



# 4 SECTION 4 TRAIL SYSTEM PLAN



# TRAIL SYSTEM OVERVIEW

As with parks, athletic facilities, and open spaces, the trail system is underpinned by the common vision defined in Sections 1 and 2. The overarching goals of the trail system are to:

1. Develop an interlinking system of high value trails, sidewalks, and on-street bikeways throughout the city that connect with regional trails and trails in adjoining communities
2. Provide reasonable trail access to the natural resource amenities within the community without unduly compromising their integrity and natural qualities
3. Provide an appropriate level of universal accessibility to trails throughout the system

## TRAIL SYSTEM PLAN INTRODUCTION

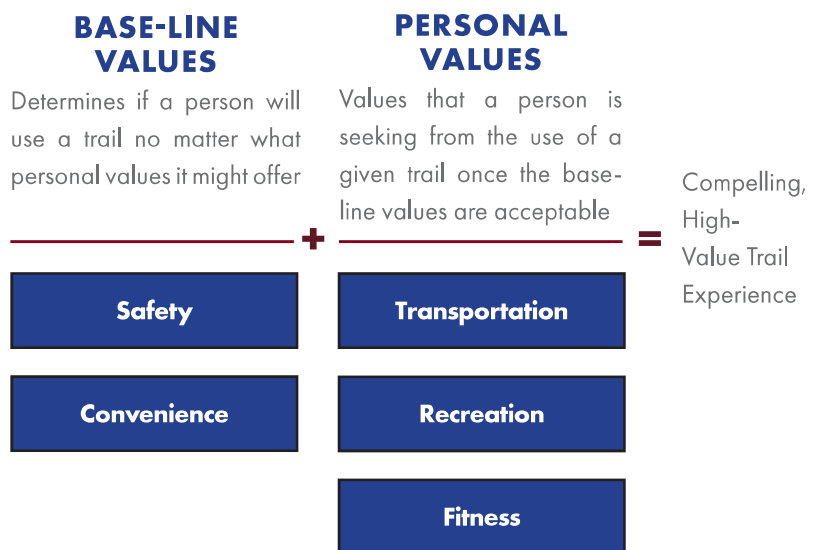
Trails, sidewalks, and on-street bikeways enhance the quality of life for Rogers residents by providing recreational, fitness, and transportation opportunities for multiple users, including people walking, bicycling, and in-line skating. The Rogers trail system plan provides information on trail classifications, the local trail system plan, trail amenities, bicyclist user groups, bikeway types, and design guidance for trails and bikeways.

## TRAIL VALUES

A key concept of the trail guidelines is maximizing the value of trails to local residents. The values ascribed to trails are important because they are at the core of why a person uses a particular trail on a repeat basis. Preference studies clearly indicate that trail users make a distinction between trails based on their perception of value, as figure 4.1 illustrates. Attention to the principles of trail design when trails are being planned will help ensure that each of these values will be maximized, resulting in high-quality trails to which users will return time and again.

**Figure 4.1 – Personal Values Ascribed to Trails**

*Source: Modified from MN DNR's Trail Planning, Design, and Development Guidelines (2007)*





**Safety and convenience are critical to the success of a trail.** This photo illustrates how open sightlines help improve the perception of safety for trail users. This is especially important when a parent is using the trail with young children.



**High value trails are most often scenic and away from traffic.** This photo illustrates a trail through a greenway system that interlinks with neighborhood parks, making the trail itself a part of the recreational experience.

### Safety

A sense of physical and personal safety is the most important trail value, and without it people are disinclined to use a trail irrespective of how many other values it might provide. Physical safety can be relatively assured through good trail design. Personal safety, which relates to a sense of well-being while using a trail, is a less tangible yet still important factor that cannot be taken lightly. Safety of trails can also be influenced by the general design and maintenance of trails and their surroundings, a concept known as crime prevention through environmental design (CPTED). Natural surveillance is one principle of CPTED, which ensures that the trail environment can be easily seen by others and has clear sightlines.

### Convenience

Convenience is important for day-to-day use of a trail. As defined in Section 1, studies have shown that the vast majority of shared-use paved trails are used by those living within a few miles of the trail.

Although convenience is important, its influence is still tempered by recreational value. No matter how convenient, a poorly designed trail in an uninteresting setting will have limited recreational value. Alternatively, a well-designed trail in an interesting setting might draw users from some distance. Trails should be located where they are both convenient and offer the recreational amenities that users are seeking.

### Recreation

Of all the values ascribed to a trail, its recreational value is the most important in terms of predicting its level of use, assuming that safety and convenience are not issues. In general, trails offering a high-quality recreational experience are those that:

- Are scenic and located in a pleasant park-like setting, natural open space, or linear corridor away from traffic and the built environment
- Provide a continuous and varying experience that takes visitors to a variety of destinations and is a destination unto itself
- Offer continuity with limited interruptions and impediments to travel

This underscores that trail planning must be based on criteria that go beyond simply providing miles of trail – with considerable emphasis on the quality of the trail experience.

In Rogers, creating trails with high recreational value inherently affects community planning and development. Planning for trails that follow greenways that seamlessly traverse public open spaces and private developments alike is considerably different than planning for trails that follow road rights-of-way. While greenway-based trails often pose more challenges to plan and implement, the value of these trails to the community has proven to be very high and worth the investment. Cities that have successfully integrated these types of trails often highlight them as key aspects of the community's quality of life.

### ***Fitness***

Fitness is a growing value that cannot be overlooked. Fortunately, this value is generally achieved if safety, convenience, recreational, and transportation values are met. Most critical to accommodating this value is developing an interlinking trail system that provides numerous route options with trail lengths necessary for the types of uses envisioned.

### ***Transportation***

A growing subset of the population use trails and bikeways for transportation purposes, both for commuting to work or school, but also for utilitarian purposes such as errands, shopping, or travelling to parks or restaurants. This is especially the case with shared-use paved trails, where bicycling, in-line skating, and walking are viable means of transportation, especially for people in urban and suburban settings. Trails and bikeways that are well designed, easily accessible, and connected to destinations or other facilities will help encourage more transportation use.



## COMMUNITY DESIRE FOR TRAIL CONNECTIONS

### COMMUNITY ENGAGEMENT

In 2014-2015, the City of Rogers conducted a community survey to determine the top issues facing the city and the opinions and suggestions of community members. Residents were asked to review various components and identify their "top priorities" for parks, trails, and recreation.

### TOP COMMUNITY PRIORITIES

- #1** Connect trails throughout the City and provide safe routes to schools
- #2** Pedestrian crossings over Interstate 94

## TRAIL SYSTEM FACILITIES

There are a variety of different facilities that make up the Rogers trail system. Each facility has different functions and varying applications. Table 4.2 provides an overview of each facility type, which are defined in more detail later in this section.

CLASSIFICATION	COMMON GUIDELINES	APPLICATION TO ROGERS
<i>Regional Trails</i>	Regional trails are typically longer trails that connect multiple communities in a region. The planning and designation of regional trails is led by Three Rivers Park District in collaboration with the City of Rogers and the Metropolitan Council. In order to be designated as Regional trails, they must first be identified through a master planning process.	Two regional trail master plans are approved in Rogers (Crow River Regional Trail and Rush Creek Regional Trail), in addition to the Diamond Lake Regional Trail Search Corridor.
<i>County Trails and Bikeways</i>	Hennepin County bikeways include off-street trails and on-street bike facilities. The County currently has over 2.5 miles of on-street bike facilities in Rogers, and has more planned facilities identified in the Hennepin County 2040 Bicycle Transportation Plan.	Future Hennepin County bikeways are anticipated to be primarily off-street trails, which may run parallel to existing roadways.
<i>Local Trails and Bikeways</i>	Local bikeways include both on-street bikeways and off-street trails. Local trails are designed to be multiuse, and may be located within a greenway, park, or open space, or within road rights-of-way or utility easements. Some local trails may run parallel to a roadway (also known as a sidepath).	Local on-street bikeways and off-street trails will form the backbone of the trail system, connecting to neighborhoods, adjoining communities, regional parks, and other facility types in the trail system.
<i>Sidewalks</i>	Sidewalks provide safe travel for walking and jogging routes within residential areas and business districts. Sidewalks also connect residents to parks and other destinations around the community. Although biking and in-line skating are allowed on sidewalks, the narrower width limit their use for this purpose. Sidewalks are most often located within road rights-of-way of a local street.	Sidewalks are primarily used as a means to connect neighborhoods to local destinations and developed areas, as well as to other facilities in the trail system. Sidewalks are an essential part of the trail system, particularly for those who rely on walking as a means of transportation, recreation, or exercise, such as youth, seniors, or non-car owners.
<i>Unpaved Trails</i>	Unpaved trails have a natural surface and are commonly developed in areas where hiking and jogging is expected to be the primary activity. These trails are not intended for bicyclists or in-line skaters.	Unpaved trails are primarily developed in natural parks as secondary connections to other trails, such as within a preserved natural area such as the Crow-Hassan Park Reserve.

**Figure 4.2 – Trail System Facilities**

The trail system features a variety of facilities, including regional, county, and local trails, bikeways, sidewalks, and unpaved trails.

## PLANNED TRAIL SYSTEM DEVELOPMENT

The Rogers trail system map (Figure 4.4) includes existing and planned off-street trails, on-street bikeways, and sidewalks that collectively form an integrated trail system. The map displays City of Rogers local facilities, Hennepin County facilities, and planned regional trails or regional search corridors from Three Rivers Park District and the Metropolitan Council for regional trails and the regional bicycle transportation network (RBTN). Figure 4.3 illustrates the potential build-out of the trail system, including existing and planned mileage for each facility type. The subsections below describe each planned facility type.

### Planned Regional Trails

There are two planned Three Rivers Park District (TRPD) regional trails located in Rogers, and one TRPD regional trail search corridor. TRPD's regional trails provide off-street trail connections between multiple communities in the region, and are popular with bicycle commuters and recreational users alike.

TRPD's Rush Creek Regional Trail currently links the Elm Creek Park Reserve to Coon Rapids Dam Regional Park. The [Rush Creek Regional Trail Master Plan](#) was approved in 2008 and calls for extending the trail west from Elm Creek Park Reserve through the southeast corner of Rogers and up to Crow-Hassan Park Reserve in northwest Rogers. The precise location of the regional trail will be determined as land and easements are acquired from willing property owners.

The second planned TRPD regional trail in Rogers is the [Crow River Regional Trail](#), which was approved in 2017 and has a proposed route that stretches from the Luce Line State Trail in Watertown Township, through Rogers, and over to the West Mississippi River Regional Trail in Dayton. The planned alignment begins in the southwest corner of Rogers, goes north along the eastern edge of the Crow-Hassan Park Reserve, and then turns east along 141<sup>st</sup> Ave towards the northeast corner of Rogers. The trail was originally planned to follow the Crow River, but the alignment has been shifted to 141<sup>st</sup> Ave because acquiring individual land parcels adjacent to the Crow River is likely to be too difficult. This new alignment provides greater access to neighborhoods, retail areas, and direct connections to Hassan Elementary School, Rogers Middle School, and Rogers High School.

Potential Trail System Mileage With Full Development			
Facility Type	Existing	Planned	Total
Regional Trails	.6	29.8	<b>30.4</b>
County On-street Bikeways	2.6	0	<b>2.6</b>
County Off-street Trails	1	11	<b>12</b>
Local On-street Bikeways	0	5.7	<b>5.7</b>
Local Off-street Trails	15.4	22.1	<b>37.5</b>
Sidewalks	26.6	0*	<b>26.6*</b>
Unpaved Trails	23.4	0	<b>23.4</b>
<b>Total</b>	<b>69</b>	<b>43.6</b>	<b>112.6*</b>

### Figure 4.3 – Potential Trail System Mileage with Full Development

The Rogers trail and bikeway system has the potential to grow to 113+ miles if all of the planned facilities are constructed.

\*This plan does not identify any planned sidewalks on the trail system map, but it is anticipated that the sidewalk network will grow as the City fills in gaps in the sidewalk network and as new development occurs in Rogers.



### *Metropolitan Council Regional Bikeway Search Corridors*

The [Metropolitan Council's Regional Bicycle Transportation Network \(RBTN\)](#) consists of prioritized alignments and corridors (where specific alignments are yet to be designated) that were developed for and adopted into the Metropolitan Council's 2040 Transportation Policy Plan. The goal of the RBTN is to establish an integrated seamless network of on-street bikeways and off-road trails to improve conditions for bicycle transportation at the regional level and to encourage planning and implementation of future bikeways by cities, counties, parks agencies, and the state, to support the network vision. There is one RBTN Tier 1 search corridor in Rogers, which begins in the southeast portion of Rogers and roughly follows Territorial Road to the northwest. This Plan recommends the RBTN alignment to follow Territorial Road and County Road 81, which are both planned Hennepin County off-street trails.

### *Hennepin County Trails and On-Street Bikeways*

The Hennepin County 2040 Bicycle Transportation Plan identifies several planned bikeways in Rogers, and this plan identifies 11 miles of off-street County bikeways. One of the planned bikeway alignments in the County bicycle plan was along the railroad tracks west of I-94, but this Plan proposes to move that County bikeway to Territorial Road because it provides a more direct route across the community and connects to more planned bikeways and trails. This Plan proposes that both the RBTN and planned County bikeway follow the same alignment on Territorial Road and County Road 81. Developing County bikeways requires coordination between the City of Rogers and the County, including planning, design, and funding.

### *Local Trails and On-Street Bikeways*

Local trails and on-street bikeways form the backbone of the local system. The City of Rogers has 15.4 miles of off-street trails and currently does not have any existing on-street bikeways. The plan identifies 22.1 miles of planned off-street trails and 5.7 miles of planned on-street local bikeways.

### *Sidewalks*

The City of Rogers currently has 26.6 miles of sidewalks in the City. This plan does not identify any planned sidewalks on the trail system plan map, but it is anticipated that the sidewalk network will grow as the City fills in gaps in the sidewalk network and as new development occurs.

### *I-94 Crossings*

The community survey conducted by the City of Rogers in 2014-2015 identified pedestrian crossings of I-94 as the #2 most important issue facing the city regarding the trail system. The trail system map (Figure 4.5) identifies six existing or planned crossings of Interstate 94, which traverses Rogers and creates a barrier that is challenging to cross for people walking and biking.

1. **141<sup>st</sup> Avenue** - Planned crossing on the existing 141<sup>st</sup> Ave bridge, which would connect to the existing and planned trail on 141<sup>st</sup> Ave. This is the planned Crow River Regional Trail route and will provide a gateway to future partnership projects to implement an improved I-94 crossing. During the design phase, additional analysis will be required to determine if the trail can be accommodated on the existing bridge or if a new trail bridge would be required.
2. **137<sup>th</sup> Avenue** - Planned crossing would connect the existing trail on 137<sup>th</sup> Ave to the existing sidewalk on Industrial Blvd. Would require new bridge or tunnel construction.
3. **Highway 101** - An existing trail is located on the Highway 101 bridge.
4. **Fletcher bypass** - Planned crossing that would require a new bridge or tunnel construction to connect Territorial Rd and Brockton Ln. This crossing would connect the planned Hennepin County off-street trails along County Road 81 and west of County Road 81 and the planned local bikeway east of I-94.
5. **County Road 81** - Planned crossing on existing bridge would be part of the planned Hennepin County off-street trail along County Road 81. During the design phase, additional analysis will be required to determine if the trail can be accommodated on the existing bridge or if a new trail bridge would be required.
6. **Brockton Lane** - Planned crossing on existing bridge would be part of the planned Hennepin County off-street trail along Brockton Lane. During the design phase, additional analysis will be required to determine if the trail can be accommodated on the existing bridge or if a new trail bridge would be required.



*The existing bridge on 141st Avenue features a paved shoulder.*



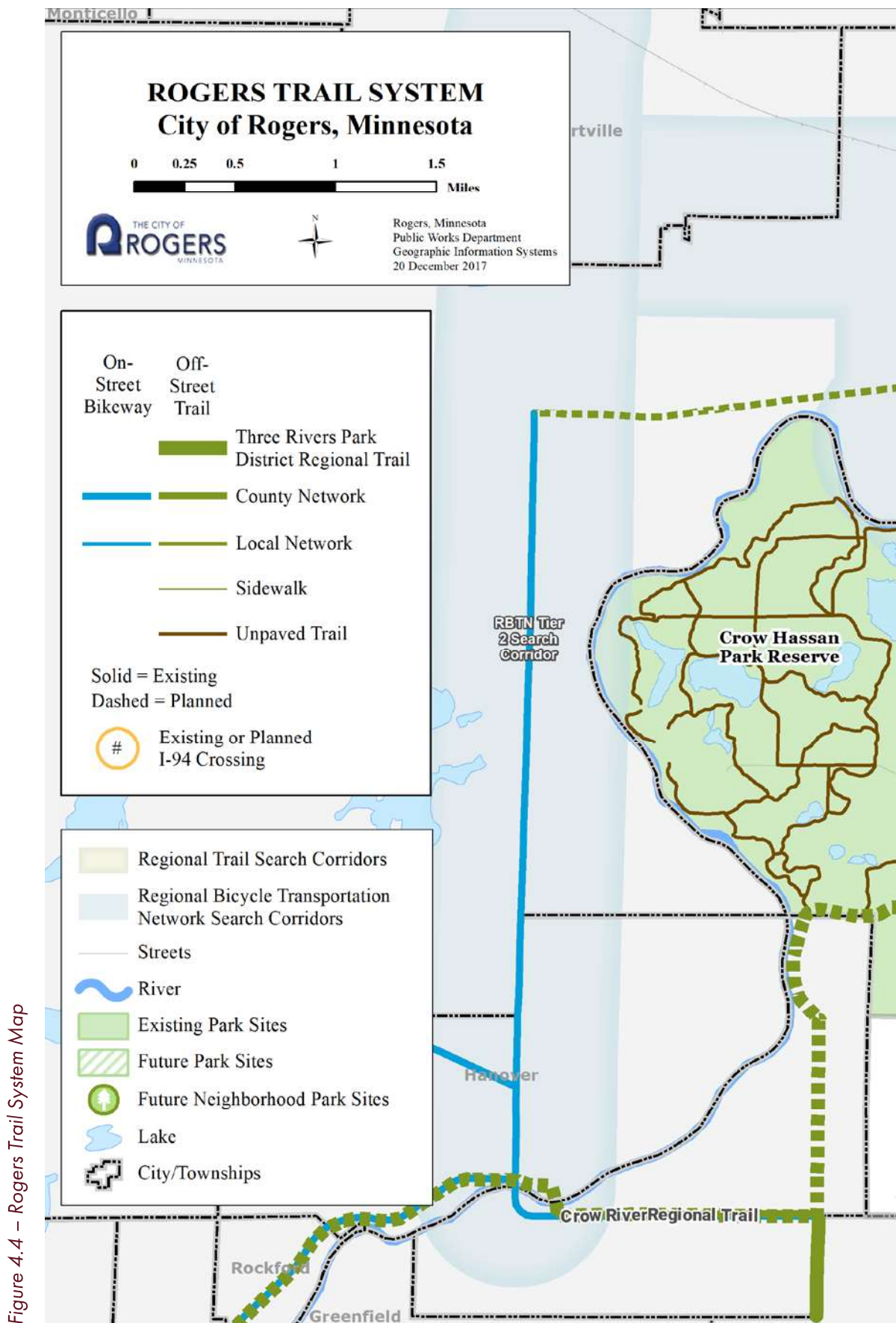


Figure 4.4 – Rogers Trail System Map

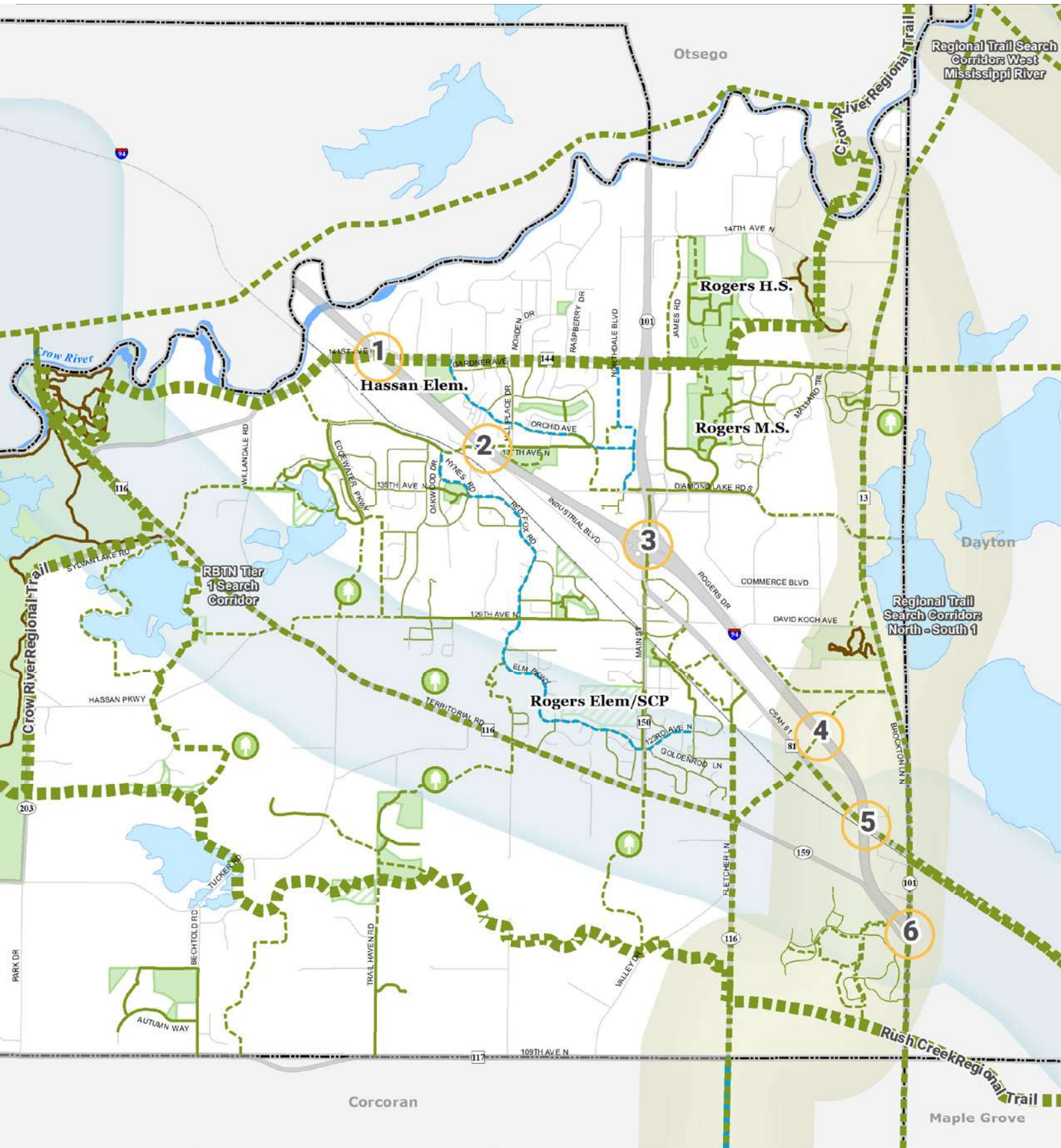
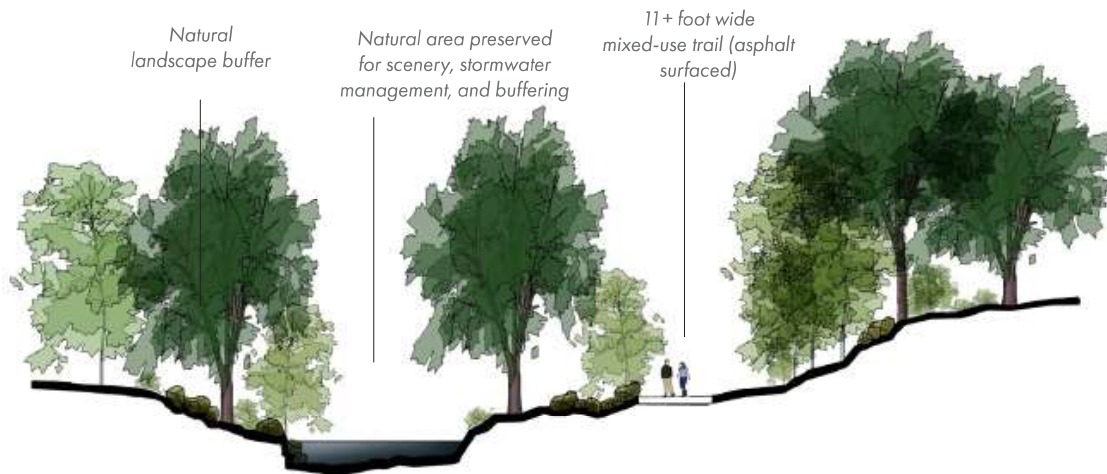




Figure 4.5 – Trails in Natural Greenway-Type Setting



The following sections describe and illustrate each type of facility included in the trail system plan.



Trails located within a greenway setting away from roadways and traffic are comfortable and scenic for recreational bicyclists, although they do not connect to as many destinations.

## LOCAL TRAILS

Local trails are paved trails that may be greenway based or right-of-way based. Greenway based trails are typically located within a park, parkway, open space, or designated trail corridor. Greenway based trails are most commonly used for recreation and exercise, and are less commonly used for transportation purposes. Figure 4.5 illustrates a typical greenway based trail cross section in a natural, scenic setting, and Figure 4.6 illustrates the character of the greenway-based trail and its relationship with adjacent development.

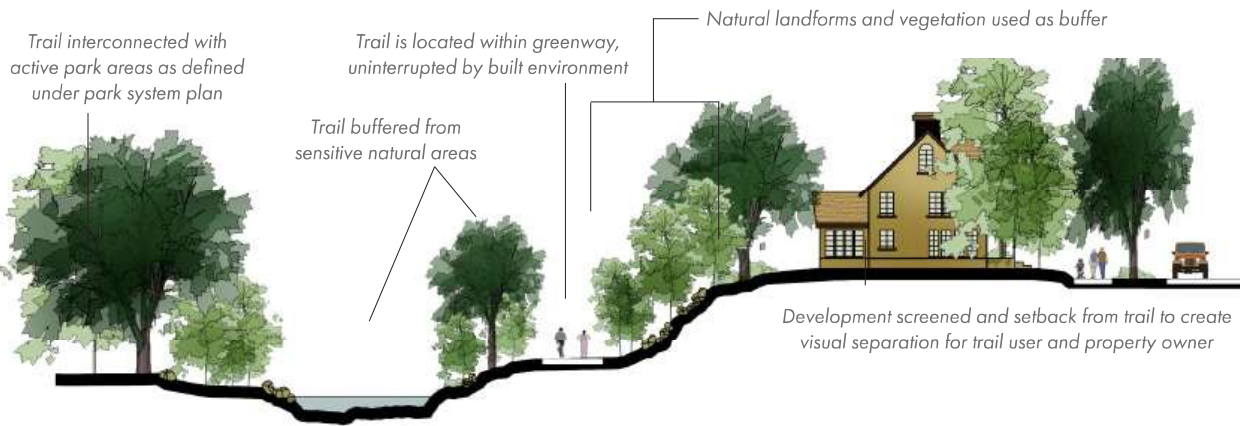
Right-of-way based trails are commonly developed alongside a roadway within road rights-of-way or utility easements and include a vegetative buffer space to physically separate trail users from the roadway (Figure 4.7). Whereas greenway trails typically attract users for exercise or recreational purposes, right-of-way based trails are also used for transportation purposes, such as walking or bicycling to destinations. These trails provide safe travel for pedestrians and bicyclists to and from parks and other destinations around the community.

**Integrating trails into the fabric of the community's built form as it is being developed is critical to the realization of greenway-based trails. Once development occurs, the likelihood of retrofitting this type of trail into a developed area is exceedingly difficult.**

### *Development Standards and Guidelines*

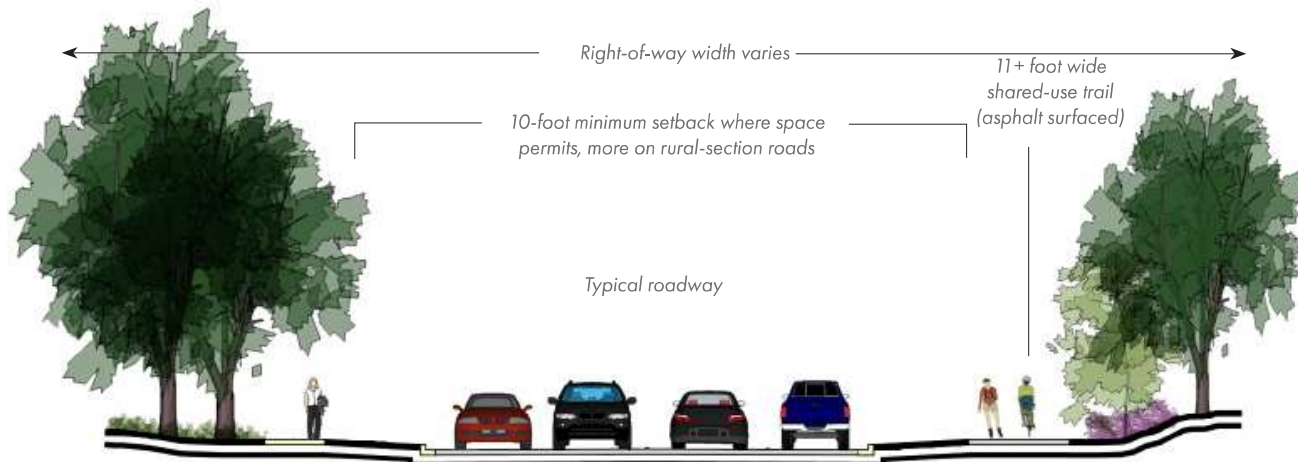
National guidelines (currently in draft form) recommend a minimum of 11 feet for multi-use trails. Eleven-foot wide trails are needed to enable a bicyclist to pass another trail user going the same direction at the same time a trail user is approaching from the opposite direction. National guidelines (currently in draft form) recommend a 12 to 14-foot wide trail where heavy use is anticipated. In constrained situations, trail widths of 8 feet is acceptable. All of these trails should meet accessibility standards whenever possible, which as a general rule means grades of 5 percent or less.

Figure 4.6 – Greenway-Based Trails and Adjacent Development



Adequate buffer space between the trail and the roadway provides a comfortable and appealing facility for a variety of trail users.

Figure 4.7 – Right-of-Way-Based Trails



A typical right-of-way based trail on one side of the roadway with a sidewalk on the other side. Depending on the circumstances, trails can be developed on one or both sides of the roadway. Trails on both sides of the road only occur when heavy use is anticipated.





## UNPAVED TRAILS

Unpaved trails are commonly used in areas where the anticipated uses are for recreation or exercise. The surface of unpaved trails are typically native soils, turf, crushed aggregate, or other non-asphalt or concrete surface. Figure 4.8 illustrates a cross section of a typical unpaved trail. The trail system map (Figure 4.4) only shows existing unpaved trails, although additional unpaved trails may be built in the future.

### *Development of Unpaved Trails*

Unpaved trails complement the paved trail system, and may be appropriate in situations such as:

- Secondary connections from the trail system through natural conservation areas or open spaces
- Within natural parks or preserve areas for interpretation and general hiking
- Within regional parks as defined under master plans prepared by Three Rivers Park District

### *Development Standards and Guidelines*

For most unpaved trails in Rogers, a width of 4 to 6 feet is appropriate when designed for pedestrian-only use. The difficulty level for unpaved trails used for this purpose should be relatively “easy” whenever possible, consistent with accepted standards.

Figure 4.8 – Unpaved Trails

Natural landscapes

Natural landscapes exhibiting unique landforms, vegetation patterns, and wildlife habitat

Interpretive signage

4 to 6-foot wide natural-surfaced trail for pedestrians only

Grass and native soils are the preferred surface for unpaved trails. Grass is typically suitable where use is light to moderate. Native soil surfaces are more common on trails that receive heavier use.

## SIDEWALKS

Sidewalks are typically constructed from concrete and are 5 to 6 feet wide, or up to 8 feet wide in areas with high pedestrian use such as in downtown Rogers. Sidewalks are most often located within road rights-of-way within a neighborhood, downtown area, or commercial district.

Sidewalks provide recreational value, but generally only serve walkers, joggers, and children on bikes. Older bicyclists and in-line skaters will not routinely use sidewalks because they are too narrow and the joints make for a rougher riding surface. The aerial image below shows some sidewalks in Rogers, which are typically only provided on one side of the street in residential developments.



*Sidewalks provide residents an opportunity to walk to local destinations, and give kids the opportunity to walk or bike to school.*



*The location of existing sidewalks varies considerably across the city. In most areas, sidewalks are provided along one side of the street through a neighborhood. Where provided, sidewalks add value to the trail system by providing a safe means for local residents to travel to the established trail system or get to a local park. Sidewalks should continue to be provided in new developments consistent with city standards.*

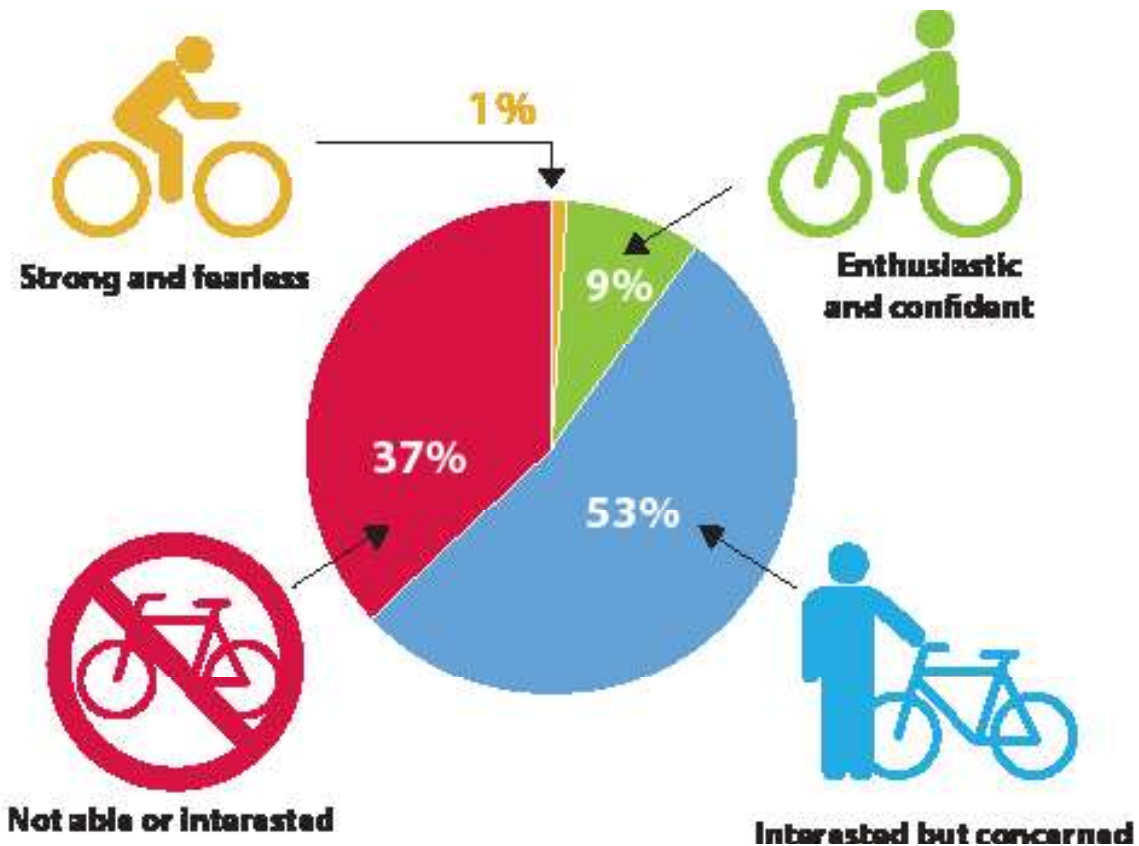


## RELATIONSHIP BETWEEN FACILITY TYPES AND BICYCLIST USERS

One of the primary users of the Rogers trail system is bicyclists, and there are many different types. Some bicyclists are comfortable riding on any type of bike facility, whether or not they have any physical separation from motor vehicles. Other bicyclists will only ride on a bike facility that has adequate physical separation from motor vehicles, such as an off-street trail. Understanding the array of bicyclist user types, their characteristics, and their facility preferences allows the City to build a trail and bikeway system that serves all users.

## BICYCLIST USER TYPES

Research conducted by the Oregon Transportation Research and Education Consortium shows that people can be categorized into four general attitudes and perceptions about bicycling (Figure 4.2): 'Strong and fearless', 'Enthusiastic and confident', 'Interested but concerned', and 'Not able or interested'. Many communities have succeeded in attracting 'Strong and fearless' and 'Enthusiastic and confident' bicyclists to bike for recreation and transportation. The challenge moving forward is to encourage the largest bicyclist user type, the 'Interested but concerned' group. These users value bikeway comfort and safety over directness or speed, and are typically less comfortable with on-street bikeways. It is important to understand general attitudes toward bicycling, as they provide clues as to which facility types are more likely to succeed.



**Figure 4.9 – Bicyclist User Types**

The four bicyclist user types and the percentage of the population that falls into each category. The research underlying this framework was done in Portland, Oregon, and the extent to which these attitudes hold true for the City of Rogers is unknown.

### *Strong and Fearless*

#### [ABOUT 1% OF THE POPULATION]

This group generally is undeterred by any roadway conditions or design. They often define themselves by their bicycling activity, and maintaining their identity as a bicyclist is important to them — they will bike for the sake of biking. They usually take the shortest route when biking for transportation, and will seek challenges when biking for recreation. These riders prefer separation from pedestrians more than they do from motor vehicles. They tend to wear specialized bicycle gear and ride high-performance bikes. Their passion for bicycling can make them vocal bicycle advocates, but it is important to consider their bicycling experience is far different from that of most people.

- Minimum bikeway: none different from roadways serving motor vehicles
- Preferred bikeway: shoulders or bike lanes
- Support facilities: fewer stop signs, signals timed to be compatible with bicycling speed, signals that detect bicycles, secure bicycle parking
- Education needs: rules of the road for when biking and when driving



**Strong and fearless**

### *Enthusiastic and Confident*

#### [ABOUT 9% OF THE POPULATION]

People in this group are comfortable sharing the roadway with automotive traffic, but prefer bikeways and will go a little out of their way to get to a better bikeway. Bicycling often is a secondary part of their identity and they will bike to maintain this status. They might wear clothing that works well for biking but also is wearable as everyday clothing that does not stand out.

- Minimum bikeway: bicycle boulevards, shoulders, bike lanes or roadside trails
- Preferred bikeway: buffered bike lanes, separated bike lanes, bike boulevards, off-street trails; a continuous network with few gaps is important to them
- Support facilities: secure bicycle parking, drinking water, intersection treatments that delineate bicycle space, trip planning
- Education needs: how and where to safely operate a bicycle, rules of the road when biking and driving, advanced bicycle repair



**Enthusiastic  
and confident**



### Interested but concerned

#### *Interested but Concerned*

##### [ABOUT 53% OF THE POPULATION]

This is the biggest group in the population and represent the greatest opportunity to increase bicycle ridership. This group includes people who prefer off-street trails for recreation and will ride for transportation where there are bikeways that make them feel safe. Comfort is a priority for them, and they need a significantly better connected, safer, and more comfortable bikeway system if they are to bike regularly for transportation. They do not identify themselves as bicyclists and would not feel guilty if they never biked again. One or two uncomfortable experiences can discourage these residents from getting back on their bikes for weeks or months. Many are on the cusp of falling into another group. A good bikeway network will nudge some of them into the enthusiastic and confident group, while a poor bikeway network will push others into the not able or interested group.

- Minimum bikeway: bicycle boulevards, buffered bike lanes, off-street trail
- Preferred bikeway: off-street trail with few motor vehicle interactions
- Support facilities: bike parking, drinking water, rest rooms, benches, trip planning, wayfinding
- Education needs: how and where to safely operate a bicycle, how to bike commute, how to bicycle with children, how to securely park a bicycle, rules of the road when biking and driving, basic bicycle repair



### Not able or interested

#### *Not Able or Interested*

##### [ABOUT 37% OF THE POPULATION]

This group includes people who have no current interest in bicycling at all for a variety of reasons, or they are unable to bike. Some in this group could transition into the interested but concerned group if environmental or personal circumstances change. They still will enjoy the benefits of a bicycling region.

- Bikeways: none needed, but a safe and connected system over time could encourage them to give bicycling a second look and they would typically start with short recreational rides
- Education needs: rules of the road for driving and bicycling if they drive, awareness of bicycling

## ON-STREET BIKEWAYS

On-street bikeways differ from trails in that they are dedicated solely to bicyclists, whereas trails are multi-use facilities and accommodate many different users. On-street bikeways (i.e., bike lanes, buffered bike lanes) are paved portions of roadways that serve as a means to safely separate bicyclists from motor vehicle traffic. Bikeways generally allow bicyclists to travel faster than on trails by providing a more direct, continuous route to destinations. Complementing shared-use trails with on-street bikeways enhances the overall trail system by making it more connected, complete, and convenient.

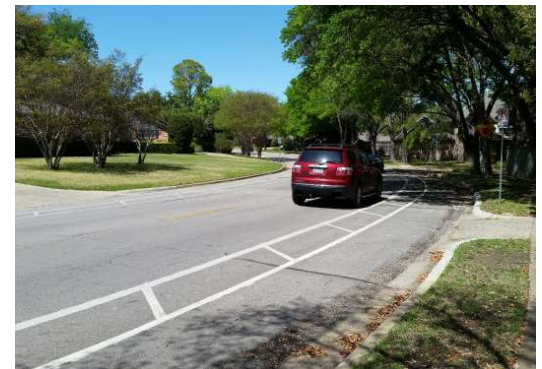
### *On-Street Bikeway Types*

There are many types of on-street bikeways that could be implemented to complement the trail system in Rogers. On-street bikeways range from paved shoulders, to bike lanes, and separated bike lanes. The facility type most appropriate for any given location depends on a number of factors, including the available right-of-way, motor vehicle speeds, and traffic volumes. Roadway conditions and land uses may change along the length of a corridor, which may result in the need to transition between bikeway types. The only on-street bicycle facility currently in Rogers is paved shoulders.

The distinction between a bike lane and bike route (paved shoulder) is the level of separation from motor vehicles, and often the roadway setting. A bike lane is a designated portion of the roadway defined by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists. A bike route, or paved shoulder, is a shared portion of the roadway that provides some separation between motor vehicles and bicyclists. Figure 4.10 summarizes various types of bikeways, as well as guidance to help choose which bikeway is most applicable to the roadway characteristics. These guidelines are based on national guidance, and are modified from the 2040 Hennepin County Bicycle Transportation Plan.



***Bike route (paved shoulder).***



***Buffered bike lanes provide a buffer space between motor vehicles and bicycles, which is more comfortable for most bicyclists.***

Figure 4.10: Overview and characteristics of bikeway types based on roadway characteristics.

	Bikeways				Separated Bikeways	
	On-street				On- or off-street	Off-street
Facility Type	Shoulder	Bicycle Boulevard	Bike lane	Buffered bike lane	Separated bike lane	Multi-use trail
Land use context	Suburban/rural	Urban/suburban	Urban/suburban	Urban/suburban	Urban/suburban	Urban/suburban/rural
Level of separation from motor vehicle traffic	Low	None	Low to moderate	Moderate to high	High	High
Traffic volume* (motor vehicles)	Low to moderate	Low	Moderate	Moderate to high	High	N/A
Posted speed limit	35-55 mph	25-25 mph	Varies	Varies	Varies	N/A
Street type	All**	Local or collector	All**	All**	All**	Independent right-of-way along minor or principal arterial
Minimum widths	5'-8' (width based on vehicle speed)	N/A	5' (with parking), 6' (curb adjacent)	5' (with parking) 6' (curb adjacent), 2' buffer	5' lane/3' buffer (one-way); 10' lane/3' buffer (two-way)	8' with 2' clear zone each side (one-way); preferred 11' with 2' clear zone each side (two-way)
Construct new or as part of pavement maintenance (re-striping)	Both	Both	Pavement maintenance	Pavement maintenance	Both	New

\* Traffic volume (average daily traffic): Low is less than 3,000 ADT; Moderate is 3,000-15,000 ADT; High is above 15,000 ADT

\*\* All=Streets where bicycle use is not prohibited. Bikeway types will vary based on roadway and land use context

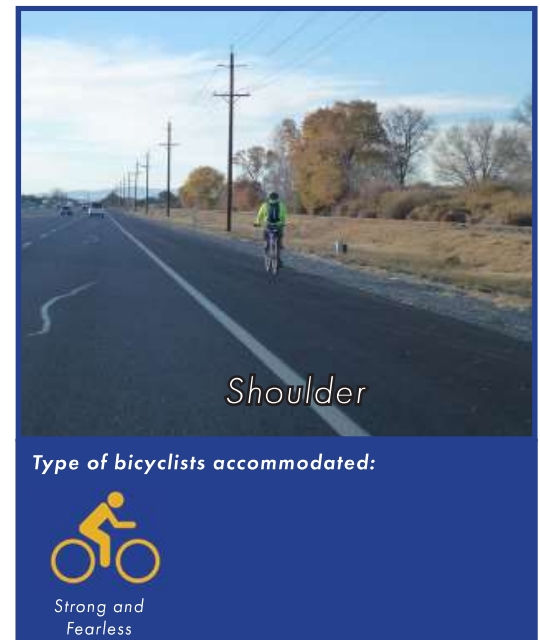
Information on each type of on-street bikeway is provided on the following pages.

## SHOULDER

Paved shoulders are typically located along moderate- to high- volume roadways in suburban and rural areas where there are long distances between intersections and access points. A paved shoulder improves bicycle connections where bike lanes would be inappropriate and a shared use trail would be prohibitively expensive.

### Roadway characteristics

- Suburban/rural context
- Low separation from motor vehicles
- Moderate to high vehicle traffic volumes
- 35-55 MPH (posted speed)
- Minimum width 5 feet (width should be determined based on motor vehicle speed)
- Best for strong and fearless group
- Also serves some of the enthusiastic and confident group, depending on context



## BICYCLE BOULEVARD

A bicycle boulevard is a type of bikeway typically suited for a local street that is low-speed and low-volume. A bicycle boulevard prioritizes bicycle traffic by turning stop signs to prioritize bike movements, giving bicycles the right of way, as well as using traffic calming features (i.e., bulb outs or traffic circles), vehicle diverters, enhanced signage for bicyclists' and other means. They are intended to improve safety and comfort and provide an alternative to higher speed roadways that may be more intimidating for bicyclists with less experience or confidence.

### Roadway characteristics

- Urban/suburban context
- No separation from motor vehicles
- Low vehicle traffic volumes
- 25 – 30 MPH (posted speed)
- Local or collector street
- Best for interested but concerned population
- Also serves enthusiastic and confident; and strong and fearless populations







*Bike Lane*

Type of bicyclists accommodated:



Strong and Fearless



Enthusiastic and Confident

### BIKE LANE

Bike lanes provide a dedicated space for bicyclists to operate alongside vehicle traffic. Bike lanes can be a low-cost option when adequate right-of-way is available, and often can be incorporated into roadway repaving or restriping projects.

Roadway characteristics

- Urban/suburban context
- Low to moderate separation from motor vehicles
- Moderate vehicle traffic volumes
- Speed limit varies
- Minimum width 5 feet (parking adjacent) to 6 feet (curb adjacent)
- Best for enthusiastic and confident; and strong and fearless groups
- Also serves interested but concerned group for critical connections, depending on context



*Buffered Bike Lane*

Type of bicyclists accommodated:



Strong and Fearless



Enthusiastic and Confident



Interested but Concerned

### BUFFERED BIKE LANE

Buffered bike lanes enhance traditional bike lanes by incorporating additional space between people biking and motor vehicles. The buffer can be incorporated to the right of the bicycle lane, protecting bicyclists from the door zone of parked vehicles, to the left of the bicycle lane, protecting people biking from motor vehicles, or both. This application is most appropriate on streets with moderate vehicle traffic volumes. Similar to the implementation of bike lanes, buffered bike lanes can often be implemented as a low-cost retrofit as part of a paving or restriping project.

Roadway characteristics

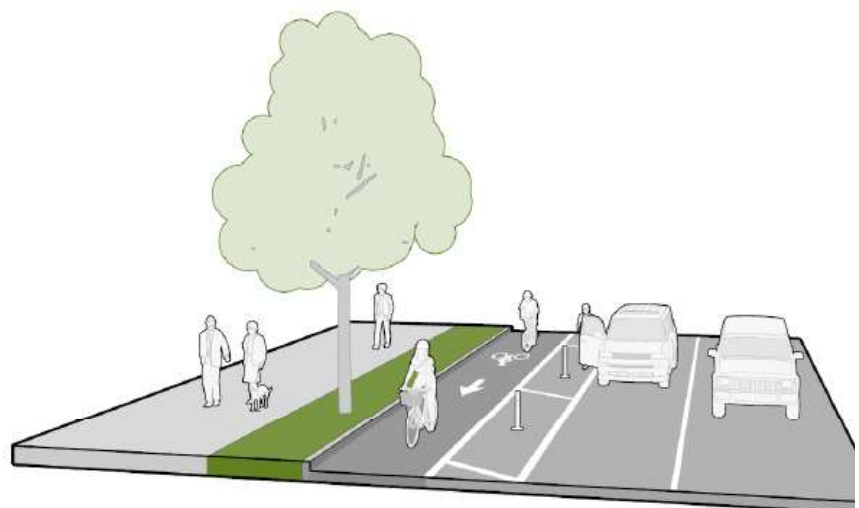
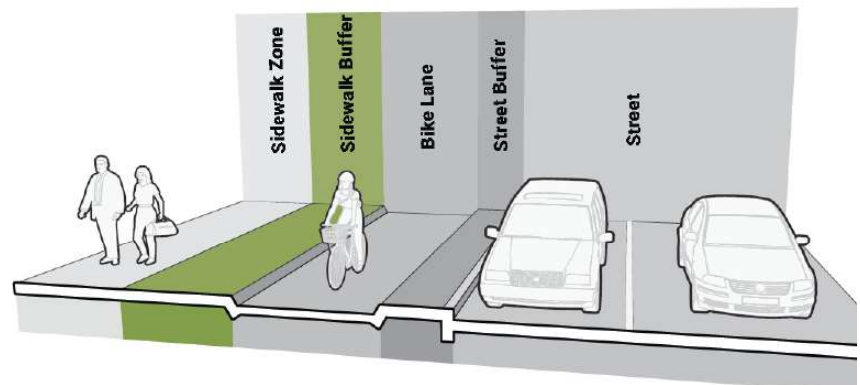
- Urban/suburban context
- Moderate to high separation from motor vehicles
- Moderate to high vehicle traffic volumes
- Speed limit varies
- Minimum width 5 feet (parking adjacent) to 6 feet (curb adjacent), minimum buffer 2 feet
- Best for enthusiastic and confident; and strong and fearless groups
- Also serves interested but concerned group and older children

## SEPARATED BIKE LANE

A separated bike lane, sometimes called a cycle track, is a type of bikeway that is vertically separated from motor vehicle traffic. A separated bicycle lane may be constructed at street level or at the sidewalk level, and can be a one-way or two-way facility. Separated bicycle lanes isolate bicyclists from motor vehicle traffic using a variety of methods, including curbs, raised concrete medians, flexible delineators (also known as bollards and flex posts), on-street parking, or large planter boxes. Separated bike lanes provide cyclists with a higher level of comfort compared to bicycle lanes, and are typically used on arterial streets where higher motor vehicle speeds exist. They may also be appropriate on high-volume but lower-speed streets.

### Roadway Characteristics

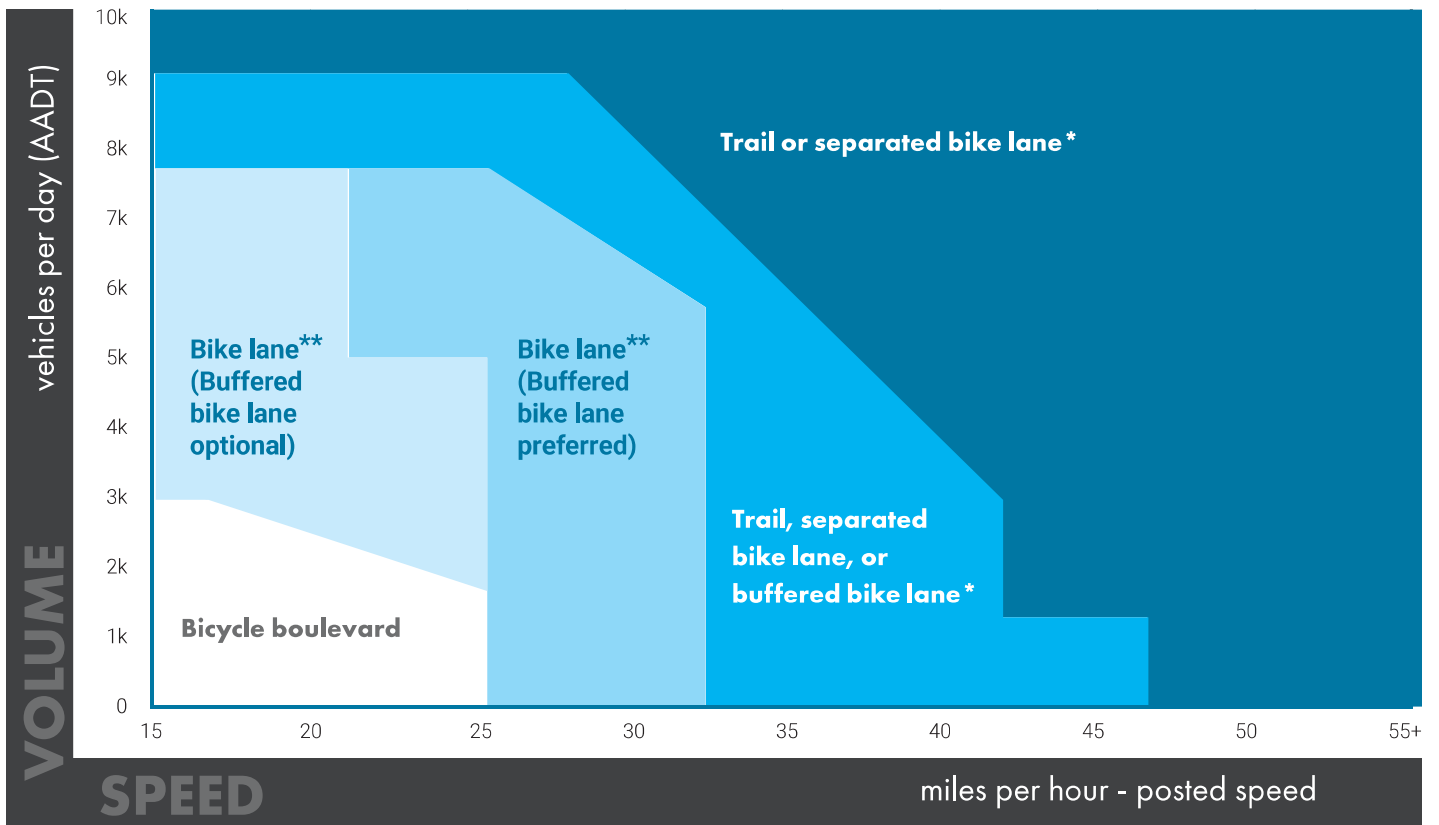
- Preferred width is 6.5 feet for a one-way facility, allowing for passing; 12 feet is preferred for a bi-directional facility
- Minimum width is five feet for a one-way facility, and eight feet for a bi-directional facility
- Preferably applied on medium to high-volume streets with an average daily traffic count of above 4,000 motor vehicles. Exceptions may be made for streets near K-12 schools.
- Appropriate on streets with operating speeds at 30 mph or higher
- Separated bicycle lanes require varying widths of buffer space between the bicycle lane and the adjacent lane. Small barriers such as flexible delineator posts or removable curbs can be separated with a minimum 2-foot buffer. In general, a 6-foot buffer is preferred for all separation methods.



### BICYCLE FACILITY SELECTION GUIDELINES

It is recommended to select bicycle facility types based on the “Interested but concerned” type of bicyclists, which makes up the largest share of the population and has the greatest opportunity for increasing bicycling in Rogers. This chart is based on the comfort level of the “Interested but concerned” bicyclists, a group that prefers physical separation as traffic volumes and speeds increase. The bikeway facility selection chart below identifies bikeway facilities that improve bicycling environment at different roadway speeds and traffic volumes. The “enthusiastic and confident” bicyclist will also prefer bikeway treatments noted in this chart.

Figure 4.11: Bikeway facility selection chart provides guidance for selecting a bikeway type based on existing roadway characteristics.



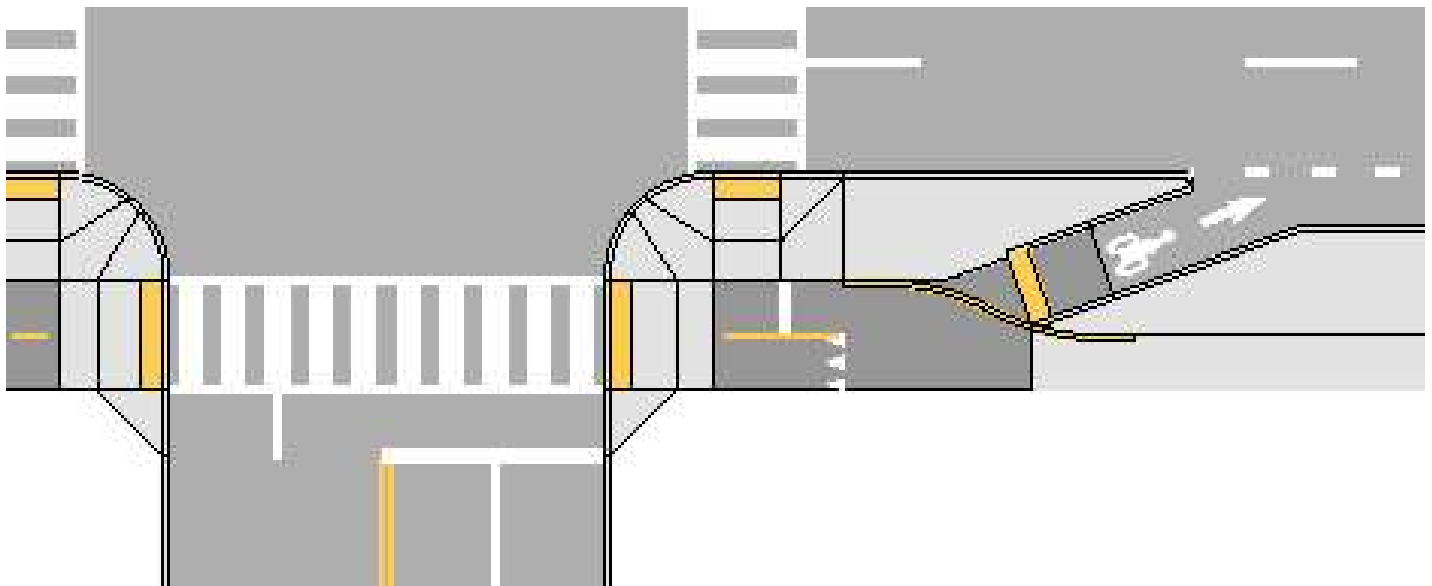
\* To determine whether to provide a shared-use trail, separated bike lane, or buffered bike lane, consider pedestrian and bicycle volumes or, in the absence of volume, consider land use.  
 \*\* Can use a bike route (shoulder) as necessary

## TRAIL AND BIKEWAY TRANSITIONS

Where a shared use trail crosses or terminates at an existing road, it is important to properly transition the trail into the existing on-street bicycle facilities to accommodate bicyclists, and into sidewalks to accommodate pedestrians and other trail users. Care should be taken to properly design a trail terminus to transition the trail traffic into a comfortable merging or diverging situation. Appropriate signing is needed to warn and direct bicyclists, pedestrians, and motorists at such transition areas.

Transitions should be seamless, intuitive, and designed to insure visibility and predictability for all users. Signalized or stop-controlled intersections can provide effective opportunities for rapid transitions to other types of facilities. In no case should a transition be so abrupt as to create a hazardous or confusing situation, particularly for bicyclists who are transitioning from facilities separated from motorized traffic into facilities that bring them into close proximity with motorized traffic.

Each roadway crossing is also an access point, and should therefore be designed to facilitate movements of trail users who either enter the trail from the road, or plan to exit the trail and use the roadway. It is particularly important to ensure trail users are provided with clear guidance to ensure they are going in the correct direction of travel when they exit the trail and enter the roadway, and that they are provided with frequent opportunities to depart from the trail as it comes within close proximity to, or connects with, the road network.



*An off-street, shared use trail can transition to an on-street bike facility and sidewalk after crossing through an intersection. Careful design consideration is needed to ensure that the transition is seamless, intuitive, and designed to insure visibility and predictability for all users.*

### TRAIL CROSSING TREATMENTS

Where trails intersect roadways, the crossing design should minimize trail users' exposure to traffic, and minimize the speed differential at the points where travel movements intersect. Another goal is to provide clear messages regarding right of way to all users moving through an intersection in conjunction with design features that result in higher compliance where users are expected to yield. Figure 4.12 shows a trail crossing a roadway, which features optional but recommended MUTCD signs.

Please note the following:

1. crosswalk markings legally establish mid-block pedestrian crossing;
2. length varies: see MUTCD table 2C-4;
3. optional roadway markings;
4. shared-use trail centerline as needed;
5. optional trail markings and signage;
6. sign placement 4'-50' from crossing

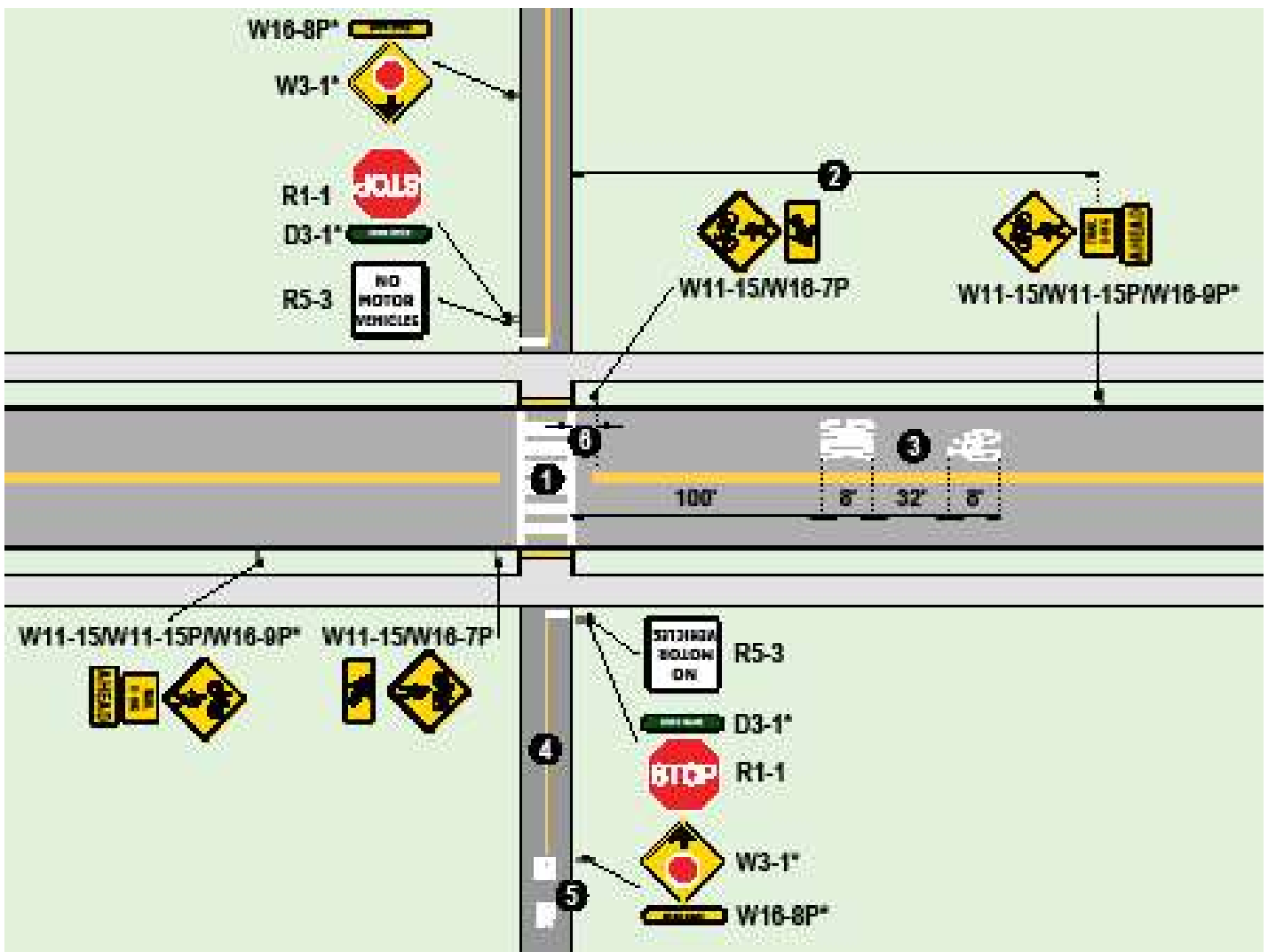


Figure 4.12: Trail crossings should be designed to minimize conflicts, reduce motor vehicle speeds, and provide signage to communicate the crossing to all modes.



## TRAIL AMENITIES

Trail related amenities include bicycle parking, motor vehicle parking, benches, lighting, water fountains and picnic tables, informational signage, wayfinding, benches, trash receptacles and more. Amenities enhance the experience of using trails, and may help attract trail users.

### *Bicycle Parking*

Consistent, organized bicycle parking encourages people to bicycle for transportation, provides site-specific benefits, and encourages good parking behavior. Inadequate bicycle parking facilities and fear of theft are major deterrents to bicycle transportation; as such, users are more likely to use a bicycle for transportation purposes if they are confident that they will find adequate bicycle parking at their destination.

The design of bicycle parking sites should consider a full occupied rack element and adequate space needed for users to access a parking space from both sides. The location of bicycle racks should follow these guidelines:

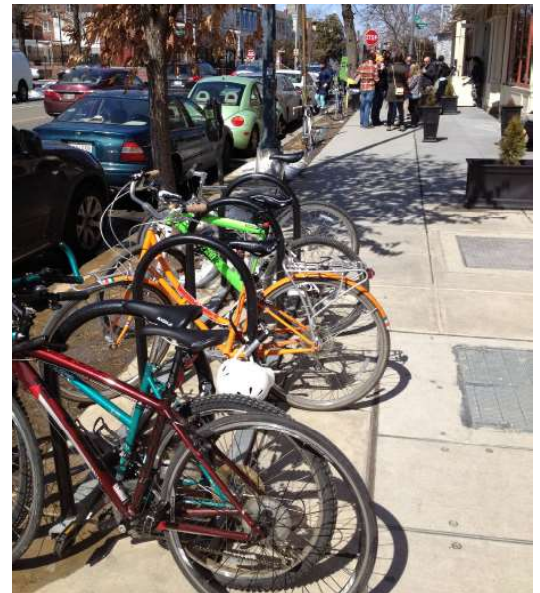
- Easily accessible from the street and protected from motor vehicle traffic;
- Visible to passers-by to promote use and enhance security;
- Does not impede or interfere with pedestrian traffic or maintenance activities;
- Does not block access to buildings or freight loading;
- Provides clearance for opening passenger-side doors of parked vehicles

Bicycle racks are manufactured in various shapes and sizes, however not all manufactured bicycle racks meet recommended standards. Features of an acceptable bicycle rack include:

- Bicycle rack should be secured to a permanent foundation;
- Use tamper-resistant hardware to fasten to location;
- Support a bicycle upright in two (2) or more places;
- Ability to support a variety of bicycle sizes and frame shapes; and
- Space to safely secure the frame with one or both wheels to the rack.



*Bike parking provided at trail heads allows users a convenient place to lock their bikes.*



*Bike parking on sidewalks in commercial areas provides a place for residents to lock their bikes while running errands, shopping, or dining. Bike parking also discourages bicyclists from locking their bikes to trees, railings, or other objects not designed for bike parking.*



### **Motor Vehicle Parking**

Most trail entrances do not provide off-street parking for motor vehicles, particularly where parking is located nearby, or where many users live within near the trail and are likely to either walk or bike to the entrance. For major trails that attract people travelling longer distances, off-street parking can be beneficial. The number of parking spaces should ideally be based on demand and include appropriate accessible spaces. However, vehicular parking is often constrained by the amount of property available. One method of determining parking demand is described in the Institute of Transportation Engineers publication, "Parking Generation"; other methods may also be appropriate.

### **Benches**

Trail entrances often act as meeting places and benches allow visitors to rest while waiting for other trail users. Trail users may also wish to rest after a walk or bicycle ride. Benches should be accessible and should generally be placed to maximize the view of people passing by, or a significant natural feature. It is generally not preferable to place a bench so that one's back is to the trail.

### **Lighting**

Lighting may be needed to improve safety and security at trail entrance that are open during evening hours.

### **Water Fountains**

Water fountains are a welcome amenity for some users, and can also be designed to provide water for pets. Water fountains are often placed at key locations along a trail system, such as at trailheads, restrooms, or shelter areas.

### **Picnic Tables**

Picnic tables are another welcome amenity for some users. In both cases, they should be accessible and should be placed away from the flow of trail traffic.

### **Informational Signage**

Informational signage can include helpful information such as the name of the trail, operating hours, "you are here" maps, contact information to report problems, emergency response information such as contact information, and trail rules and regulations. These should meet accessibility requirements for position, height and legibility of signs.

### **Bicycle Repair Stations**

Bicycle repair stations can be placed along trails or at trailheads to provide the public tools to perform basic bike repairs and maintenance, from adjusting brakes and derailleurs to inflating a flat tire. The tools are securely attached to a stand with stainless steel cables and tamper-proof fasteners to ensure they withstand weather and reduce theft. The stations typically include hanger arms which allows bikes to hang freely while making adjustments or repairs. Some bicycle repair stations come with a built-in air pump for inflating tires, or they may be sold separately.



*Bicycle repair stations provide quick access to bicycle repair tools for trail users, such as wrenches, screw drivers, and air pumps.*

## TRAIL MAINTENANCE

Several activities contribute to the maintenance of trails and bikeways, including those which are corrective, preventative, routine, and seasonal. Comprehensive maintenance covers the life of a trail from the conceptual stage to its eventual end. Trail and bikeway maintenance includes:

- Pavement markings (e.g. epoxy, latex, polypreform, thermoplastic)
- Pavement preservation (e.g. surface treatments, crack treatments, pothole repair, resurfacing)
- Routine maintenance (snow removal, sweeping, vegetation management)
- Sign and signal maintenance
- Traffic control (i.e. detours)

Snow and ice clearing

After constructing a trail, ongoing pavement preservation is important to maintain a smooth surface for users and prolong the life of the pavement. When selecting an appropriate pavement preservation method, it is important to consider the surface type and desired ride quality. Types of pavement preservation include: surface treatments, crack treatments, pothole and depression repair, and resurfacing. Properly maintaining trails on an on-going basis is more cost-effective than neglecting preventative maintenance and allowing the bikeway condition to decay to the point that reconstruction is needed (“pave it and leave it approach”). Figure 4.13 illustrates how neglecting pavement preservation treatments can cause a rapid decline in trail pavement condition.

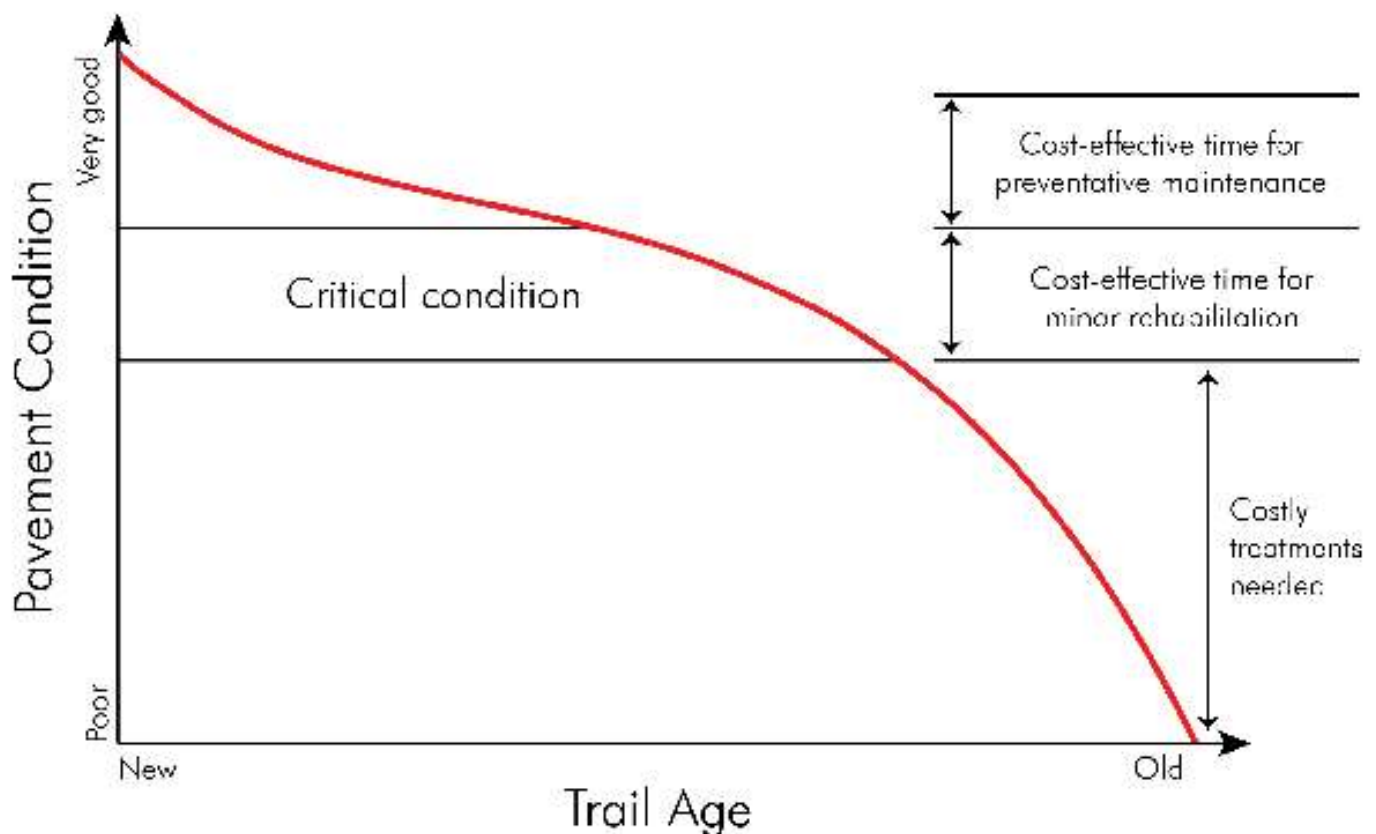


Figure 4.13: Preventative pavement maintenance and minor rehabilitation can significantly extend the lifespan of trails and help avoid costly future treatments such as mill and overlay or trail reconstruction.

Source: Modified from Minnesota Local Road Research Board

### *Surface Treatments*

Pavement surface treatments are intended to restore minor surface defects and to seal and refresh the pavement surface. These generally have relatively short lives when compared to pavement overlays, and must be re-applied on a regular basis to obtain maximum benefits. Surface treatments include the following:

#### FOG SEAL

Fog seals are a recommended application for sealing and enriching the asphalt surface, sealing minor cracks, helping prevent raveling (surface deterioration) on high volume open-graded friction courses and providing shoulder delineation.

#### SLURRY SEAL

Slurry seals are a mixture of fine aggregates (rock) ranging in size from approximately ¼ to ½ inch in diameter, asphalt emulsion (oil), water, and mineral filler, which is mostly Portland cement. Slurry seals, which are typically ¼ to ½" thick, may be used to seal existing oxidized and hardened asphalt pavements, slow surface raveling, seal small cracks, and improve skid resistance.

#### CHIP SEAL

Chip seals (also known as seal coats) are applications of asphalt followed immediately with a layer of small rocks. Applications with two layers are referred to as double chip seals. Seal coats are primarily used to protect the pavement from the deteriorating effects of sun (asphalt hardening and oxidation or "chalking") and water.

#### MICROSURFACING

Microsurfacing is a mix of polymermodified asphalt emulsion (oil), well graded and crushed mineral aggregate, mineral filler (normally Portland cement), water, and chemical additives that control the "break" (separation of water from asphalt) and evaporation time. Microsurfacing is primarily used as a preventive maintenance technique or surface treatment for asphalt pavements still in good general condition. Microsurfacing can slow raveling of aging asphalt pavements.

### *Crack Treatments*

Crack treatments are necessary to prevent moisture infiltration into bikeway pavements, which can accelerate pavement distress. Crack treatments should be applied within the first five years of pavement construction to achieve the maximum benefit, and then reapplied as needed thereafter. Common materials used primarily for asphalt crack treatments in Minnesota include crumb rubber, hot-poured elastic, and CRAFCO Mastic One.

### *Pothole and Depression Repair*

Even with proper maintenance, potholes and depressions can appear in pavement. Methods to repair potholes and depressions include hot mix asphalt patching, cold mix asphalt patching, and infrared patching.

### *Resurfacing*

After a bikeway pavement has reached the end of its useful life, it will need to be reconstructed or resurfaced. Methods of resurfacing include asphalt overlay, mill and overlay, – The removal of a surface layer of asphalt to remove surface defects prior to the application of a new layer of hot-mix asphalt surfacing, and ultrathin bonded wearing course.

