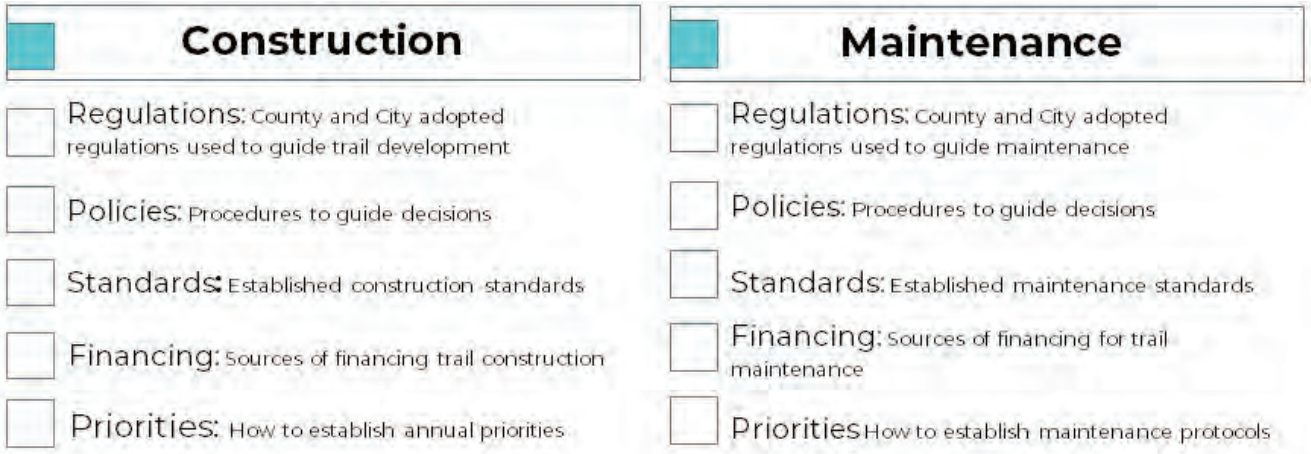
The Connector Paths shown on the proposed trail maps are intended to be developed with future development. These trails will need to be coordinated with private property owners and regulated by development code requirements.

Neighborhood Trails

Neighborhood Trails will be constructed at the time of subdivision development. Given the likelihood of continued development in the Triangle area, it is important for this plan to address the implementation of this trail type within a framework of opportunistic growth over time rather than according to a logical and linear pattern. While neighborhood trails do not have specific alignment requirements on the map, trails are required within subdivisions that make sense for the site plan and create connectivity to outside of the development either to adjacent parcels or existing or proposed commuter pathways.

Priorities

The implementation strategies focus on trail construction and trail maintenance. As emphasized throughout the Trail Plan, properly maintaining the existing trails within the Triangle area is equally important as constructing new trails and important network connections. The primary implementation components for both trail construction and maintenance include:



Regulations: County and City regulations needed to guide trail development within future subdivision development and public transportation projects

Policies: County and City procedures or policies used to guide decisions and identify implementation priorities

Standards: Unified standards for trail construction and maintenance across all jurisdictions

Financing: Sources of financing for all types of trail construction and maintenance

Priorities: Procedures to establish annual and long-term priorities for maintenance of the trail system and construction of new trail sections

Trail Construction

Regulations

Gallatin County and the Cities of Belgrade and Bozeman implement land use and subdivision regulations that establish private development requirements. While each jurisdiction must implement regulations in accordance with the Montana Subdivision and Platting Act (Title 76, Chapter 3, Montana Code Annotated), variations are permitted and do occur. Therefore, developing consistency between jurisdictions to ensure trail implementation is critical to establishing a comprehensive trail network.

Goal: Achieve consistency between municipal and County regulations for development of trails within the Triangle Area

The regulations for constructing trails as a part of future subdivisions are contained within the following documents:

- Gallatin County enacts trail development through Gallatin County Subdivision Regulations Section 6: Design and Improvement Standards, (Subdivision_Regulations) and the Transportation Design and Construction Standards Section 4.4 Pedestrian, Bicycle and Transit Facilities. (Transportation Design and Construction). These documents outline the requirements for trail development, dedication of easements, and design standards for trail construction.

- The City of Bozeman enacts trail development through the Unified Development Code, Section 38.400.110 Transportation Pathways and Section 38.420.110 Recreation Pathways

Recommendations:

- The City of Belgrade should consider adoption of regulations like Gallatin County Subdivision Regulations 6.E Pedestrian, Bicycle and Trail, and Transit Facilities.
- Gallatin County, City of Bozeman, and City of Belgrade should consider adoption of Trail Design Standards and Specifications (Appendix D) to ensure uniformity between trail typologies across the entire Triangle Trails system and beyond.

Goal: Ensure public access easements for proposed to future trails

In some instances of minor subdivision or commercial subdivisions, development of trails may not be warranted with the development. In those instances, securing easements for future trail corridors should be sought.

Recommendation:

- Review subdivision and site development regulations to create consistent requirements for trail easements in cases where trail development is not required. Easements should be located to provide connectivity to the larger trail system and comply with applicable regulations.

Policies

Building the comprehensive trail network requires a variety of policies to ensure trail development continues within the Triangle Area. A review of existing policies should be completed to ensure coordination in the construction process. The following policies should be considered.

Coordination: Continuous collaboration between jurisdictions and stakeholders will be required to ensure success of the Trail Plan. Several actions should be undertaken to facilitate this coordination.

Goal: Ensure coordinated implementation of the Triangle Trails Plan

Recommendations:

- Add a staff position within Gallatin County to support the implementation of the plan. The staff would coordinate with developers and homeowners on parkland and trail development and maintenance plans, as well as provide support for grant applications.
- Develop policies between Gallatin County, Cities of Belgrade and Bozeman to review proposed trail locations adjacent to jurisdictional boundaries and for Commuter and Connector trails that cross between jurisdictions.
- Gallatin County should maintain a coordinated GIS trail data inventory. Include information from field assessments and construction for surface types, width, and other characteristics.
- Consider providing Gallatin Valley Land Trust an opportunity to review and comment on proposed trail designs during the subdivision review process. Establish the roles and responsibilities through a Memorandum of Understanding.
- Engage developers early and often to educate them about the Trail Plan's trail classifications, trail connectivity needs, design standards, and maintenance requirements. Ensure the Triangle Trails Plan is provided when starting the development process with Gallatin County.
- Coordinate the proposed trails in the Trails Plan with the Triangle Transportation Plan

and other relevant plans, such as the upcoming City of Bozeman Parks, Recreation, and Active Transportation plan (PRAT).

Wayfinding: This plan highlights the important ways a coordinated wayfinding system benefits trail users, adjacent property owners, and the community as a whole. Development of a comprehensive wayfinding system should be completed so that wayfinding elements can be incorporated into the design for new trail construction and added to existing trail sections. Several actions should be undertaken to further develop the wayfinding element of the Trail Plan.

Goal: Provide comprehensive wayfinding within the Triangle Trails system

Recommendations:

- Develop a comprehensive wayfinding plan. This should be based on wayfinding elements of the existing trail systems; standards developed by the local jurisdictions, Manual of Uniform and Traffic Control Devices (MUTCD), the Gallatin Valley Land Trust, and other stakeholder entities.
- Review options for subdivisions to incorporate standardized wayfinding as part of trail development.

Trail-Related Improvements: Prioritize improvements to be included with trail development. Providing consistent improvements will create a predictable experience for users, as well as predictable costs for developers.

Goal: Develop a list of prioritized amenities for inclusion in trail construction.

Recommendations:

- Using the list of amenities in the plan, identify priority elements for each trail typology.
- Provide information to developers for sources of amenity products.

Standards

The standards recommended within Appendix D are sourced from local and national standards. As local standards are revised or updates, they should be reviewed with these standards to ensure consistency across jurisdictional lines.

Goal: As appropriate, develop a single source for Trail Standards within the Triangle Area

Recommendations:

- Review existing standards for adequacy and consistency and pursue regulatory and policy updates as needed.

Financial Investment

Financing the trail network will be a long-term cooperative effort. There will need to be a variety of funding sources, and much of the trail development will depend upon the subdivision development within the Triangle Area.

Goal: Identify consistent funding sources for each trail typology

Commuter trails general align with major road corridors. As those roads are upgraded or constructed, trail design and construction should be included as part of the road improvement projects. Several actions should be undertaken to facilitate this work.

Recommendations:

- Review existing capital improvements plans and include trail costs as appropriate for scheduled road improvements.
- On an annual basis, review and revise the capital budgets to support trail development.

  There are grants available to assist with trail construction. This type of funding is consistently competitive, and therefore not a reliable source of funding. In order to improve competitiveness, jurisdictions and stakeholders should coordinate funding requests and secure matching funds so as to provide stronger proposals.

Recommendations:

- Strategically prioritize grants applicable to trail construction.
- Identify on a yearly basis applicable grants with trail needs.

Grant Source • **Purpose**	**Description**
Surface Transportation Block Grant Program (STBGP) • Bicycle and pedestrian improvements	The Surface Transportation Block Grant program (STBG) provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects
Transportation Alternatives Program (TAP) • Bicycle and pedestrian improvements	Funds can be used for construction, planning and design of on and off-road bicycle and pedestrian facilities
Rebuilding American Infrastructure and Sustainability and Equity (RAISE) • Transportation infrastructure	Previously known as BUILD and TIGER discretionary grants, these competition awards support the development of transportation infrastructure
Federal Lands Access Program (FLAP) • Transportation infrastructure	The program is designed to provide flexibility for a wide range of transportation projects to access high-use recreation site and economic generators
Recreation Trails Program (RTP) • Trail construction	The program funds construction of new trails, as well as acquisition of land or easements for the purpose of trail development

Neighborhood trail construction will be completed as part of future residential subdivisions. These improvements will be completed by the developer as part of the required infrastructure improvements, as outlined in the applicable subdivision regulations.

Priorities

Because trail building will be largely dependent upon the development of future subdivisions and private road projects within the Triangle Area, determining future priority trails or connections is difficult. Instead, it will be more helpful to create criteria that can be used annually to determine priority projects.

Goal: Develop criteria to determine priority trail projects

Recommendations:

- Develop a methodology for determining projects to be included within a capital improvement plan, grant application, or other funding source
- Criteria for determining priorities should include:
  - Ability to improve trail connectivity
  - Ability to connect to a large number of people
  - Ability to connect to a school or park
  - Ability to reduce or eliminate a significant safety issue
  - Significant stakeholder interest and funding opportunities

Trail Maintenance

Building and maintaining trails that are safe for users of all ages and abilities is a high priority. Individual jurisdictions will need to establish annual and long-term maintenance plans based on available funding sources. The plan's suggested trail maintenance guidelines can help communities identify what activities to incorporate in their maintenance plans.

Regulations

There are two important elements of trail maintenance: establishing minimum standards for maintenance and establishing responsibility for that maintenance. Regulations adopted by each jurisdictions require a developer or homeowner association to assume responsibility for maintenance public or common improvements. The City of Bozeman is currently implementing the Parks and Trails District to maintain parks and trails within the city. The implementation of this plan should coordinate with that district to ensure consistency within and beyond the Triangle Area.

Goal: Create consistent and predicable standards for trail maintenance

Recommendations:

- Review regulations assigning maintenance responsibility in areas outside of the Bozeman Parks Maintenance District.

Policies

Maintenance of trails with the Triangle Area is currently managed through a variety of resources, including homeowner associations, local jurisdictions and the Montana Department of Transportation. Standardizing responsibility of maintenance, as well as standards for maintenance will help ensure the financial investment of trail development is protected and enhanced in future years. According to the Rails to Trail Conservancy, annual maintenance costs on average range from $1,000 to $2,000 per trail mile, depending upon the surface.

Goal: Create consistent policies for trail maintenance

Recommendations:

- Review standard maintenance practices and establish minimum standards across all jurisdictions.
- Establish a template for maintenance of gravel fines trails. This template would be

available to developers and homeowner associations to estimate costs and develop a schedule of tasks and inspections.

Standards

Standards for paved trails and gravel trails will differ in the approach to maintaining the surfaces. General maintenance standards for evaluating needs for repairs, maintaining clearance standards, and treatment for noxious weeds should be consistently applied to all trail types. Consistently removing snow from paved trails will significantly increase winter and shoulder season use.

Goal: Establish consistent routine maintenance plans

Routine maintenance of paved trails is important for safety and protection of the investment made in the trail network. Paved trails should be maintained to accommodate all users of the facilities to a reasonable level of safety. Common maintenance concerns such as cracks or ridges in pavement, potholes and removal of debris should be addressed on a regular basis.

Below is a list of routine maintenance activities for paved trails:

- Routine sweeping to remove debris, gravel and other hazardous items
- Regular snow removal during winter months
- Inspect and repair pavement surface problems. Seal cracks, grind down ridges, cut back tree roots and repair pavement
- Coordinate and schedule pavement overlays as part of adjacent road maintenance
- Prune adjacent and overhanging vegetation to reduce encroachment or cause sight distance problems
- Repair or replace wayfinding, stop control signs and other elements
- Restripe crosswalks and other markers

Routine maintenance of gravel trails can be defined as maintenance that is needed to keep the trail operating in a safe and usable condition.

Below is a list of routine maintenance activities for gravel trails:

- Yearly trail evaluation to determine the need for minor repairs, identification of erosion damage, need for improved drainage
- Removing encroaching vegetation from trail tread (grading, chemical treatment)
- Treating noxious weeds along corridor
- Mowing trail edges if applicable (keep vegetation height low along trail)
- Clearing drainage features to ensure proper function
- Removal of fallen trees, hazardous trees or dangerous limbs
- Planting, pruning, and general landscaping
- Flood or rain damage repair: silt clean up, culvert clean out, etc.
- Trash removal/litter clean-up, routine

- Bridge/culvert inspection, clearing and repair
- Map/signage post condition inspection, and vandalism repair
- Assessing need for sign/map updates or replacement

Periowdic maintenance activities:

- Addition of surfacing material depending on condition (2-3 years)
- Re-grading to improve cross-slope or out-slope for improved drainage
- Improvement of transitions with sidewalks or streets, restripe crosswalks and other markers

$ Financial Investment

Funding of trail maintenance is often not identified when trails are constructed. The result is that maintenance is often deferred, leading to declined trail conditions and costly repairs. A critical component of any trail system is to identify responsibility and funding for maintenance. Similar to trail construction, maintenance responsibilities will differ with each trail typology.

Goal: Identify and establish dedicated funding sources for trail maintenance

Commuter Trails
As with construction, the maintenance of commuter trails should be completed with the adjacent road maintenance. From a budget perspective, commuter trail infrastructure should be no different from other transportation infrastructure. These trails will be asphalt or concrete surface and should be included in annual road maintenance budgets.

Connector Trails
Connector trails will play an important role to link places throughout the Triangle Area. These trails are mostly located off the street grid and outside of the neighborhood trails. Maintenance for these trails will need to be coordinated through different jurisdictions and neighborhoods. Potential funding for maintenance includes:

- Future Metropolitan Planning Organization (MPO). Upon certification of the 2020 census, an MPO area will be designated around Bozeman. This purpose of the MPO is to coordinate transportation planning. For trails identified as part of the transportation network, the MPO may be the appropriate organization for coordinating maintenance.
- Recreational Trails Program (RTP) Grants. This program is one of the few grant programs for trail maintenance. It is a program of the US Department of Transportation's Federal Highway Administration (FHWA) and is administered at the state level. Funds are intended for recreation trails and require a local match.
- Montana Stewardship Grants. This program funds new trail construction as well as maintenance of existing trails and shared-use paths

Neighborhood Trails
As the City of Bozeman begins to maintain trail improvements through the Parks and Trails maintenance district, neighborhoods outside of the city should ensure consistent financing for maintenance of their trail inventory. Currently, new subdivisions are required to maintain trails by the homeowner association. The association provides maintenance for common elements, including parks, trails and streets. Maintenance varies by subdivision and could be improved with prescriptive standards and required maintenance plans.

Other options for maintenance of subdivision trails:

- Rural Special Improvement District. Pursuant to 7-12-2102, MCA, the Board of County Commissioners may order and create RSIDs upon receipt of a petition to create an RSID that contains the consent of all the property owners to be included in the RSID. The purpose of the RSID is to assess property owners annually for the costs associated with the proposed maintenance. These districts require administration by the county to provide assessments, maintain expenses and ensure the work is completed.
- Funding trail maintenance at a larger scale could be accomplished by a maintenance district approved by voters. Such a district simplifies the administration of maintenance, can provide coordinated efforts with adjoining jurisdictions, and ensures funding into the future. Because it must be voter approved, it is not guaranteed. Similar districts include the Bozeman Parks and Trails District, and the Big Sky Trails, Recreation and Parks District.

Priorities

Priorities for establishing maintenance include the following:

- Establish standards and expectations for each trail typology
- Create a maintenance plan template for use by developers and homeowner associations to develop annual costs
- Identify areas of deferred maintenance as priority areas
- Coordinate maintenance between jurisdictions
- Consider long term funding sources for a maintenance program as the trail network expands

Trails for future generations

Appendix A: Useful Resources

American Trails
www.americantrails.org
American Trails is a national, nonprofit organization working on behalf of all trail interests to create and protect America's network of interconnected trails. Since 1988, American Trails has been a collective voice for a diverse coalition to enrich the quality of life for all people and the sustainable development of communities promoting the development and enjoyment of diverse, high quality trails. We envision a network of trails within 15 minutes of every home, school, and workplace.

Why Trails? 2020 Edition
www.americantrails.org/images/documents/Why- Trails.pdf

Trail Maintenance Management System
www.americantrails.org/resources/maintenance-management-systems-for-trails

Maintenance Guide for Greenways and Urban Trails (City of Denver)
www.americantrails.org/resources/maintenance-checklist-for-greenways-and- urban-trails

Micromobility Devices on Multi-Use Trails
https://www.americantrails.org/images/documents/RTCMicromobility_Footnotes_ 9.6.19.pdf

E-Bikes on the Trail
https://www.railstotrails.org/resourcehandler.ashx?id=11762

Gallatin Valley Land Trust
www.gvlt.org
Gallatin Valley Land Trust connects people, communities, and open lands through conservation of working farms and ranches, healthy rivers, and wildlife habitat, and the creation of trails in the Montana headwaters of the Missouri and Upper Yellowstone Rivers. Our trail mission is to link Bozeman's core to public lands throughout the Gallatin Valley. Since 1990 we have collaborated with the City of Bozeman and dozens of public and private organizations to expand the Main Street to the Mountains system to over 80 miles of trails. These trails are used by commuters, runners, bikers, birdwatchers, and stargazers, and help make the Gallatin Valley the best place to live under the Big Sky.

Go Gallatin
www.gogallatin.org/
Rethink Transportation! Explore your transportation options with GoGallatin trip planner. Find the best routes for walking or biking, view Streamline routes and schedules, and find carpool partners to save money, reduce your carbon footprint, and get moving during your commute. Get started here to discover all the ways you can get to where you need to go!

Partnership of Active Transportation
www.railstotrails.org/partnership-for-active-transportation/
The Partnership for Active Transportation is a unique collaboration of organizations working at the intersection of transportation, public health and community vitality to promote greater investment in creating safe trail, walking and bicycling networks for all, and facilitating greater physical activity through active transportation.

U.S. Department of Transportation

www.transportation.gov/mission/health/active-transportation

Transportation agencies and their partners can create opportunities for people to exercise for recreation and to build physical activity into their daily routine. Agencies can do that by reducing distances between key destinations and providing and improving bicycle and pedestrian facilities. More people might then bicycle or walk to work, shops, and services.

Walk Score

www.walkscore.com/

Walk Score's mission is to promote walkable neighborhoods. Walkable neighborhoods are one of the simplest and best solutions for the environment, our health, and our economy.

Appendix B: Summary of Related Plans

Gallatin County Growth Policy (2021)

The Gallatin County Growth Policy is currently being updated and the 2021 working draft, "Envision Gallatin", recognizes that "the high levels of outdoor recreation and activity by residents and visitors lends itself to the importance of non-motorized infrastructure throughout the County."

The primary proposed recreation goal in the Envision Gallatin draft focuses on the elements of creating a "regional recreation network" including strategic planning of future trails, parks, and open space; establishing trail development standards; and accounting for maintenance responsibilities and costs. Perhaps most importantly the draft growth policy sets the goal to:

"Promote design standards and development patterns that connect multimodal facilities, trails, and pathways to recreational open space corridors, parks, community amenities, and other meaningful destinations."

The Triangle Trails Plan provides an opportunity to build off the proposed goals of the County Growth Policy and create a comprehensive vision of a safe, interconnected active transportation network of trails and shared-use paths.

Bozeman Community Plan (2020)

The 2020 Bozeman Community Plan serves as the City's statutory growth policy. Several of the adopted goals and objectives related to trails and active transportation are highlighted below:

- N-1.8 Install, replace, and maintain missing or damaged sidewalks, trails, and shared use paths.
- N-1.10 Increase connectivity between parks and neighborhoods through continued trail and sidewalk development. Prioritize closing gaps within the network.
- EPO-3.2 Ensure complete streets and identify long-term resources for the maintenance of year-round bike and multi-use paths to improve utilization and reduce annual per capita vehicle miles traveled.
- M-1.4 Develop safe, connected, and complementary transportation networks for pedestrians, bicyclists, and users of other personal mobility devices (e-bikes, electric scooters, powered wheelchairs, etc.).
- M-1.9 Prioritize and construct key bicycle infrastructure, to include wayfinding signage, connections, and enhancements with emphasis on completing network connectivity.
- M-1.14 Identify possible routes for future bicycle and pedestrian beltway/greenway.

Triangle Community Plan (2020)

The Triangle Community Plan is the genesis of this trail plan and contains overarching guidance for a more comprehensive approach to trail planning, construction, and maintenance. One of the formal goals of the Triangle Community Plan is to "support and improve opportunities for trail development and active transportation infrastructure for a variety of uses and users, from avid cyclists to pedestrians, and from children to the elderly". Other highlights include:

- Walkable neighborhoods and trails to local parks or community core areas support the physical, social, and mental health of people in the communities where they live, learn, work and play.
- Trail systems strive to provide maximum connectivity and serve different purposes and users.
- Non-motorized transportation systems will be a priority and developed at three levels: neighborhood trails, connector trails, and commuter pathways.

The policy statement to create this Triangle Trails Plan specifically emphasizes these priorities:

- Connecting trails to meaningful destinations, such as parks, schools, residential areas, neighboring city centers, and other community hubs, which supports opportunities for walking, biking, and social interaction.
- Improving connections at the ends of trails and connecting into commuter routes/pathways.
- Connecting trails as developments are built and integrating smaller parcels into the trail system, as opportunities arise.
- Designing and maintaining trails and pathways for winter use.

Belgrade Parks and Recreation Master Plan (2020)

The Belgrade Parks and Recreation Master Plan recognizes the importance of trails as community amenities that improve the quality of life for residents. The Master Plan references Headwaters Economics research that trails benefit not only residents, but also has value to businesses and property owners. Proposed trail developments include a City Loop shared-use path, linear parks, and a section of the Great American Rail Trail. The Master Plan also identifies wayfinding and public education about trail etiquette and safety as integral components of a successfully trail system.

Bozeman Transportation Master Plan (2017)

The Bozeman Transportation Master Plan emphasizes active transportation as a critical component of the overall transportation system place it on equal terms with vehicle and transit elements. It is important to note that the project area addressed by the Master Plan extends well beyond the Bozeman city limits and thus overlaps with a significant portion of the Triangle Trails Plan boundary.

The Master Plan acknowledges that Bozeman has a long history of promoting and developing active transportation facilities yielding an inventory of 92 miles of natural surface trails and 23 miles of shared-use paths as of 2017. But the Master Plan identifies the opportunity to greatly expand the active transportation network with an additional 126 miles of natural trails and 102 miles of shared use paths.

The Bozeman Transportation Master Plan also emphasized the need for better long- and short-term maintenance of the existing and future trail and path network. Long-term maintenance is very dependent on construction materials and methods which vary widely. The Master Plan recommends more frequent sweeping and snow removal to ensure safe, year-round use.

Gallatin County Parks and Trails Comprehensive Plan (2010)

Although never formally adopted, the Gallatin County Parks and Trail Comprehensive Plan represents a foundational element of this Triangle Trails Plan. The Comprehensive Plan established goals and recommended policies to "support economic growth and development through the stimulation of tourism and the provision of quality-of-life amenities". It recognizes that the planned development of parks and trails can help preserve agricultural land and natural resources in the Gallatin Valley by strategically locating facilities and access where most appropriate.

The Comprehensive Plan included a National Park Service Rivers, Trails, and Conservation Assistance report that concluded:

"The Belgrade-to-Bozeman/triangle area trail network is a long-term project that will develop incrementally, as a constellation of projects that coalesce into a system over time. The overall vision should be established by the county, given the size of the area under consideration and the long-term nature of the task. Every mechanism available to improve bicycle-pedestrian facilities should be employed. Community trails enthusiasts can assist by advocating for the projects most important to them."

Bozeman PROST Plan (2007)

The Bozeman PROST (Parks, Recreation, Open Space, and Trails) Plan is 13 years old and scheduled to be update in 2021. Nonetheless, the PROST Plan provides insights about the importance of active transportation to the Bozeman community and beyond. For instance, the PROST included a robust public survey showing "trails are the most used recreational facility in the City". The survey established that approximately 70 percent of the respondents selected walking and hiking as their primary recreational activity. Correspondingly, the PROST highlighted the most requested improvement the City's Parks and Recreation facilities was to better maintain existing trails and expand the network of shared use paths.

The PROST analyzed current usage and inventory to project future trail and path mileage:

"The City should seek to provide a slightly higher level of service than is currently being provided with 1.5 miles of trail per 1,000 people. Based on this recommended service standard, and the City's population projections, trails miles per 1,000 people will needed as follows: 2010 – 54 miles; 2015 – 64; 2020 – 104; and 2025 – 133."

Noting that trails and shared-use paths are uniquely popular with all age groups in the community, the PROST recommends that safe trail design, particularly at street intersections, and winter maintenance are paramount.

Lastly, the PROST recognized the need to build and better connect the trail and path system to create longer routes for both recreation and transportation use.

Four Corners Community Plan (2006)

Even 15 years ago, the Four Corners Community Plan supported the development of a more robust and regionally integrated parks, trails, and open space system. Of note is the vision that a comprehensive transportation system should include bicycle and pedestrian facilities that are separated from the road network.

Concurrent Planning Processes

Two important and related transportation planning processes coincided with the drafting and adoption of the Triangle Trails Plan. Just as it is critical that this plan recognize and complement the host of existing area planning documents referenced above, it is vital to coordinate with concurrent planning efforts.

Greater Triangle Area Transportation Plan

This transportation plan has been initiated by Gallatin County to guide transportation infrastructure investments within the 'greater triangle area' that includes Bozeman, Belgrade, Four Corners, and Gallatin Gateway. The plan will identify recommended improvements based on the transportation system needs and forecast development over the next 20 years.

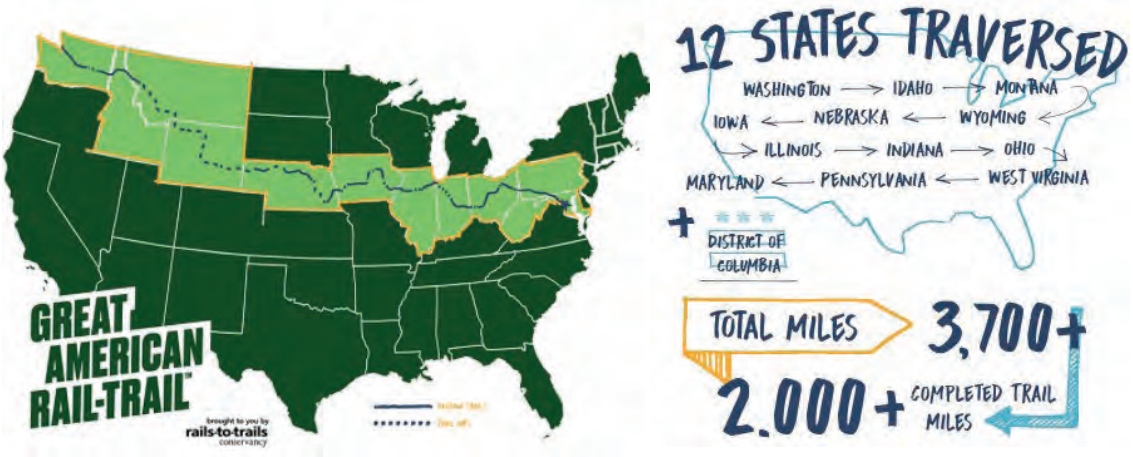
"The plan will integrate with the County's ongoing Triangle Trail Plan for the Bozeman-Belgrade-Four Corners area and build from transportation plans completed for the Greater Bozeman Area and for the City of Bozeman and City of Belgrade. The Greater Triangle Area Transportation Plan will evaluate and address the transportation system needs of all travel modes."

The Greater Triangle Transportation Plan process began in October 2020 and is scheduled to be finalized in December 2021.

The Great American Rail Trail Project

This visionary Rails-to-Trails Conservancy (RTC) project plans to connect a multiuse trail that stretches more than 3,700 miles between Washington, D.C. and the coast of Washington State traversing twelve states. Large portions of the proposed trail network are old railroads converted to public trails and to date over 2,000 miles of completed trails have been designated as part of the Great American Rail Trail.

A group of stakeholders are actively coordinating with each other and the RTC Great American Rail Trail team to identify, design, and fund the construction of the missing sections though Gallatin County and beyond. The engaged stakeholders include local, state, and federal agencies and local active transportation organizations.



The proposed trail runs through Gallatin County between Bozeman and Three Forks. The route includes:

- Bridger Canyon to Belgrade (M Trail, Oak Street, North 19th, Valley Center)
- Belgrade to Central Park (no existing trail or proposed route)
- Central Park to Three Forks (proposed along Hwy 205/Frontage Road to join the Headwaters Trail System)

Appendix C: Summary of Community Engagement

Below is a comprehensive summary of the public input received during the community engagement process. The comments below were captured during the focus group meetings and the virtual open house.

Triangle Trail Vision

- In 10 years, I hope to describe the trail network as being connected for all users. The measure of success will be seeing a vast variety of ages and abilities using the trail network year-round for a wide range of purposes such as recreating, commuting to work/school and/or running errands, socializing, etc. What still needs to be done is a unified effort across jurisdictions to recognize the need for following current best practices for design, construction, and maintenance as well as dedicating sustainable funding sources appropriated for the completion of a connected trail network (within our lifetimes).
- Bike/walk trails that connect the existing Belgrade, Gallatin Gateway and Bozeman trails. I would also like to see an increase in community trails in the Four Corners area, creating access to the river as well as scenic pathways throughout neighborhoods, creating greater connection within the neighborhoods and to trails that connect communities. Ideally, I would like to see a robust trail system that decreases the reliance on vehicle transportation between and within these communities.
- Trail system that appeals both to recreation and utility. I would like to have more safe access to run/bike commuting routes. I would love to have more varied trail and connecting options near my home. I would like to see the trails, like road, have both some main arteries that provide a safe transportation corridor as well as side trails that get closer to nature.
- I hope to see a quality connected network of trails throughout the triangle. Trails will be well signed, and longer trails or loops will be branded/marketed in an appealing way. Smaller feeder trails will connect throughout the triangle to larger paved trails that enable bike commuting into and out of Bozeman from the more remote reaches of the triangle.

Accessibility & Comfort

Provide for most accessibility – taking into consideration all abilities and types of users

- Consider different abilities and ages
- Consider different activities (true single track and family neighborhood trails) – possible parallel trails with different uses.
- Consider access / poverty and diversity
- Consider winter use – connect to maintained x-country ski trails
- If paved, can you have a parallel trail of natural surface for walking/horseback?
- Consider future transit and park & ride.
- ADA toilet / porta potty
- Shelter and resting areas
- BIPOC community
- POC (i.e., MT Racial Equity Project) and Indigenous groups (i.e.: Indian People's Network) and center their recommendations in your plans.
- Best trails are at least 10 feet wide, are away from roads, use natural landscaping, and consider all types of users in their design. Often there are parallel trails -- one for those on foot and one for those on wheels.

- Plan ahead for electric bike and small pods used for transportation – make sure separated and wide enough
- Ability to connect with nature / natural surroundings

Amenities

- Benches
- Shelter
- Water
- Restrooms
- Garbage and recycling
- Wayfinding and interpretative signage
- Especially adjacent to community gardens and food forests

Design Standards

- Create standards that work to reduce user conflicts on the trail.
- Different types of trails will provide for different types of uses – walking the dog vs. commuting vs. exercise.
- Create standards for trail development and adopt these to ensure connectivity and consistency – same or very close Bozeman, Belgrade and County.
- The County transportation standards adopted earlier this year address trails but having a trails plan adopted that shows specific routes and level of development for trails will be another good tool.
- Complete streets resolution, but no regulatory teeth – follow complete streets guidelines

Trail System Structure

Like the tiered approach of neighborhood, connector and commuter trails that are integrated

- There is understanding and support that neighborhood trails (local) would have different standards and maintenance than commuter trails
- Complete the perimeter (arterials)– separated, paved, maintained pathway along Jackrabbit, Frontage and Huffine.
- Create other “spines” (collectors) – that are more enjoyable to travel on, less busy and noisy and can connect different destinations and neighborhoods.
- Use transit for major distances and then bike last mile
- Need a true transportation network not just trails
- Connect to future great American trail (rails to trails)
- Network on ½ to ¼ mile grid

Broad support for requiring developments to install and connect trail systems at the time of development (concurrency) just like all infrastructure. Need to ensure this is enforced / compliance.

- Trails should be embedded in plans, policies, and new developments.

Top Rated Trail Connections:

- Connection to communities
- Connection between neighborhoods, commercial areas, and schools

- Connections between neighborhoods and public open space (interconnected greenways)
- Connect the segments of trails that exist (Costco area and in Triangle)
- Connecting trails to commercial areas is an economic boost

Development Funding

Funding the development of trails – this topic had a variety of ideas from RID to grants to partnerships. 1% for trails, gas tax, federal funds, philanthropy – a variety is important. There were some comments about tax fatigue and the high cost of housing and being sensitive to adding more burden to residents. Take away was use a variety of mechanisms. Funding proportionality is fair.

Use public-private partnerships.

- Realtors not supportive of new tax
- State funds – emphasize front country and daily exercise needs
- MT Trail Stewardship
- LWCF
- Opportunity to pair transit and trails – grants like Smart Growth America
- Create district before the land is developed – funding source
- How do we pay for roads? – Just add 5 or 10% and cover the trail transportation network.
- Double positive of a gas tax of $0.02 – Missoula County example

Open House: existing budgets, grants, local option tax, developer pays for development and existing budgets for maintenance

Maintenance Funding

Funding for maintenance was also important and it was suggested several times to have this in a separate fund from development.

A variety of ideas were recommended – RID, using existing transportation maintenance funds, partnerships public-private, adopt a trail (businesses), similar approach to "I Plow Hyalite" initiative.

- Pool funding and hire private contractor for winter and summer maintenance.
- Use $$ in the county mil for maintenance – at least part of it.
- Partner with Streamline on trash and snow removal
- Snow removal is an issue for safe routes to school – should not be responsibility of school
- Asphalt/concrete – higher capital expense up front, but lower overall maintenance cost. We need an asphalt management approach because these facilities would have a longer life with the right maintenance program.
- Clear about who is responsible for maintenance

Wayfinding

People like the existing wayfinding that is used for GVLT's Main Street to the Mountains – keep this consistent theme and unify the trail systems in Bozeman, Belgrade and the Triangle this can be a unifying element.

- How far to? Am I on the right path?
- Is the path going to change (paved now but will turn to hard pack soil in 2 miles)
- Investigate an app for the trails system
- Use wayfinding to share the appropriate uses on that system and how far to popular destinations
- Trail etiquette
- Clear communication on allowed uses – better information and education
- Integrate trails and transit wayfinding on app

Destinations & Routes

Destinations that were identified:

- Schools – new high school, to be built schools (Bozeman is delaying development of the next elementary school, but it should be considered in this plan (west of Gooch Hill Road, south end of Woodland Park development to Elk Lane and west to 191), Cottonwood/Stucky another location, Monforton also looking for properties to expand.)
- Community Centers – YMCA
- Sports field complex
- Work – major employers
- Water – Gallatin River Access points or views, Hyalite, other waterways – use terrace / floodplains
- Water – canals – Farmers Canal
- Commercial nodes (market)
- Food and beverage – commercial nodes
- Along Blackwood
- Connecting Belgrade, Bozeman, Four Corner – perimeter
- Focus on connecting existing trails that have gaps
- Think about connections beyond Triangle (Rails to Trails)
- Can we look for opportunities with MSU ag land?
- Gooch Hill area is isolated – needs connections -along Stucky
- Fowler – Hyalite
- Oak Street, Durston Street, Love Lane
- Davis Lane
- More Parks between Baxter and Huffine off Durston and Love Lane. County gravel pit in future park?
- Four corners to Hot Springs (old RR grade)
- Existing trail systems leading to parks and recreational areas and then connecting with trails that generally parallel county roads...Most of the trail system was wide enough to accommodate small groups walking and much of it is paved especially near the parks
- Extend Valley Center to Bozeman / to Catamount St.
- Quail Run to Monforton School
- Separated paths along Fowler, Huffine, and College St.
- Heart of Valley dog park
- Harper Pucket
- Future Destination Park in Triangle?

- Quiet recreation opportunities – bike to hike.
- Bikers – mountain biking and Through bikers
- New Billings Clinic
- East of 19th and Blackwood – dense development in next 5 years
- Airport to Belgrade
- Park and ride opportunities / streamline integration
- Belgrade area – Thorpe and Amsterdam to Jackrabbit – Gallatin Heights connection
- Erwin Bridge Fishing Access
- Old railways
- Main connector and arterial streets such as Alaska, Oak, Davis, Harper Pucket, Hidden Valley, Love Lane, Durston, Baxter, etc.
- Connector trail between the Cimmeron neighborhood and Sundance Trail
- Path along 191 to Rainbow School
- Connect Elk Grove along Violet Rd
- NorthStar subdivision to Monforton School
- Trail that dead ends behind Christ the King church, suggest continuing south to Durston to pick up the Fowler trail or Valley West trails.
- Forest Park connection
- Paved trail through Meadowlark Ranch subdivision.
- Cameron Bridge
- Pedestrian bridge from Thorpe across I-90, the railroad tracks, and Frontage over to the northwest side of Belgrade
- Kagy (beginning at 11th) and going West. Also, on Stucky from 19th W to Cottonwood. Then on Cottonwood to Huffine.
- Frank Rd
- CJMS to Gallatin High
- Durston to Hulbert

Safety Issues

- Separation away from traffic
- Watch busy trucking areas (i.e., gravel pits)
- Baxter is scary
- Lighting
- Visual awareness and space
- Welcoming – multi-language wayfinding – all races.
- Indigenous land recognition
- Safety station? Do you need a friend? – Community care.
- Focus on unity and inclusion in design and wayfinding
- How do we get across Jackrabbit & Huffine?
- Need adopted safety standards
- Alaska Road is dangerous
- Consider sight line
- Some county roads in desperate need of upgrades (for ag and safety)
- Need to right size the crossing facility related to motor vehicle infrastructure. Paved separated

facilities along arterials, appropriately engineered crossings, designing roads for the speeds we want to see to enhance crossing safety, safe interactions between all users.

- Snow removal is an issue for safe routes to school
- Wider shoulders – avoid steep drop offs
- Consider speeds of e-bikes and where they can safely travel
- Tunnels and overpasses like Three Forks
- Pedestrian lead times and/or pedestrian scrambles at signalized intersections
- Reduced car speeds
- Gallatin heights and other underpasses for Jackrabbit
- Fowler and Huffine intersection is not safe
- Crossing over I 90

Irrigation Ditch Concerns

- NOT in ditch right of way for maintenance (possible in open space adjacent to right of way)
- Ditch easements are not public right of ways
- Public access has negative impacts on ditches (yard clippings, dog waste, liability)
- Maintaining access to and ease of ditch maintenance, e.g., planting of trees and shrubs, placement of trails
- Impacts to or destruction of trails during canal maintenance
- Liability insurance - requirements, increased costs
- General increased time and management costs to ditches
- Signage, EDUCATION, and enforcement - who will be responsible for that?
- Impacts to water quality (trash, dog waste, etc.)
- Users should pay for access, perhaps via an entity like the city or GVLT - if it's a desirable amenity, then there should be funding for insurance, maintenance, cleaning, signage, education, enforcement and this responsibility should NOT fall on the ditches.
- Big picture, if this is something people want and will pay for, there should be a "ditch trail" manager who is responsible for these things. Build it and then figure out how to manage use/ impacts after the fact is not an acceptable approach.
- Many of the waterways within the Triangle area are, in fact, irrigation ditches with existing easements on private land for the ditch companies to conduct maintenance and improvements. Ditch companies have huge concerns with people, kids, and dogs along their ditches due to the liability as well as people not respecting the water and its use to those who use it for a livelihood.
- Undersized Culverts
- I like the idea of the trail being 50' off the ditch bank and creating corridors. I have no problem with someone planting trees if they have water rights. I think they help protect the ditch bank. Grass growing and encroaching the ditch banks making the ditches smaller I think is a bigger issue.
- Not near farming operations – better along roads.
- Ensure development will continue the use of the ditch and maintenance - Planning of the subdivision and how it is accommodating the ditch is really important and has long lasting impacts beyond the developer and the future landowners – the ditch may continue on into the future to serve water rights or as irrigation for that subdivision.
- Better choice may use the ditch as part of the park land, but you need to ensure that maintenance could still happen – you cannot deny access due to state law – it is a prescriptive easement secured by adverse possession – the ditch is there and that is the easement – period according to state law. There is a secondary easement for maintenance that is in state law that

allows for access by only the people doing the maintenance.

- Legally the easement is not for trails, so it is not legal, and the ditch company does NOT own the land under that easement

General Challenges

- Roundabouts – how to incorporate bikes and pedestrian crossings SAFETY
- Commercial developments are not required to put in trails causing a break
- Crossing and curb cuts – need safety striping or lights depending on how busy.
- Need a system that can bridge the gaps between developments – temporary easements and buy backs?
- Need dedicated funds for maintenance.
- Protect Landowners and ditch companies from liability.
- Working with MDT regarding easement when they widen roads.
- Work with MDT for establishing separated shared use path when possible.
- Trash and gravel make trails unappealing – need clean up.
- Can trails offer wildlife corridor connections?
- Concern about sensitive wildlife areas (wetlands, riparian).
- Limit crossings to reduce impact on traffic flow
- Snowplows cover pathways
- Rivers and streams move over time and are sensitive areas – need a buffer and careful planning
- Lack of Connectivity is a barrier
- Unsafe crossings
- Lack of maintenance
- Wayfinding – confusing, not enough
- Not maintained – gravel, debris, garbage
- Safety – lack of lighting
- Roadways difficult to cross
- Not enough separation between cars and trails
- Link trails and bike lanes
- Bike lanes commuter routes, such as Baxter, Oak, and Love.
- E-bike speeds

Focus Group Participants

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Circle 4
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Spanish Peaks Sand and Gravel
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Nonprofit / Advocacy

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Gary Hellenga, Big Sky Wind Drinkers
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Ralph Zimmer, Pedestrian Traffic Safety Committee
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Appendix D: Trail Classification and Design Standards

In continuity with the Transportation section of the Triangle Community Plan, the Triangle Trails Plan is divided into three classes trail based use. The classifications are a combination of the City of Bozeman PROST Plan and draft Gallatin County Trails Report and Plan.

Trail Classification and Design Standards

Trails consist of a central walkable/ridable surface, known as a tread. Trails have a shoulder located on each side. The tread plus the shoulder is known as the clear width. The height above the trail with no obstacles like tree branches is known as the clear height.

Trails are classified based on the amount of traffic and type of use. As uses or intensity change, a trail may be upgraded in classification.

Class I Trail Design Standards

These paved commuter pathways connect larger community nodes trails. They are heavily used with full access and are designed use along major transportation corridors. These trails are designed to permit two-way traffic using an impervious surface material such as asphalt or concrete.

Width and Clearance

- 12 feet wide
- Width can be decreased to 10 feet in interior subdivision settings.
- 1' gravel shoulder, 2' minimum shoulder graded away from trail (2% max. slope)
- A minimum vertical clearance of 10' should be provided. Branches that could restrict the trail when weighted with snow or rain should also be removed.

Grade

- The maximum trail cross slope shall be 2%, sloping one direction, not crowned. The cross slopes on corners and curves shall be towards the inside where drainage permits.
- The maximum trail cross slope should be 5%, the cross slopes on corners and curves shall be towards the inside where drainage permits. If there is a segment that has a cross slope of more than 5%, the segment should be as short as possible.
- Maximum grade segments:

•8.3% for a maximum of 15.24m (50ft)

•10% for a maximum of 9.14m (30ft)

•12.5% for a maximum of 3.05m (10ft)

- Near the top and bottom of the maximum grade segments, the grade should transition to less than 5%. Rest intervals should be provided within 7.6m (25ft) of the max grade segment.
- There can be no abrupt change in surface level greater than ½ inch.

Cross Section

- Concrete - The trail base shall consist of a minimum of 3 inches of crushed gravel compacted to 95 percent of maximum density as determined by AASHTO T99. Concrete shall be a minimum of 6 inches of M4000
- Asphalt -Excavate 11.5 inches of material. Install a minimum of 9 inches of crushed gravel compacted to 95 percent of maximum density as determined by AASHTO T99, unless otherwise

dictated by sub-soil type materials being compacted to road standard. The overlay shall consist of 2.5 inches of asphalt compacted to 93 percent of maximum density, as determined by ASTMD 2041. Construction seal shall be applied at 0.08 gallon/square yard after installation.

Material

- To decrease long term maintenance, tread surface must predominately be impervious material such as asphalt, concrete, pavers set on concrete, or wood decking
- Porous surfaces (permeable pavers, porous asphalt, porous rubber) should be a priority in sensitive areas.
- The tread material including any base course will have a total minimum thickness of six inches.
- Wood deck planks must be run perpendicular to the direction of travel and joints must not exceed 36 inches. Planks must be securely fastened so they do not warp.

Class II Trails

These trails receive moderate use intended for multiple non-motorized, recreational and commuter users. These trails connect meaningful destinations, such as neighborhoods, schools, and hubs of commercial activity. Class II trails are constructed of natural fines and are 6 feet in width.

Width and Clearance

- Single surfaced tread with a minimum width of five or six feet.
- Tread width may be reduced to 36 inches for a maximum distance of 30 feet to pass or preserve significant features such as rock formations, important vegetation, etc.
- The minimum cleared zone will be tread width plus 2 feet to either side of the tread and 10 feet vertical. In no instance may the overhead clear height be less than 8 feet.

Grade

- A cross-slope of no less than 2 percent and no more than 5 percent to provide for water drainage is allowed.
- Maximum sustained running grade is 5%. A 10% maximum grade is allowed for a maximum distance of 30 feet.
- Tread will be raised above adjacent surfaces and have a 1-to-2-inch crown. Where this requirement is not possible, the tread will have a 1 to 20 cross slope and/or side ditches outside the cleared zone.
- Stream crossings will be over culverts or bridges.
- Only dips or slot-entrance drainpipe will be used for cross tread water stops.

Surface Material

Class II trails or portions of trails designed for ADA access will be surfaced with a minimum of wood decking, natural fines, or with a well maintained compacted crushed gravel meeting specifications in the figure below.

Percentage by Weight Passing Square Mesh Sieves

Passing	Crushed Top Surface	Crushed Base Course	Pit Run Gravel Base Course
3 inch sieve			
2 inch sieve			100%
1 inch sieve		100%	
1/2 inch sieve			
3/8 inch sieve	100%		
No. 4 sieve	50–80%	25–60%	
No. 10 sieve	35–70%		
No. 200 sieve	8–15%	6–12%	10–15%

- A gravel or particulate tread surface will be a minimum of six inches thick.
- Wood chips are not an acceptable tread material for Class II trails.
- Geo-textile material will be placed beneath the tread material in poorly drained, boggy or marshy areas, or wet meadows and on any of the following soil types: clays, clayey loams, silts, silty loams, or less.

Geo-textiles for all Classes of Trails:

a. The preferred geo-textile is a continuous filament non-woven needle-punched engineering geo-fabric.
b. An acceptable geo-textile is a woven engineering geo-fabric.
c. Minimum geo-textile requirements:

Property	Non-woven	Woven
Mass per unit area (ASTM D-3776)	4 oz/sqyd	N/A
Thickness (ASTM D-1777)	60 mils	N/A
Flow Rate (ASTM D-449)	100 gpm/sqft	40 gpm/sqft
Puncture Resistance (ASTM D-3787)	50 lbs	70 lbs
Trapezoid Tear Strength (ASTM D-4533)	40 lbs	45 lbs
Grab Tensile Elongation (ASTM D-4632)	100 lbs @ 60%	140 lbs @ 15%

Cross Section

- The trail bed must be excavated 6 inches deep, prior to installation of tread mix.
- Tread mix shall be installed in two parts. The first 3-inch lift shall be of ¾ inch Road mix, compacted to 95%, and then 3/8th inch minus gravel (natural fines) compacted to 95%.

• *(If moisture content is not adequate for compaction, water should be added prior to rolling and compacting).*

- Natural fines used for these trails shall consist of 80 percent sand, 10 percent silt and 10 percent clay.

• *If the natural fines tread mix does not contain enough clay or soil binder, additional binder must be mixed in.*

- Geo-textile material will be placed beneath and gravel or particulate tread material in poorly

drained, boggy or marshy areas, or wet meadows and on any of the following soil types: clays, clayey loams, silts, silty. The preferred material is non-woven needle-punched engineering geo-fabric, but woven is acceptable. Fabric should be selected for use and durability.

Width and Clearance

- Single surfaced or unsurfaced tread, five-foot minimum width. Tread width may be reduced to 32 inches for a maximum distance of 30 feet to pass or preserve significant features such as rock formations, important vegetation, etc.
- The minimum cleared zone will be tread width plus one foot horizontal, and ten feet vertical.

Grade

- Grades will be 15% or less. Class II trails or portions of trails designed for ADA access will have a maximum sustained running grade of 8% and a 14% maximum grade is allowed when resting intervals are provided every (5 ft), and the maximum cross slope is 5 percent.
- Tread will be raised above the adjacent surfaces and have a 4 inch crown. Where this requirement is not possible the tread will have a 1:20 cross slope and/or side ditches outside the cleared zone.
- Changes in level:
    - *Should not exceed 51mm (2 in)*
    - *May be up to a maximum of 76mm (3 in) in areas where 51mm cannot be attained and the slope of the trail is less than 5% in any direction.*
    - *Obstacles over 51mm (2 in) in height should be removed*
- Stream crossings will be over culverts or bridges.
- Only dips, slot-entrance drainpipe, or rubber belting will be used for cross-tread water stops.

Class III Trails

Class III trails are narrower neighborhood soft surface trails that connect locally to parks and open space These trails receive moderate to low use and are typically 3-5 feet in width. They are either natural trails developed by use over time or constructed with natural fines. ADA accessibility may be limited as trails typically follow the natural contours.

Material

- Preparation varies from machine-worked surfaces to those worn only by usage
- No surfacing is required except in erosion prone poorly drained, boggy or marshy areas, or wet meadows.
- Wood chip tread materials are acceptable when traffic is limited to pedestrian traffic in sensitive locations such as in wetland nature education areas.

Cross Section

- No trail bed excavation is required.

Width & Clearance

- Tread width minimum is three feet.
- The minimum clear zone will be the tread width horizontally and seven feet vertically.

Grade

- Provide positive drainage for the tread.
- Grades typically follow the natural topography
- ADA access is extremely limited
- Utilize grade dips, cross sloping, and water bars to minimize erosion.

- Blending the trail into the setting is emphasized in trail routing.
- Applicable to all Trail Classifications
- Adequate visibility for safety.
- The minimum acceptable trail easement width is 25 feet.
- Trail entrances will be signed describing the degree of ADA access.
- All above items may be modified to meet current ADA specifications.
- A minimum of 5-foot separation between edge of path to top of slope that is greater than 1V:3H, if not met, a railing must be implemented.

Drainage

Culvert

- Drainage shall pass under the trail by culvert or chase drain designed for 25-year storm event with no surcharging.
- The minimum culvert diameter should be 15” and a flared end section is required.
- Culverts should run perpendicular to the trail, sloping drain downslope with a slope of 2-5%.
- Culvert should extend 12” beyond edge of trail (up-slope) and 4” into sump. Where no sump is included, culvert should extend 12” beyond trail down- slope.
- A minimum of 6” cover should be above the culvert.

Ditches

- Appropriate crossing treatment for all trails that need to cross ditches.
- Need for a no-rise floodplain analysis on jurisdictional waterways.
- Shall have a flat bottom of 8” in width and be dug to a minimum depth of 12” within 2’ of the trail tread.
- Drainage ditch slope shall be greater than 2% with increasing depth to a point where natural grade allows for discharge.
- Where drainage ditches slope at greater than 1’ vertically in 12’ for more than 30’, provide a 6”x6” timber check-dam, across the bottom of the ditch embedded 12” into each side 10’ spacing.
- Rock spillways shall be provided with the width or diameter of the drainage structure and 3x that dimension down-slope. Spillway shall drain a minimum 2% slope or conform to the existing slope.

Bridges

- Bridges should be as wide as the path with an additional (2 ft) buffer on either side.
- The height of the bridge is measured from the bridge deck to the bottom of the stream or river. If the deck is more than 30 inches high a protective rail is required.
- Rails are to be 42 inches high, with at least one mid rail at 34inches, to be used as a handrail. A protective barrier must be installed along the length of the rail system with either solid paneling or vertical bars.
- Spacing between bars shall be no greater than 9 inches or less than 3.5 inches.
- If the bridge does not require a rail it must have a 3-inch-high curb on both sides along the entire length of the bridge.
- The deck should be constructed of slip-resistant material.
- The deck of the bridge shall not exceed a12:1 slope along any part of its length.
- The deck and ends of the bridge must have no abrupt change in surface level greater than ½ inch. Cross slope shall not exceed 2 percent. Bridges must be rated for weight load distribution in
- All bridges to be installed on public lands must be certified by a licensed civil or structural

engineer

Waterway Setbacks and Vegetative Buffers

- Riparian buffers are strips of vegetation along the banks of creeks and streams. They can serve many purposes including:

•*Protecting stream/creek bank integrity*

•*Providing pollutant removal for runoff and interflow*

•*Supporting necessary wildlife habitat*

- The proposed setback for streams, ditches, and waterways shall be at least 30-feet as measured from the high-water mark or top of bank, when the high water mark is not distinguishable.
- The trail must be designed to limit or discourage foot traffic into the setback.

Intersections

- Curb cuts shall be provided at all street / trail connections.
- Trail widths should be increased at intersections. Signage must be added and in accordance with MUTCD. Right of way must be determined and signed appropriately.
- Visible crosswalks across the intersection must be included.

Signalized Intersections

- Intersections shall be designated with signs in accordance with MUTCD.
- Where crossing distances exceed 60ft, a crossing island should be considered. Crossing island width should be 6ft or greater. Truncated domes are required in ramps.
- Marked crosswalks shall meet MUTCD standards.

Un-Signalized Intersections

- All trail crossings shall intersect at a minimum of 60 degrees, preferably 90 degrees.
- Intersections shall be designated with signs in accordance with MUTCD.
- Special emphasis on crosswalk markings should be used to increase visibility. Crosswalks should be straight and in line with the trail. In street crosswalk signs must be installed at uncontrolled pedestrian crossings, most effective in two-lane, low-speed streets.
- RFBs can be used to increase yielding rates at uncontrolled or mid-block crossings.
- Curb ramps and detectable warnings should be used to ensure users with vision impairments are aware of the street.
- Line of sight should be unobstructed from both a seated and standing position. Longer site distances are required for shared use paths including equestrians and bicyclists.

Mid-Block Locations

- Mid-block trail crossings shall have a painted pedestrian crossing, with crossing and advanced crossing signs at either end.
- Mid-block crossings shall be located outside of the functional area of the nearest intersection.
- Mid-block crossing shall not be located within 100 ft from Stop or Yield controlled streets. Crossings shall not be located within 300 ft of non-signalized intersections and 400 ft from signalized intersections.
- Curb ramps and detectable warnings should be used to ensure users with vision impairments are aware of the street.
- Where a trail crossed an unpaved road or driveway, the road or driveway should be paved at a minimum of 20ft on each side of the crossing.
- Raised crosswalks may be utilized to slow traffic speeds, truncated domes are needed at curb lines and visible pavement markings are required on roadway approach slopes.

Grade Separated

- Sight lines must not be obstructed from both a seated and standing position.