Auto Club Road Bikeway (Includes Segments along Bloomington Ferry Road and Southern Normandale Boulevard)

This corridor begins along Bloomington Ferry Road at the intersection with Old Shakopee Road. From there, it heads south to Auto Club Road, which it follows to the east until Normandale Boulevard and then ends at the intersection with Old Shakopee Road. The most important aspect of this last segment is making the connection with the 110th Street bikeway. Currently, with the exception of the lower loop of Auto Club Road (which is a 2-lane configuration), a 4-lane configuration is used on most of the street. Along the Bloomington Ferry Road segment turn lanes are also provided to aid turning movements into Dred Scott and nearby multi-family housing areas.

Traffic volumes along Auto Club Road are relatively moderate at 2,800 ADT or less. The segments along Bloomington Ferry Road and Normandale Boulevard are higher, approaching 6,000 and 8,900 ADT respectively. Other than near the two intersections with Old Shakopee Road, accommodating a bikeway along this corridor can be accomplished through the use of a 2-lane striping configuration, which leaves adequate space for a bikeway. A more detailed evaluation will be needed to determine the best way to integrate the bikeway near the two intersections. The following table provides an overview of the key factors associated with establishing this corridor as a designated bikeway.

Auto Club Road Bikeway Considerations and Recommendations

Factor	Considerations and Recommendations
Predominant Street Width	For the majority of its length, these streets are typically 44 feet wide, with a few sections being wider near the intersections with Old Shakopee Road.
Current and Proposed Striping Configuration	Currently, a 4-lane striping configuration is used for Auto Club Road and Normandale Boulevard. The street configuration gets more complicated along Bloomington Ferry Road. **Maintaining a 2-lane configuration for the entire length of this bikeway is optimal,** which allows for standard drive lanes plus an ample shoulder for a bike route 7 or 8 feet wide.
Major Intersections and Other Predominant Reconfiguration Issues	The intersections at Old Shakopee Road are two predominant issues associated with establishing a bikeway along this corridor. Each of these are designed with wider turning radii and turning lanes to accommodate truck turning movements. The striping layout at each of these intersections and a few blocks to the south will need to be individually considered to determine the best approach to maximizing safety and visibility of bicyclists to motor vehicles. Otherwise, no major physical constraints to accommodating a 2-lane striping configuration is envisioned.

As the aerial illustrates, the lower loop of Auto Club Road is already a 2-lane configuration. The remaining segments of this bikeway are currently a 4-lane configuration.

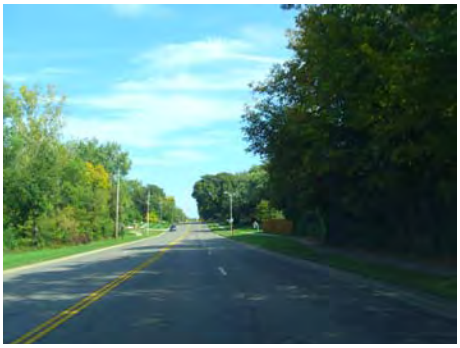
Note: Converting Minnesota Bluffs Drive to a 2-lane configuration should also be considered to maintain consistency along this street.

West 102nd Street Bikeway

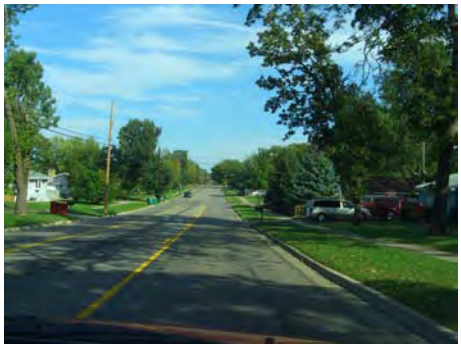
This corridor begins at Nesbitt Avenue on the western end and heads directly east until Penn Avenue. Traffic volumes along this corridor are between 2,800 and 6,600 ADT, with the latter being near the intersection with France Avenue. For the most part, accommodating a bikeway along this corridor can be accomplished through the use of a 2-lane striping configuration, which leaves adequate space for a bikeway. As the photos below illustrate, the street is not consistently wide enough for a 3-lane configuration while still leaving enough room for a bikeway. The following table provides an overview of the key factors associated with establishing this corridor as a designated bikeway.

West 102nd Street Bikeway Considerations and Recommendations

Factor	Considerations and Recommendations
Predominant Street Width	Across its length, West 102nd Street ranges between 41 and 44 feet wide, with a few sections being narrower.
Current and Proposed Striping Configuration	Currently, a combination of 4-lane and 3-lane striping configuration is used along this corridor. Since the road is not wide enough for a 3-lane configuration with a bike lane, **conversion to a 2-lane configuration for the entire length of this bikeway is optimal,** which allows for standard drive lanes plus an ample shoulder for a bike route of 6 to 8 feet in width.
Major Intersections and Other Predominant Reconfiguration Issues	The intersections at France Avenue and Penn Avenue/Old Shakopee Road are two predominant issues associated with establishing a bikeway along this corridor. Each of these are designed with wider turning radii and turning lanes. The striping layout at each of these intersections will need to be individually considered to maximize safety and visibility of bicyclists to motor vehicles. Another important issue is accommodating safe bus parking and turning movements associated with the schools along this street.



As this photo illustrates, a 4-lane configuration is found on the western end of this corridor.



On the eastern end, a 3-lane configuration was introduced. Based on public input during the planning process, many residents found this to be unsafe for bicyclists.

West 110th Street and Penn Avenue Bikeway

This corridor begins at Normandale Boulevard on the western end and heads directly east until Overlook Drive/Penn Avenue, where it heads north until it connects with the trail system in Moir Park. As with West 102nd Street, traffic volumes along this corridor are light to moderate between 1,700 and 6,700 ADT, with the later being near the intersection with France Avenue. Accommodating a bikeway along this corridor can be accomplished through the use of a 2-lane striping configuration, which leaves adequate space for a bikeway. As with West 102nd Street, the street is not consistently wide enough for a 3-lane configuration while still leaving enough room for a bikeway. The following table provides an overview of the key factors associated with establishing this corridor as a designated bikeway.

West 110th Street and Penn Avenue Bikeway Considerations and Recommendations

Factor	Considerations and Recommendations
Predominant Street Width	Across its length, West 110th Street and Penn Avenue ranges between 41 and 44 feet wide, with a few sections being as narrow as 36 feet.
Current and Proposed Striping Configuration	Currently, a combination of 4-lane and 2-lane striping configurations are used along this corridor. Since the road is not wide enough for a 3-lane configuration with a bike lane, **maintaining a 2-lane configuration for the entire length of this bikeway is optimal,** which allows for standard drive lanes plus ample shoulder for a bike route of 6 to 8 feet in width.
Major Intersections and Other Predominant Reconfiguration Issues	Intersections along this corridor should not be a major issue. There are also no other major physical constraints to establishing a 2-lane configuration along this corridor.

As this photo illustrates, a 4-lane configuration is found on the western end of this corridor.

As this photo illustrates, a 2-lane configuration is found on the eastern end of West 110th Street.

On the southern end of the Overlook Drive/Penn Avenue segment, a 2-lane configuration already exists, which is optimal for the entire corridor.

West 106th Street Bikeway

This corridor begins at Penn Avenue on the western end and heads directly east until Lyndale Avenue. Unlike some of the other corridors, traffic volumes along this corridor are over 11,000 ADT. Further, the right-of way, grades, bridges, and turning movements in the area of I-35W provide additional distractions for drivers. Given these challenges, accommodating a designated bikeway along this route is perhaps a longer-term prospect. As such, the ***System Plan*** attempts to compensate by providing a link around this segment via a connection from West 110th Street to the Minnesota River Trail, which then makes a connection to the Lyndale Avenue Bikeway.

In spite of the difficulties of this corridor, it remains an important east-west connector and justifies being at least a long-term priority. The following table provides an overview of the key factors associated with establishing this corridor as a designated bikeway.

West 106th Street Bikeway Considerations and Recommendations

Factor	Considerations and Recommendations
Predominant Street Width	Across its length, West 106th Street is typically 44 feet wide, with a few sections being wider near I-35W.
Current and Proposed Striping Configuration	Currently, a 4-lane striping configuration is used along this corridor. Since the road is not wide enough for a 3-lane configuration with a bike lane, **conversion to a 2-lane configuration for the entire length of this bikeway is optimal if traffic patterns change over time as noted above.**
Major Intersections and Other Predominant Reconfiguration Issues	Other than the issues defined above, the other issue along this street is the mid-block crossing west of Morgan Avenue. The effectiveness and necessity of this crossing should be assessed, with removal being an option.

As this photo illustrates, a mid-block crossing is provided at west of Morgan Avenue. The value of this needs to be assessed.

As this photo illustrates, the grade changes considerably along this street, posing more challenges given the heavier traffic levels.

The intersection at I-35W also poses concerns with right and left turn lanes complicating the traffic flow.

Lyndale Avenue South Bikeway (South End Only)

This corridor begins at 106th Street and heads north ideally to the transit hub on 98th Street. At a minimum, it needs to connect with the bikeway along East 102nd Street. Traffic volumes along this corridor are around 8,000 ADT, with the heavier traffic near 98th Street. For the most part, accommodating a bikeway along this corridor can be accomplished through the use of a 2-lane striping configuration, which leaves adequate space for a bikeway. As with many of the other corridors, the street is not wide enough for a 3-lane configuration while still leaving enough room for a bikeway. The following table provides an overview of the key factors associated with establishing this corridor as a designated bikeway.

Lyndale Avenue Bikeway Considerations and Recommendations

Factor	Considerations and Recommendations
Predominant Street Width	Across its length, Lyndale Avenue is typically 44 feet wide.
Current and Proposed Striping Configuration	Currently, a 4-lane striping configuration is used along this corridor. Since the road is not wide enough for a 3-lane configuration with a bike lane, **maintaining a 2-lane configuration for the entire length of this bikeway is optimal,** which allows for standard drive lanes plus ample shoulder for a bike route of 7 to 8 feet in width. Note, however, that the ability to convert Lyndale Avenue from 4-lanes to 2-lanes may be affected by its A-Minor Arterial Reliever functional classification, which requires additional consideration.
Major Intersections and Other Predominant Reconfiguration Issues	The striping layout at each of these intersections will need to be individually considered to determine the best approach to maximizing safety and visibility of bicyclists to motor vehicles. There are no other major physical constraints to establishing a 2-lane configuration along this corridor.

Alternate option: *If providing a bikeway along Lyndale Avenue proves technically unfeasible between 106th Street and the transit hub south of 98th Street, an alternate is to provide a linking trail along the I-35W frontage road (E. Bloomington Ferry). However, this too entails its own challenges in terms of ROW limitations and buildability.*

As this photo illustrates, Lyndale Avenue is only wide enough for a 2-lane configuration to allow enough room for a bikeway.

As noted, the traffic issue and turn lanes become a more complex issue near 98th Street, making it more of a challenge to continue the bikeway right to the intersection.

East 102nd Street Bikeway

This corridor begins at Lyndale Avenue on the western end and heads directly east until it intersects with the Xcel Energy Corridor Trail, making this an important bikeway. As with West 102nd Street, traffic volumes along this corridor are light to moderate between 2,800 and 5,500 ADT, with the later being near the intersection with Lyndale Avenue. For the most part, accommodating a bikeway along this corridor can be accomplished through the use of a 2-lane striping configuration, which leaves adequate space for a bikeway. As with West 102nd Street, the street is not consistently wide enough for a 3-lane configuration while still leaving enough room for a bikeway. The following table provides an overview of the key factors associated with establishing this corridor as a designated bikeway.

West 102nd Street Bikeway Considerations and Recommendations

Factor	Considerations and Recommendations
Predominant Street Width	Across its length, East 102nd Street ranges between 41 and 44 feet wide, with a few sections being as narrow as 36 feet.
Current and Proposed Striping Configuration	Currently, a 4-lane striping configuration is used along this corridor. Since the road is not wide enough for a 3-lane configuration with a bike lane, **maintaining a 2-lane configuration for the entire length of this bikeway is optimal,** which allows for standard drive lanes plus ample shoulder for a bike route of 6 to 8 feet in width.
Major Intersections and Other Predominant Reconfiguration Issues	Intersections along this corridor should not be a major issue. Removal of parking along certain segments of the street will need to be addressed, as is the case with accommodating bus turning movements associated with the school sites along this route. There are also no other major physical constraints to establishing a 2-lane configuration along this corridor.

As these photos illustrates, a 4-lane configuration is used along East 102nd Street. Overall, if it a pleasant street and converting to a 2-lane configuration will enhance its local neighborhood appeal.

At the east end of West 102nd Street past the Xcel Energy Corridor Trail, the street narrows and ultimately ends.

Old Cedar Avenue South Bikeway

This corridor begins at the Old Cedar Avenue Trailhead where it makes a connection to the Minnesota River Trail. It continues north until it reaches American Boulevard. Traffic volumes along this corridor are highest between Old Shakopee Road and 86th Street, ranging from 5,000 to 8,300 ADT. North of 86th Street traffic volumes drop off to less than 4,000 ADT. For the most part, accommodating a bikeway along this corridor can be accomplished through the use of a 2-lane striping configuration, which leaves adequate space for a bikeway. Replacement of the old Cedar Avenue bridge is also needed to complete this bikeway. The following table provides an overview of the key factors associated with establishing this corridor as a designated bikeway.

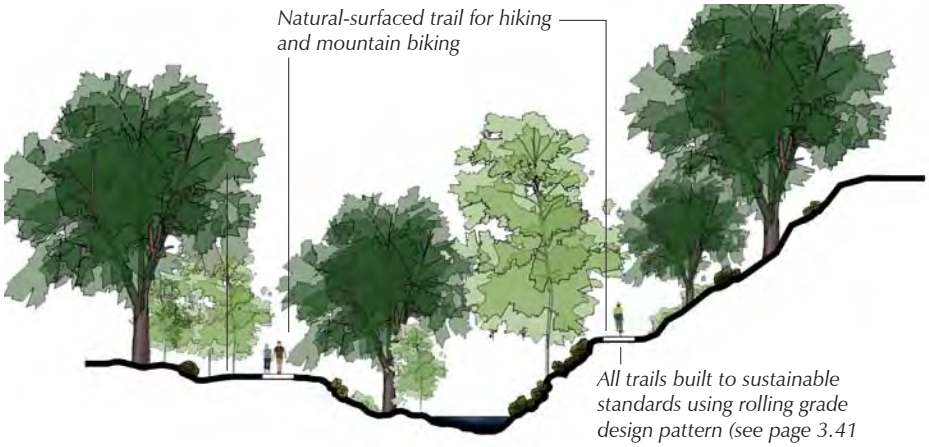
Old Cedar Avenue South Bikeway Considerations and Recommendations

Factor	Considerations and Recommendations
Predominant Street Width	Unspecified.
Current and Proposed Striping Configuration	Currently, a combination of 4-lane and 2-lane striping configurations are used along this corridor, with the former used between Old Shakopee Road and 86th Street. Since the road is not wide enough for a 3-lane configuration with a bike lane its entire length, **maintaining a 2-lane configuration is optimal,** which allows for standard drive lanes plus ample shoulder for a bike route of 6 to 8 feet in width. Note, however, that a 3-lane configuration would be acceptable in lieu of the 4-lane configuration if there is enough width to maintain a 6-foot wide bike lane on either side.
Major Intersections and Other Predominant Reconfiguration Issues	The intersection at Old Shakopee Road is designed with wider turning radii and turning lanes to accommodate truck turning movements. The striping layout at this intersection will need to be individually considered to determine the best approach to maximizing safety and visibility of bicyclists to motor vehicles. Otherwise, there are no other major physical constraints to establishing a 2-lane configuration along this corridor.

Natural-Surfaced Trails for Hiking and Mountain Biking

Natural-surfaced trails are commonly used in areas where a soft-surfaced tread is desired for hiking or mountain biking in a natural setting. In Bloomington, natural trails in the park reserve tend to be turf covered and used for both summer hiking and winter skiing. Along the Minnesota River Valley, native soil-surfaced trails predominate and are commonly used for mountain biking and hiking. Figure 3.14 illustrates a typical natural-surfaced trail, accompanied by photos of trails common to Bloomington.

Figure 3.14 – Natural-Surfaced Trails in Greenway-Type Setting



As the cross-section illustrates, continued expansion of a sustainable, high value system of natural-surfaced trails is proposed. In select locations, one-directional trails will be provided to accommodate mountain bikers and hikers.

A well-designed signage program will also be provided to minimize uncertainty of use and minimize conflict.

Natural hiking trails to meet varying needs and settings. *Grass and native soils are preferred surfacing for natural trails. Grass is typical in the park reserve, whereas compacted native soils is recommended for the mountain biking and hiking trails along the Minnesota River Valley.*

As with paved destination trails, natural-surfaced trails offer high recreational value to distinct user groups whose needs are not accommodated with other types of trails or bikeways. Although absolute numbers of natural trail users may be less then paved trails, a high demand clearly exists in Bloomington to justify maintaining a well-designed and robust natural-surfaced trail network within the city. This is especially the case along the Minnesota River Valley, long thought to be a regional amenity and a premier area for mountain biking and hiking. As defined on page 3.11, even though a paved destination trail is proposed along the river, that does not diminish the value and importance of providing natural-surfaced trails in this area. In fact, as defined under this plan, managed expansion of this system is proposed.

As with other trails, providing high quality facilities for these user groups is important to achieving the active living principles defined in Section 2 – Vision and Values. This is especially well understood in Bloomington, where local advocacy groups have worked with the City and other agencies for many years along the Minnesota River Valley establishing an increasingly sustainable network of quality natural-surfaced trails for mountain biking and hiking. In fact, the local mountain biking group remains very active in developing and maintaining these trails to complement the City's efforts. Continuation of this relationship will be important to future success.

The Minnesota River Valley is an obviously appealing place for mountain bikers and hikers to enjoy the outdoors. A well-designed natural-surfaced trail system is another means to encourage residents to be more active and healthy.

The ***natural-surfaced trails*** as shown on the ***System Plan*** represent trail corridors that:

- Are integrated with existing regional parks and community open spaces where there is adequate space for a robust system of trails
- Take advantage of an appealing natural aesthetic setting for a trail of this type
- Provide contiguous routes and loops, with particular emphasis on connections with access points from nearby neighborhoods and via the destination and linking trail system

As with destination trails, the generally uninterrupted character of natural-surfaced trails is essential to their recreational and fitness value. If continuity is lost or route-finding is unclear, the value of the trail diminishes to the targeted user groups.

The alignment of the destination trails as shown on the ***System Plan*** along the river corridor is conceptual at a citywide planning scale. The actual detail alignment of these trails will be determined as part of the design process at the point of implementation.

Development Standards and Guidelines

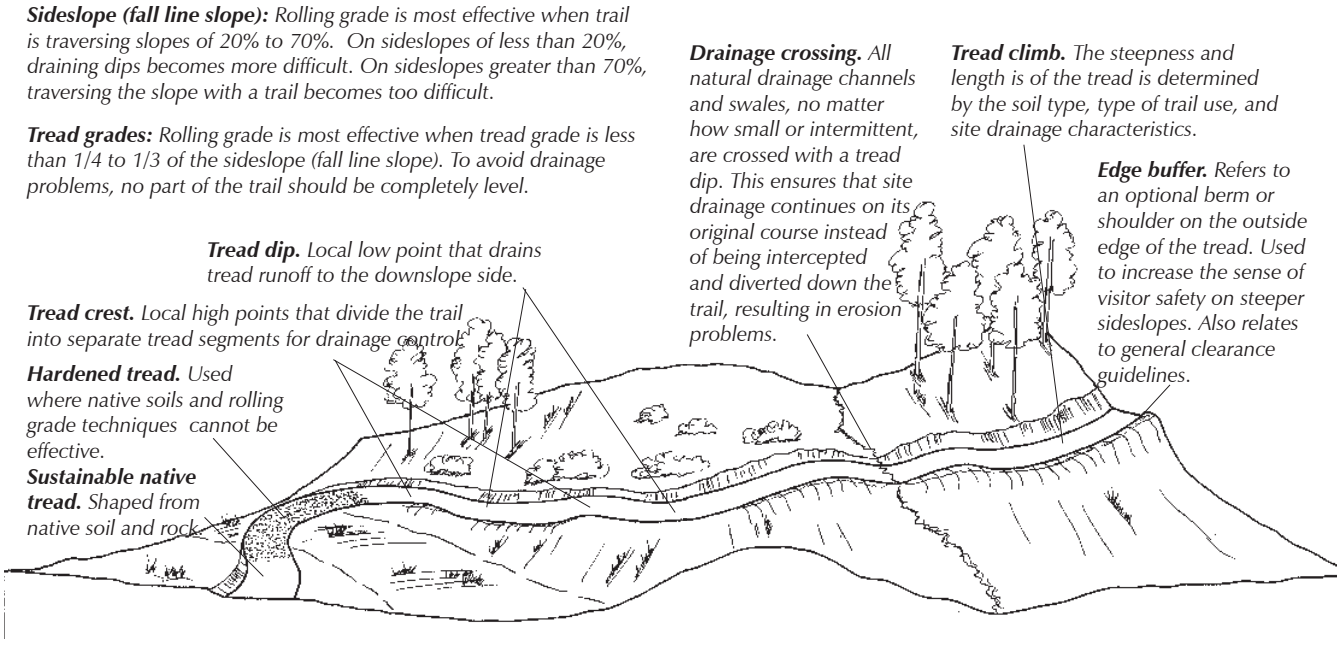
Whether a hiker or mountain biker, design quality, route layout, and trail length are of particular importance to encouraging and sustaining higher levels of use. Within the regional park reserve, Three Rivers Park District will determine the design standard most suited for natural-surfaced trails. For the trails along the Minnesota River Valley, a single track design will likely prevail for use by mountain bikers and hikers. The difficulty level for these trails should range from easy to difficult, consistent with accepted standards. The *Minnesota Trail Planning, Design, and Development Guidelines* (MN DNR 2007) provides the baseline standards and guidelines for developing natural trails, including defining difficulty levels. In addition, the International Mountain Biking Association (IMBA) has several well-respected guidebooks for building sustainable mountain biking (and hiking) trails.

In each of these publications, sustainability and design quality is stressed. With trail layouts, providing a sequence of events that highlight the natural character of area and create varying levels of challenge and intrigue around every corner is important. Inspirational viewing locations and contemplative spaces should also be taken advantage of as these trail systems are completed. Creating loops, even short ones, is also recommended to add interest.

All natural-surfaced trails should be designed using a "rolling grade" technique to ensure long-term sustainability and to limit impacts to surrounding ecological systems, especially wetlands and creeks. The rolling grade technique essentially aligns trails in harmony with landforms and contours, which reduces construction impacts and helps prevent erosion. Figure 3.15 provides an overview of the rolling grade technique (as described in MN DNRs' *Trail Planning, Design, and Development Guidelines*).

FIGURE 3.15 – OVERVIEW OF ROLLING GRADE AS THE PRIMARY DESIGN PATTERN FOR NATURAL SURFACE TRAILS

Rolling grade is the primary pattern for designing and building natural surface treads. Under rolling grade, trails are described as a series of tread dips, crests, climbs, drainage crossings, and edge buffers. In this illustration, rolling grade is used for portions of a trail traversing a side slope.



OVERVIEW OF INDIVIDUAL NATURAL-SURFACED TRAIL CORRIDORS

To add context, the following provides a general overview of the natural-surfaced trail corridors provided for and/or illustrated on the ***System Plan***.

Hyland-Bush-Anderson Lakes Park Reserve

A whole network of natural-surfaced trails are provided in the park reserve for hiking in the summer and skiing in the winter. Mountain biking is not allowed. As a park reserve, Three Rivers Park District is responsible for development and maintenance of this trail system.

Continuing to expand the existing signage will be important to successfully managing the trail system along the river.

Mountain bikers have long found the area appealing and have worked as strong advocates for developing a sustainable system. This commitment to collaboration will need to continue as the system plan is implemented to ensure all user groups are involved in the process.

Minnesota River Trail Corridor

As previously defined, the Minnesota River Trail Corridor accommodates both natural-surfaced and destination trail, as illustrated on the ***System Plan***. Currently, natural-surfaced trails are provided from the Bloomington Ferry Road trailhead east to the Mound Springs Park area. These trails are generally single track and open to mountain bikers and hikers. Adding a paved destination trail along this same corridor will likely result in the need to realign portions of the existing natural-surfaced trail. Rather than be viewed as an imposition, this presents an opportunity to assess the alignment, sustainability, and overall appeal of the natural-surfaced trails along the river and develop a layout plan that maximizes its value to the trail user.

In addition to retaining and improving the existing trails, the ***System Plan*** illustrates continuation of natural-surfaced trails from the Mound Springs Park area east over to the National Wildlife Refuge Headquarters area to more fully take advantage of the outstanding trail opportunities along the river corridor. The intent is to interconnect with existing trails provided by the USFWS in this area to create a more extensive and interlinked system of looped trails. Note that the extent to which mountain biking versus hiking will be allowed on this expanded trail system will require consultation and negotiation with the USFWS, perhaps in concert with the MN DNR. Development of the trail to sustainable standards will also require a cooperative partnership between the City of Bloomington, USFWS, and local advocacy groups. Including the later in this partnership is important in that these groups – such as MORC and IMBA – have technical expertise in designing quality trails and, of equal importance, can play a vital role in maintenance and self-policing through an effective peer-to-peer approach.

With both existing and proposed trails, providing additional looped directional trails is recommended to add interest, improve safety, and reduce the potential for conflict between hikers and mountain bikers. This will also help reduce the likelihood of trail users creating their own trails. Continuing to enhance signage along these trails consistent with accepted standards is also recommended, and in fact is already occurring.

Although the extent to which the trail system can be expanded needs further evaluation, the mountain biking trail system provided at Lebanon Hills Regional Park in Dakota County has proven successful and sustainable in a relatively small footprint. This layout, as well as others, should be reviewed as detail plans are prepared.

Natural-Surface Trails in Local Parks

In addition to the aforementioned trails, natural-surfaced trails are also provided or planned for some of the local parks within Bloomington. The City's *Park and Recreation Master Plan* provides information on these trail settings.

Connections with Other Systems and Regional Trail Considerations

As the ***System Plan*** illustrates, connection to adjoining trails, pedestrian-ways, and bikeways is extensively fostered under the plan to expand regional recreational and transportation opportunities. The locations for connections as highlighted are conceptual and will need to be refined as the plan is implemented. To varying degrees, trail, sidewalk, and bikeway networks are either already in place or planned in adjoining communities.

An area of particular interest is making connections to Richfield between Nicollet Avenue and Bloomington Avenue via existing and proposed bridge crossings. As shown on the ***System Plan***, there are numerous options to consider. Figure 3.16 provides an enlargement of this area.

Figure 3.16 – Possible Connections to Richfield

As shown, several options are available for making connections across I-494 to connect with Richfield's trail and bikeway system. Note that the most important objective is maintaining as much continuity as possible between the Xcel Energy Corridor Trail and the Nine Mile Creek Trail Corridor proposed along 76th Street in Richfield. Ideally, this would be via a new pedestrian bridge over the freeway in two areas as shown on the graphic as Pedestrian Bridge (Proposed).

Connections to Adjoining Communities Note: *The connection points shown on the map are conceptual and subject to refinement after further consultation with adjoining communities as detailed plans evolve over time. Also note that the crossing points for bikeways may be different than those for trails and sidewalks depending on street and bridge configurations and specific points of connection with adjoining systems.*

Of the connections shown, Nicollet Avenue and 12th Avenue are currently best suited for making bikeway connections since there are no on and off ramps from I-494 to contend with. If that continues to be the case when I-494 is upgraded, these crossings could be further enhanced to more safely and appealingly accommodate pedestrians as well.

The existing pedestrian bridge west of Portland Avenue also provides a connection, although its design with steps limits its appeal to pedestrians and bicyclists will not routinely use it. Ultimately, this bridge should be replaced with a new pedestrian/bicycle-friendly bridge in close proximity to the Xcel Energy Corridor Trail alignment between Portland Avenue and Chicago Avenue. As Figure 3.16 illustrates, there are no direct options, although a Chicago Avenue alignment for a pedestrian bridge offers an advantage in that no vehicular bridge is planned for this street. However, the ultimate location of this bridge should be driven by many factors, not the least of which is its interrelationship with future redevelopment of I-494 and the associated on and off ramps from the freeway. Wherever its final location, the major objective with this connection to Richfield is to provide continuity of the destination trail experience from the freeway crossing to the Xcel Energy Corridor Trail. This poses some challenges in regard to crossing American Boulevard as well. Optimally, providing a paved destination-type trail from a new bridge crossing to the powerline corridor is preferred, versus expecting bicyclists to use sidewalks or ride on the street.

Another possibility for a pedestrian/bicycle bridge is Bloomington Avenue, which should also be considered as Bloomington and Richfield finalize crossing options as the I-494 corridor is upgraded.

Continuation of the Minnesota River Trail to Fort Snelling State Park is also important to make a connection with trail and bikeway systems in Minneapolis and St. Paul. This connection would greatly expand opportunities for bicyclists and pedestrians.

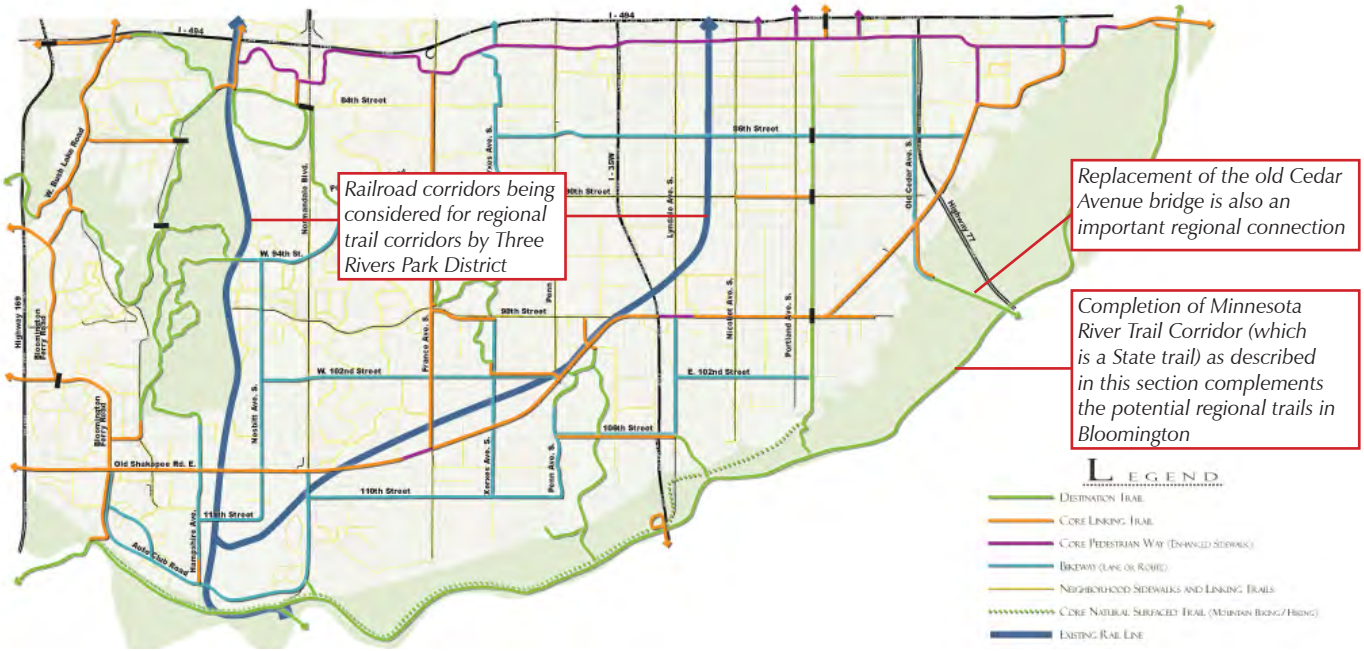
Regional Trail Considerations

In addition to the trails included under this plan, there are also some regional trails being planned by Three Rivers Park District. One of these is the Nine Mile Creek Regional Trail, which runs east-west north of Bloomington in Richfield and Edina. Making connections to this

trail in as many locations as possible should be pursued as the trail is implemented. Longer range, Three Rivers Park District is examining the feasibility of developing and operating a regional trail within the CP Rail corridors within the cities of Bloomington, Edina, Minneapolis, Richfield and St. Louis Park. This study would include the CP Rail and Progressive Rail spur in Bloomington. Figure 3.17 illustrates these alignments on the system plan map.

Figure 3.17 – Rails-to-Trails Regional Trail Alignments

Proposed Nine Mile Creek Regional Trail runs east-west north of Bloomington in Richfield and Edina.



As shown, a couple of existing rail corridors are being considered by Three Rivers Park District for a regional trail corridor. Although perhaps only a longer-term possibility at this point, adding these trails to the system would be very beneficial and should be supported by Bloomington.

The study may include examination of some areas immediately outside the rail corridors for locating the regional trail when the trail cannot be placed within the rail corridor. The study is proposed to be funded by Three Rivers Park District as part of their 2008 budget.

Expanding the Core Alternative Transportation System

As defined, the core alternative transportation system plan consists of existing and proposed trails, pedestrian-ways (sidewalks), and bikeways under various classifications that collectively form the backbone of the larger system. These are the corridors that offer the highest overall value in serving the needs of various user groups and thus take precedence over others as an implementation priority.

Enhancing or expanding numerous other corridors would add much value to the system as well. For example, improving the trails along Normandale Boulevard would be of considerable value to complement those along France Avenue. As appealing and justified as this may be, the City of Bloomington is encouraged to stay disciplined in focusing on implementing the core system as defined under this plan prior to expanding out to other corridors. Otherwise, maintaining focus on providing high quality facilities along primary routes that people will actually use can be lost. Once the core plan has been implemented, then consideration of improvements to other corridors can be contemplated. And if core system improvements prove successful, public support for continued expansion will be more assured.

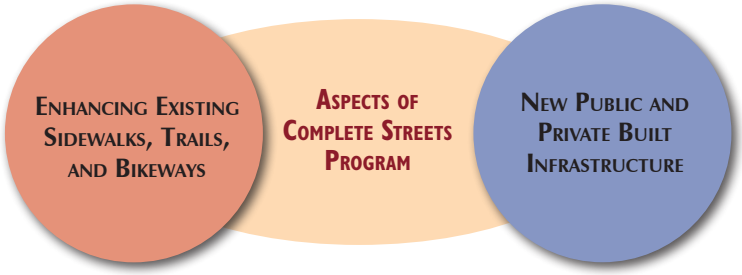
Complete Streets Program*

** **Program Note:** The elements of the Complete Streets Program as presented here may ultimately be incorporated into other City design programs or policies, such as land use, zoning, and transportation – as opposed to becoming a separately established program.*

The second component of the alternative transportation plan is the Complete Streets Program, which focuses on incorporating alternative transportation features into all new public and private developments/ redevelopments to achieve the "The Complete City" vision described in Section 2. With greater insights as to the importance of accommodating all forms of transportation into the built form to foster healthy lifestyles and reduce reliance on motor vehicles comes the need to update planning and design practices to take advantage of all opportunities as the City's built infrastructure evolves.

In Bloomington, the Complete Streets Program has two major aspects, as figure 3.18 illustrates.

Figure 3.18 – Major Aspects of Complete Streets Program



The following considers each of these aspects.

Complete Streets Program Applied to Enhancing Existing Sidewalks, Trails, and Bikeways

Enhancing the built infrastructure in areas of the city not subject to full redevelopment focuses on the removal of barriers that diminish the likelihood of a person walking, biking, or using public transit to a destination. Common barriers include gaps in the sidewalk system, inconsistent designs, and lack of end-of-trip facilities at destinations.

The following considers a number of existing infrastructure improvements being proposed to augment the core alternative transportation system as previously defined in this section. Through parallel implementation of these enhancement programs, the City of Bloomington will, over time, transform itself from a vehicle-oriented transportation system to a multi-modal system that serves pedestrians and bicyclists with greater safety and convenience.

Filling in Gaps in Existing Sidewalk and Trail System

As defined in figure 3.2 on pages 3.2 and 3.3, the existing infrastructure of sidewalks and trails within the street rights-of-way are often aging and, to varying degrees, in need of repair or replacement. As that figure highlights, gaps in the system exist to varying degrees across the city – with some neighborhoods having very limited sidewalks or trails due to the era in which they were built. In some cases, different design standards were used depending on when a sidewalk or trail was built. Surface material, width, setback from road, use of properly designed curb cuts and ramps, etc. vary from development area to development area depending on the development standards at the time.

Filling in gaps in the system over time will greatly augment the core system of trails, sidewalks, and bikeways defined under this plan. Even simple improvements, such as adding a bicycle-friendly cut-through between the pictured streets, can enhance the commuting experience for those living in or traveling through an area. Providing opportunities for commuters to identify these gaps is encouraged to ensure that improvements made are in locations where they will actually be used.

Whereas retrofitting all parts of the city with new sidewalks and trails offers numerous practical limitations (i.e., funding resources, lack of right-of-way, encroachment issues, landscape impacts, increased maintenance needs, etc.), filling in gaps and using current standards as old sidewalks and trails are replaced is achievable. To that end, it is recommended that the City's successful Pavement Management Program (PMP) be expanded to cover trails (including those within parks), sidewalks, and streetscape amenities. The PMP provides a systematic program of street rehabilitation and repair in order to assure that the city streets receive the most economical maintenance at the right time. The program focuses on the upkeep of approximately 360 miles of city streets within its boundaries. This includes maintenance activities such as crack sealing, street patching, and structural maintenance of the street system.

Once the systematic evaluation of the condition of all sidewalks and trails across the city is completed, it is recommended that a prioritized schedule be prepared as part of the PMP to guide maintenance and infrastructure improvements in line with funding levels. The following photos highlight some of the gaps and issues associated with existing sidewalks and trails in the city that would be systematically identified and eliminated over time.

As this aerial illustrates, gaps in the sidewalk system exist in various locations across the city. The City will, over time, eliminate these gaps through a prioritization process that is lock-stepped with funding levels.

An important side note to this discussion is the limited easement/ right-of-way that exists along many of the streets in the city, which in turn can limit the location where new sidewalks and trails can be placed. In addition, costs are often higher in these situations since retaining walls and additional grading is commonly needed to create enough space for a wider sidewalk or trail than was originally provided.

(Left photo.) Although the PMP inventory of sidewalks and trails is not 100% complete, it is already known that the majority of existing paved trails along streets are aging and will have to be replaced at considerable expense. Once replaced, these upgraded facilities will significantly augment the core system of trails and bikeways previously described in this section.

(Right photo.) The same holds true for select sidewalks, in which older sidewalks were built to a narrower standard than would be the case today.

The City's consideration of broader issues associated with street designs will likely affect opportunities for bikeways. As those issues are resolved, updating the bikeways plan has merit.

It is recommended that the City establish a website link to allow pedestrian and bicycle commuters to identify specific gaps in the system along routes most frequently used. For example, it is fairly common for bicyclists to make their way across the city from one of the Bloomington LRT stations to businesses such as Quality Bicycle Products. Along any of these often self-selected routes, gaps in the system exist, such as a lack of a short trail connection between streets, could be addressed at modest cost to better facilitate ease of bicycle travel. In making these improvements, identified barriers to alternative transportation could be eliminated over time along the routes that matter most to users.

Augmenting Core On-Road Bikeways with Secondary Bikeways

As defined on page 3.27, the core system of on-road bikeways follow carefully selected routes that offer the highest potential for establishing safe *primary* on-road bikeways across the city. Notably, each of these routes will require extensive feasibility evaluation, taking into consideration highly variable traffic conditions along any given route. As defined earlier, the core system of bikeways will allow the City to test various roadway configuration options as part of their detailed evaluation process of each route.

In addition to evaluating the core bikeway routes using currently accepted drive lane standards (i.e., 11 or 12-foot drive lanes), it is recommended that the City establish a program for periodic review and analysis of research findings related to alternative lane configurations/ roadway designs that include bikeway facilities. In particular, the City should considered the merits of alternative approaches to lane widths being tested in other parts of the region and country. An example of this that was brought up during the public process is the use of 10-foot drive lines in select situations to provide more space for bikeways while safely accommodating daily traffic patterns and turning movements.

As the bikeway system plan is implemented, some of the core (and secondary) bikeway routes may be suitable for testing new thinking on roadway configurations to determine if such approaches have local merit. If alternative lane configurations prove successful after testing, more options may be available to expand the on-road bikeway system beyond the core routes defined under this plan (as considered in the next paragraph). *The key with any street striping configuration is making sure that the design meets minimal standards for bikeways as defined earlier in this section.* Note also that any deviation from current drive lane standards may require a variance from Mn/DOT, depending on the circumstances and road classification.

Assuming that establishing on-road bikeways is well-received by the community, incrementally expanding the system beyond the core routes is recommended, and consistent with the ideals of the Complete Streets Program as applied to Bloomington. In essence, establishing this "secondary" network of bikeways will create a feeder system to the core bikeways, thereby expanding access and encouraging higher levels of use of the alternative transportation system. Secondary bikeways will also enhance connections to businesses, schools, transit facilities, and retail nodes. For example, the area along 84th Street between France Avenue and Penn Avenue includes several destinations that a secondary bikeway could be useful for enhancing alternative transportation options.

In practice, expansion of the secondary bikeway system will likely occur incrementally as opportunity presents itself when streets are scheduled for restriping or otherwise upgraded. *To that end, it is recommended that on-road bikeways be duly considered whenever street restriping or upgrading is proposed to avoid missing the opportunity to efficiently expand the system.* A statement as to the efficacy of including (or not including) a bikeway along a given route should be included as part of all street restriping or upgrade plans to provide the City Council with a basis for plan evaluation and consideration. This includes defining how a given route would ultimately tie into the core bikeway system and/or serve as a means to access a destination to ensure that all proposed routes serve a legitimate purpose.

In situations where traffic volumes are below 5,000 ADT, converting a 4-lane street to a 2 or 3-lane street would allow enough space to accommodate a bikeway (and possibly parking) without unduly impacting traffic patterns. Consideration of adding a bikeway facility is most likely to occur when a street is scheduled for restriping or other upgrades, such as resurfacing.

As with the core bikeways, secondary routes should also be considered for testing any promising new approaches to roadway configurations when traditional approaches fall short of accommodating a bikeway facility. With respect to adhering to Mn/DOT standards, it is recommended that variances be sought whenever a proposed bikeway serves a justifiable purpose and can be accommodated without compromising the health, safety, and welfare of the public.

As with the core routes, consideration of secondary bikeways will require feasibility evaluation, taking into consideration variable traffic conditions along any given route. As a general guideline, secondary bikeways along 4-lane second-tier streets with less than 5,000 ADT will likely (but not exclusively) offer fewer constraints than streets with heavier daily traffic loads. As such, lower volume second-tier streets will tend to offer the highest potential for becoming secondary bikeway routes and therefore should be the first considered to complement the core bikeway routes.

Reevaluation of Existing Signed or Striped Bike Routes

As part of plan implementation, all existing bike routes (as defined by signage and existing striping configurations) should be reevaluated to determine their relevance as core or secondary bikeways within the context of this plan and level of compliance with the guidelines established in this section. In general, this means starting from scratch in terms of building a logical, interlinked bikeway system that builds upon core routes as defined under this plan. (Refer to page 3.63 for additional information on dealing with the existing bikeway signage program.)

Improving Pedestrian and Bicycle Access to Existing Destinations

As defined on page 3.4, there are a variety of existing principal destinations that pedestrians and bicyclists may want to get to using alternative modes of transportation. In each of these cases, end of trip facilities are critical to enticing them to do so.

As defined on page 3.54, providing secure bike parking is vital to promoting bicycling as an alternative form of transportation, in concert with providing adequate trails, sidewalks, and bikeways and accompanying signage. To this end, it is recommended that the City proactively work with local businesses to review current facilities at identified destination nodes to determine where improvements can be made to enhance access and end of trip facilities.

A major example of where access needs to be improved is the Mall of America (MOA), which was not considered bicycle/pedestrian commuter-friendly by those participating in the public process.

At MOA, providing a "bike center" that includes bike parking, lockers, and showers to serve employees would significantly enhance the appeal of using alternative modes of transportation like bicycles.

The lack of adequate end of trip facilities, such as secure bicycle parking, was one of the most frequent issues cited during the public process. The main point made was that without secure parking and clear points of access for bicyclists, the likelihood of promoting the use of alternative transportation for commuting to destinations is greatly reduced. This also holds true with some of the small yet important destinations throughout the city.

Improving Pedestrian and Bicycle Access to Existing Transit System Facilities and Routes

As defined on page 3.57, integrating the alternative transportation system with the Metro Transit system plays an important role in making walking and bicycling a part of daily life in Bloomington. As is the case with retail destinations such as MOA, improving end of trip facilities at established (and planned) transit hubs and select route stops is critical to encouraging individuals to actually use alternative modes of transportation to get to work or destinations throughout Bloomington. A primary example of this relates to the LRT transit stations, in which bicycle commuters participating in the public process commented that the lack of end of trip facilities impeded the use of mass transit as a means to aid commuting by bicycle. The idea of providing a "bike center" that includes secure bike parking was thought important to meeting the needs of bicycle commuters. As with private businesses, the City will proactively work with Metro Transit to review current facilities to determine where improvements can be made to enhance access.

As with the MOA, providing secure end of trip facilities is needed to encourage the use of mass transit by bicyclists coming and going from Bloomington to work or other destinations. This includes the newer LRT transit stations, as pictured.

Desirable features that need to be considered at all major transit stops and park and ride sites include a shelter, concrete pad, lighting, curb cuts, benches, trash receptacles, and secure and covered bike racks or lockers.

In addition, the City will continue exploring expansion of the transit system to include new transit hubs and establishing bicycle "park and ride" sites (as described on page 3.57) in select locations that best serve commuting bicyclists. With respect to new transit hubs, possible locations include the Normandale Office Park area and the I-35W/ American Boulevard area. In each of these possible locations, providing end of trip facilities for bicyclists will be a foremost consideration to encourage bicycle commuting on a daily basis.

Placing bicycle "park and ride" sites along key corridors, such as the Xcel Energy Corridor Trail, should be considered as the system plan is implemented and demand for facilities along a given route can be more accurately accessed.

With respect to establishing bicycle "park and ride" sites, locations should respond to actual bicycle commuting use patterns as the core system is developed, rather than trying to predetermine these locations based on limited information. This approach will help ensure that the end of trip facilities will be provided in locations that they will actually be used.

Complete Streets Program Applied to New Public and Private Built Infrastructure

The City is encouraged to adopt a Complete Streets Program in which new or upgraded streets, transit facilities, public spaces, and private development areas are consistently designed to enable safe access and movement for all users. Taking a cue from the U.S. Department of Transportation, the following policy considerations are recommended to ensure that pedestrians, bicyclists, motorists and transit riders of all ages and abilities are accommodated as the city's transportation infrastructure evolves. Considerations include:

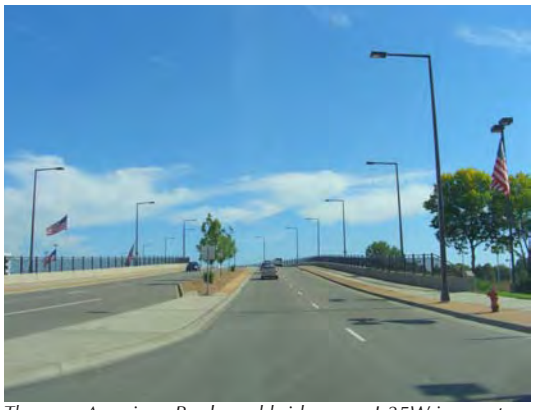
- Establishing bicycle and pedestrian-ways in new and road widening projects in all redevelopment areas *unless* one or more the conditions are met: bicyclists and pedestrians are prohibited by law from using the street; the cost of establishing bikeways or walkways would be excessively disproportionate to the need or probable use; and where sparsity of population or other factors indicate an absence of need
- Designing, constructing, operating and maintaining sidewalks, shared use paths, street crossings (including over- and undercrossings), pedestrian signals, signs, street furniture, transit stops and facilities, and all connecting pathways so that all pedestrians, including people with disabilities, can travel safely and independently
- Designing and developing the transportation infrastructure to improve conditions for bicycling and walking through the following additional steps: planning projects for the long-term; addressing the need for bicyclists and pedestrians to cross corridors as well as travel along them; and designing facilities to the best currently available standards and guidelines

The forthcoming design guidelines are provided to foster a balanced approach to accommodating alternative forms of transportation across the city. Where pertinent, the guidelines emulate Hennepin County's "recommended policies and standards for effective pedestrian infrastructure" in order to maintain consistency across the region in addressing these issues (which are not unique to Bloomington). All of the guidelines have been documented to increase safety and/or access for all users, not only pedestrians.

Note that guidelines are intended to serve as a checklist as related to alternative transportation, fully recognizing that many other factors need to be considered in any redevelopment scenario.

Guidelines Note: *These design guidelines serve as a starting point for developing a comprehensive "checklist" of desirable complete street features to be integrated into new developments. The plan recommends that these items be integrated into the various development checklists that the City already uses to guide land use and transportation planning activities – thus ensuring that alternative transportation will be a key factor in private and public development decisions.*

Guidelines Note: *It is important to state that these guidelines focus on improving the pedestrian-related aspect of Bloomington's transportation network. As such, application of the guidelines have to be balanced against other legitimate transportation system design needs and concerns, which at times will take precedence over those outlined here. Further, use of any of these guidelines is site-specific and requires detailed evaluation to determine the most appropriate streetscape design for a given situation.*



The new American Boulevard bridge over I-35W is a vast improvement in providing for pedestrians and bicyclists. With future bridges, providing on-road bike lanes to complement the sidewalk should be considered.

Poorly placed crosswalks offer no value to the user and can actually detract from the safety of a sidewalk and trail system. As with all such crossings, this mid-block crossing on 106th Street should be formally reviewed to determine if it has value. If not, it should be removed or relocated elsewhere.

Shared Overpasses/Underpasses

Often due to the general lack of adequate facilities for pedestrians – such as sufficient pedestrian visibility, lighting, and sidewalks or even a shoulder wide enough to separate pedestrians from traffic – can make overpasses and underpasses more prone to vehicle-pedestrian collisions along major streets. Further, signals are sometimes placed where vehicular traffic is either accelerating onto an expressway or exiting at high speeds, with drivers paying more attention to vehicles than to pedestrians. Inherently, these intersections are difficult for pedestrians to safely navigate, much less use on a routine basis.

Enhanced design guidelines for improving pedestrian safety around overpasses and underpasses may include:

- Increasing visibility of pedestrian and bicycle elements, especially crosswalks
- Designing turn lanes and access ramps/lanes to slow down incoming traffic (junction and interchange exits commonly allow a driver to maintain a high speed through a turn onto a street with a much lower speed limit)

Crosswalks, Curb Extensions, Pedestrian Refuge Islands, and Mid-Block Crossings

A successful pedestrian and bicycle network requires safe and convenient street crossing opportunities. Wide roads carrying large traffic volumes are significant obstacles to pedestrians, making facilities on the other side difficult to access. Safe street crossings also benefit motorists, in which an automobile driver parking on one side of the road may desire access to points across the street. A pedestrian system with sidewalks and crossing opportunities also allows a driver to park once and then walk to multiple destinations.

Combined with refuge islands where needed, good illumination, and signage, crosswalks can improve the visibility and safety of pedestrian crossings. If designed as part of an overall streetscape, crosswalks can provide visual cues that help alert motorists of pedestrians.

Note that the simply striping a crosswalk will not necessarily ensure that it will be safe and not confusing to motorist or pedestrian. In fact, poorly placed crosswalks not only discourage use but also can cause unsafe conditions when drivers are confused as to whether or not they have to stop for a pedestrian in a crosswalk. This is especially true of mid-block crossings in an urban setting like Bloomington, where the general expectation of the driver is that crosswalks occur only at intersections.

When a crosswalk is not working, possible problems may include:

- Enforcement – more rigorous enforcement of traffic laws might be needed for motorists to understand that it is their legal obligation to yield to pedestrians in a crosswalk, marked or unmarked
- Location – marked crosswalks must be located in visible, unobstructed areas where parked cars, signs, etc. do not affect sight lines
- Traffic movement – many turning vehicles at nearby intersections or driveways can compromise the crosswalk
- Users – some people need extra help crossing a street and crosswalks alone may not be sufficient

A formal traffic study is recommended in any given situation to objectively determine if a marked crosswalk will actually enhance pedestrian safety along any given street segment. This is important in that an objective evaluation is critical to determining the validity of providing a crosswalk in a particular location, versus relying on anecdotal or subjective information. The importance of this cannot be understated since a poorly placed crosswalk can actually detract from pedestrian safety, versus enhancing it. This is especially the case with mid-block crossings, which can be especially prone to conflict between motor vehicles and pedestrians.

Nonetheless, well-placed intersection and mid-block crossings are a design feature that planners and traffic engineers need to duly consider in recognition that people *will* take the shortest route to their destination irrespective of where designated crossing occur. Further, the lack of well-placed crossings entice pedestrians to use their vehicle to get to a destination, thus defeating the purpose of the plan. Prohibiting such movements is also counter-productive if pedestrians are enticed to dash across the road with no protection. In other words, it is better to design streets that enable pedestrians to cross safely.

It is often most effective to evaluate a potential crosswalk location based on the distance from other formal crossings and the degree of visibility for vehicles and pedestrians. Signals and other treatments often make a drastic difference in areas where there are many young or elderly pedestrians.

To enhance crosswalk safety, a curb extension is a design feature worthy of consideration at intersections and mid-block crossings. Also know as "bulbs, neckdowns, and chokers", curb extensions essentially reduce the pedestrian crossing distance and improve the visibility of pedestrians by motorists. These are especially useful in situations where parking is allowed. Reducing the time pedestrians spend in the crosswalk limits their exposure to traffic and, as a benefit to the motorist, reduces the amount of time before a motorist is legally able to continue traveling through the intersection. Curb extensions also make stop signs and curb side traffic signals significantly more visible to a driver.

Pedestrian refuge islands are used to create a barrier that protects the individual during long crossings, as well as improve signal timing, reduce crashes and help guide traffic. These design measures can significantly reduce the likelihood of collisions if placed and designed correctly. In addition, the island allows the pedestrian to cross only half of the street at once, alleviating the need to find a gap in both directions of traffic at the point the crossing is initiated.

The best design is a median that is cut through at grade with the road and leaves a small bullet nose on the intersection side of the island that protects pedestrians against left-turning vehicles. Refuge islands are also common at mid-block crossings to act as a traffic calming measure and allow pedestrians to face only one direction of traffic at a time. This combination vastly increases safety for pedestrians.

Raised medians, which are commonly used in Bloomington's newer road designs adjacent to right turn lanes, provide refuge for pedestrians making longer street crossings.

Intersection Geometry: Turning Radii and Right Turn Lanes

Turning radii control the speed at which a motorist is able to drive around a corner. Wide turning radii increase crossing distance and affect crosswalk and ramp placement. Roads are designed in relation to a target "design vehicle" that influences almost every aspect of road construction. The design vehicle on county-level roads is often a 63-foot truck. The average vehicle is much smaller and moves much faster through that corner, which can make it more challenging for pedestrians to cross the street.

Balanced intersection geometry is one design technique that can help improve safety in these instances for all users. For example, turning radii in urban and high activity areas can be sometimes be designed to have a progressive turn radius or multiple radii that is tightest where the vehicle merges into traffic. This design maintains a direct sightline between driver and pedestrian traffic and encourages the driver to slow down before making a turn.

Dedicated right-turn lanes are often built with a wide turning radius that allows vehicles to turn a higher speeds. When turning along an unchanging radius at high speeds, the driver's focus is often on merging with traffic rather than directed at pedestrians in the crosswalk. A raised median, or pork chop, on right turn lanes help separate pedestrians from turning traffic. In addition, right turn lane geometry can be designed with a wider curve followed by a tighter curve. The wider radius increases visibility of the pedestrian crossing while the narrower radius slows the vehicle down before turning the corner. In areas of significant pedestrian activity, eliminating the use of a right turn lane would create an even safer environment for pedestrians.

Left Turn Lanes

Left turns can be significant threats to pedestrians if crossings are not well-designed. Intersection design should pay particular attention to how left turning movements are accommodated. In general, the number of dedicated left turn lanes should be reduced to an amount that is absolutely necessary, with unneeded lanes requiring pedestrians at times to wait two signal cycles, effectively doubling the amount of exposure to traffic.

Sidewalk Zones

A common issue, especially with older sidewalks, is the obstruction of the path by subsequent infrastructure such as utility poles, fire hydrants, transit shelters, garbage receptacles, newspaper boxes, etc. The delineation of pedestrian rights-of-way in highly active areas presents similar issues as the travel way of a road. Establishing a pedestrian zone, building frontage zone, furniture zone and a curb zone to organize the multiple spatial demands of the pedestrian right-of-way ensures a sidewalk is clear of obstacles.

The pedestrian zone and building frontage zones are where travel and access with adjacent buildings occur. The furniture zone serves as a buffer between the pedestrian and vehicular travel-way. It is also a dedicated space for utilities and the placement of other possible facilities that could obstruct the pedestrian zone, such as mailboxes, garbage receptacles, light poles, fire hydrants and other necessary elements.

The curb zone is important because it is where the pedestrian transitions from the sidewalk to the street. Those that use a wheelchair, are visually impaired or have difficulty walking, depend on the treatment between the curb and the street to access the sidewalk.

Signals

Signal timing note: *A complicating factor in timing signals is that it is difficult to accommodate the timing differences between pedestrians, bicyclist, and motor vehicles given the variable speeds each are traveling. This reality has to be factored into signal timing, with one or the other ultimately getting preference depending on the situation.*

Commonly, traffic signals are timed to accommodate smooth motor vehicle flows at a desired operational speed. In urban areas, these speeds exceed typical bicycling and walking speeds of 10 to 20 MPH and 2 to 3 MPH, respectively. Signal timing, or the lack thereof, can create difficulties for bicyclists trying to maintain a constant speed to take advantage of their momentum, which in turn tempts bicyclists to get a jump on a light or to simply run red lights out of frustration. The situation is even more frustrating to pedestrians, who often can only walk one or two blocks at a time, stopping at nearly every light.

Signal timing is important on designated bikeways through the city, as would be the case here on 86th Street and Portland Avenue.

Where bicycle and pedestrian use is high, signal timing should take into account the convenience of bicyclists and pedestrians. On signals that function "on-call" (with loop detectors), there are several improvements that can be made to benefit cyclists:

- Placing loop detectors in bike lanes on side streets to trip the signal
- Placing loop detectors in bike lanes to prolong green phase when a bicyclist is passing through (the upcoming yellow phase may not allow enough time for a cyclist to cross a wide intersection)
- Increasing the sensitivity of existing loop detectors in bike lanes, and painting stencils to indicate to cyclists the most sensitive area of the loops
- Placing push-buttons close to the street where a bicyclist can reach them without dismounting

Improvements for pedestrians may include:

- Incorporating a pedestrian phase in the signal sequence, rather than on-demand, in locations with high pedestrian use
- Placing pedestrian push-buttons in locations that are easy to reach, facing the sidewalk and clearly in-line with the direction of travel (this will improve operations, as many pedestrians push all buttons to ensure that they hit the right one)
- Placing additional actuators prior to the intersection, to decrease pedestrian waiting time
- Adjusting the signal timing to accommodate average walking speeds, or to limit the time a pedestrian has to wait.

Ultimately, including bikeways as an integral part of future street designs is the goal if bicycling is to become a more routine means of transportation in Bloomington.

In more recent times, motion detectors (both infrared and video) are being experimented with that automatically change the signal phase when a pedestrian approaches. Lead Pedestrian Interval (LPI) signals are also being used to allow the pedestrian to get a head start in crossing an intersection, thus preventing cars from darting through on a turn and cutting off a pedestrian. The use of countdown timers at key intersections is also becoming more common and proving effective with improved understanding about the amount of time a pedestrian has to cross the street.

Bikeways as Integral Part of Future Street Design

As defined earlier in this section, the core alternative transportation plan establishes an initial system on interconnected, high value trails, pedestrian-ways, and bikeways that form the backbone of the larger alternative transportation system. As previously stated, bikeways should be a design consideration for all new or upgraded roads within the city, especially through roads that serve as "feeder routes" which reasonably interconnect with the bikeways and trails shown on the system plan.

End of Trip Facilities

As parking lots are an integral part of a motor vehicle transportation system, so is the case with end of trip facilities that support alternative forms of transportation, especially bicycles. As such, providing end of trip facilities cannot be overlooked since inadequate, poorly located, or unsecured facilities pose significant barriers to enticing higher levels of bicycle commuting. In addition to common bicycle racks, end of trip facilities include secure, longer-term bike storage lockers and showers/ changing space for commuters.

For the bikeway network to be used to its full potential, secure bicycle parking should be provided at likely destination points. The perceived threat (and reality) of bicycle theft being common due to the lack of secure parking is often cited as a reason people hesitate to ride a bicycle to certain destinations. The same consideration should be given to bicyclists as to motorists, who expect convenient and secure parking at all destinations.

Bicycle parking facilities are generally grouped into 2 classes:

- Long term – provides complete security and protection from weather; is intended for situations where the bicycle is left unattended for long periods of time, such as apartments and condominium complexes, schools, places of employment and transit stops; these facilities are usually lockers, cages, or rooms in buildings that provide real security for the bicycle
- Short term (less than 2 hours) – provides a means of locking the bicycle frame and both wheels, but does not provide accessory and component security or weather protection unless covered; it is for decentralized parking where the bicycle is left for a short period of time and is visible and convenient to the building entrance

Covered parking should generally be provided at multi-family residential, school, industrial, and commercial destinations. Where motor vehicle parking is covered, bicycle parking should also be covered. Covered spaces can be building or roof overhangs, awnings, lockers, or bicycle storage spaces within buildings.

Covered parking needs to be visible for security, unless supplied as storage within a building. Bicycle parking should be located in well lit, secure locations within 50 feet of the main entrance to a building, but not further from the entrance than the closest automobile parking space. To reduce theft, a highly visible location with much pedestrian traffic is preferable to obscure and dark corners. Racks near entrances should be located so that there are no conflicts with pedestrians.

Bicycle racks must be designed to:

- Avoid bending wheels or damaging other bicycle parts
- Accommodate high security U-shaped bike locks
- Accommodate locks securing the frame and both wheels
- Avoid tripping pedestrians
- Be covered where users leave their bikes for a long period of time
- Be easily accessed from the street and protected from motor vehicles

Modern bike racks can range from the tried and true loop system to the architectural version designed for a specific application. These two would be considered a short-term bicycle parking facility.

In situations requiring more protection from weather and theft, bike lockers or secure indoor options are readily available for long-term bicycle parking.

Currently, there are no established standards for a specific number of bicycle parking spaces at a given type of destination in Bloomington. To aid this discussion, the following table developed for Portland, Oregon provides a baseline for establishing a minimum number of bicycle parking spaces for select types of destinations.

Baseline for Establishing a Minimum Number of Bicycle Parking Spaces for Select Types of Destinations

Land Use Category	Minimum Number of Bicycle Parking Spaces Required	Minimum Amount Covered
Residential		
Multi-family residential, general	1 space per unit	100%
Multi-family residential, seniors or with physical disabilities	4, or 1 space per 5 units, whichever is greater	100%
Institutional		
Schools – Elementary	4 spaces per classroom	100%
Schools – Jr. High/Middle School	4 spaces per classroom	100%
Schools – Sr. High	8 spaces per classroom	100%
College	1 space per 4 students (plus 1 space per student housing room/unit)	100%
Transit Centers/Park & Ride Lots	5% of auto spaces (or 100% of demand, depending on accessibility to bicyclists)	100%
Religious Institutions	1 space per 40 seat capacity	25%
Hospitals	1 space per 5 beds	75%
Doctor, Dentist Offices	2, or 1 space per 1000 s.f., whichever is greater	25%
Libraries, Museums, etc.	2, or 1 space per 1000 s.f., whichever is greater	25%
Commercial		
Retail Sales	0.33 space per 1000 s.f.	50%
Auto-oriented Services	2 or 0.33 space per 1000 s.f., whichever is greater	10%
Groceries/Supermarkets	0.33 space per 1000 s.f.	10%
Office	2, or 1 space per 1000 s.f., whichever is greater	10%
Restaurant	1 space per 1000 s.f.	25%
Drive-in Restaurant	1 space per 1000 s.f.	25%
Shopping Center	0.33 space per 1000 s.f.	50%
Financial Institutions	2, or 0.33 space per 1000 s.f., whichever is greater	10%
Theaters, Auditoriums, etc.	1 space per 30 seats	10%
Industrial		
Industrial Park	2, or 0.1 space per 1000 s.f., whichever is greater	100%
Warehouse	2, or 0.1 space per 1000 s.f., whichever is greater	100%
Manufacturing, etc.	2, or 0.15 space per 1000 s.f., whichever is greater	100%

Notes:

Each individual use needs to be evaluated for bicycle parking - e.g. a commercial accessory use in an industrial district may have different requirements than the industrial uses around it. Similarly, in mixed-use developments, the amount of each use and required bicycle parking needs evaluation. Finally, within each use category one needs to consider the different user categories - residents, employees, customers, etc. - and parking requirements for each. Provisions to allow requirements of additional bicycle parking exceeding these minimums should be considered where it is appropriate.

Note that the City is currently developing local standards for bicycle parking spaces based on local research. The standards will take into consideration site-specific needs and actual and projected use numbers. A common approach in applying a standard is to establish a baseline "proof-of-parking" capacity at a given destination consistent with the standard, then provide actual bicycle parking spaces as demand warrants. In general, employment and retail centers should voluntarily provide parking to satisfy the demands of customers and employees.

Directional signs are needed when bicycle parking locations are not visible and obvious from building entrances or transit stops. Instructional signs may be needed if the design of bicycle racks isn't readily recognized as such. For security reasons, it may be desirable not to sign long-term employee parking within a building, to avoid bringing bicycles to the attention of potential thieves.

Transit Integration Note: As defined in Section 2 - Vision and Values Statement, it is recommended that pertinent elements of this plan be applied to the land use and transportation elements of the City's Comprehensive Plan. This will ensure that each element of the Comprehensive Plan is complementary and that "active living" and "design for health" principles are intrinsic to all City planning endeavors. In particular, adopting land use policies and practices that promote transit integration principles in the built form (public and private) will further work toward the realization of the vision and values of this plan.

Transit Integration

Integrating the alternative transportation system with the Metro Transit system plays an important role in making walking and bicycling a part of daily life in Bloomington. As the ***System Plan*** illustrated on page 3.8, the core bikeways, trails, and pedestrian-ways interlink with established transit hubs and park & ride lots wherever possible. With increasingly convenient linkages, the potential to increase the use of bus and light rail transit is enhanced.

To encourage a more robust integration of bicycles with transit, four main components are necessary. These include 1) allowing bicycles on transit, 2) offering secure bicycle parking at transit locations, 3) improving bikeways to transit locations, and 4) education. The first two of these are largely controlled by Metro Transit, which already provides bike racks on all Metro Transit buses and Hiawatha Line trains at no additional charge. The third item will be addressed through the implementation of this plan. The fourth is best addressed jointly between the City of Bloomington and Metro Transit through a coordinated local effort.

As with the rest of the system, quality of end of trip facilities is critical to increased uses. Providing quality long-term bicycle parking at transit stations in particular is necessary to reassure bike commuters that their bicycles are safe and secure until they return. As defined in the table on page 3.54, a mix of short and long-term bike parking is typically provided at transit centers. Programs such as Metro Transit's "Guaranteed Ride Home" for cyclists who ride their bike to work three times a week or more also help reduce reluctance to travelling without an automobile.

Bicycle "Park and Ride" Sites

Currently, transit-oriented bicycle facilities are provided at designated vehicular park and ride lots and transit hubs. However, these may not always be the most safe and convenient locations for bicyclists to get to via the street or trail system. As such, the validity of providing stand-alone bicycle park and ride facilities in select locations along the bikeway and trail system should be considered as the core alternative transportation plan is implemented. The best way to determine where and the extent to which this should occur is to observe bicycle commuting patterns and work with local bicycle groups. Realistically, these patterns will not fully emerge until some of the key bikeway and trail corridors defined under this plan have been established.

Neighborhood Pedestrian/ Safe Routes to School Program

As defined on page 3.1, the alternative transportation plan consists of three key components that will be implemented incrementally and concurrently over time as resources allow. Each of these have a specific focus for improving the alternative transportation system within Bloomington to serve various constituencies. This particular plan component focuses on the incremental improvement of facilities at the neighborhood and local school level to achieve a number of desired outcomes consistent with those advocated by the FHWA Safe Routes to School Program. Key outcomes having equal application for neighborhoods and areas around schools include:

- Increased bicycle, pedestrian, and traffic safety
- More children walking and bicycling to and from schools
- Decreased traffic congestion
- Improved childhood health
- Reduced childhood obesity
- Encouragement of healthy and active lifestyles
- Improved air quality
- Improved community safety
- Reduced fuel consumption
- Increased community security
- Enhanced community accessibility
- Increased community involvement
- Improvements to the physical environment that increase the ability to walk and bicycle to and from schools
- Improved partnerships among schools, local municipalities, parents, and other community groups, including non-profit organizations
- Increased interest in bicycle and pedestrian accommodations throughout a community

In Bloomington, the physical form that these outcomes will take will depend on the circumstances. As is the case with the broader Complete Streets Program discussion, the focus will generally be on the removal of barriers that diminish the likelihood of a person walking or biking to a destination. Common barriers include gaps in the sidewalk system, inconsistent standards, and lack of end-of-trip facilities at destinations, especially schools. End-of-trip facilities include secure bike parking, changing areas, and a place to shower. The following photos highlight some of the conditions found in Bloomington.

As this photo illustrates, the sidewalks vary in width and location, reducing a pedestrian's desire to walk along this segment. Being directly adjacent to the road also introduces concerns about separation from vehicles.

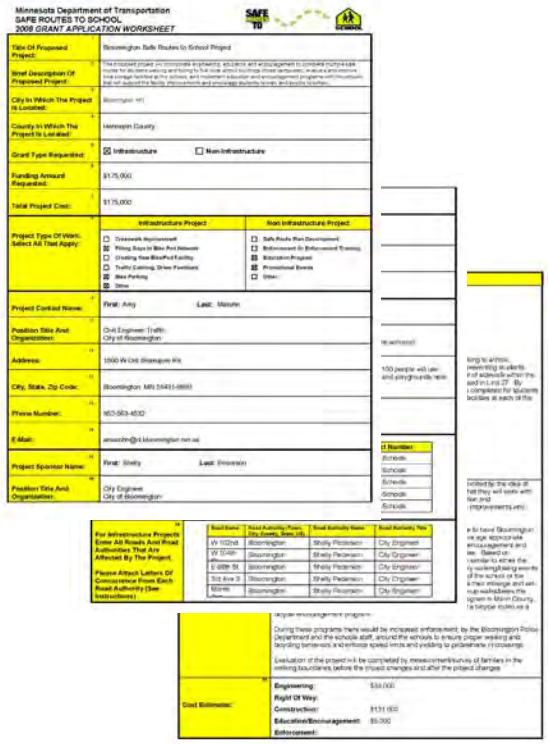
Providing accessible ramps at curb lines was a common issue brought up during the public process. Ramps that had a "lip" are especially annoying to many users, especially seniors and those in wheelchairs.

The proximity of the walkway right next to the road diminishes the user's quality of the experience and sense of safety.

As this photo illustrates, three surfaces are used in one short segment. This lack of consistency diminishes the appeal of the corridor to pedestrians and bicyclists.

As shown here, major strides are being made in filling gaps in the trail and sidewalk system, which greatly enhances the prospect for future generations to travel around the city.

The lack of end of trip facilities at schools, retail nodes, and institutions diminishes the likelihood of residents using bicycles as a routine form of alternative transportation.



Minnesota Department of Transportation
SAFE ROUTES TO SCHOOL
2008 GRANT APPLICATION WORKSHEET

Previously submitted but unfunded application by Bloomington for Safe Routes to School Program funding administered by Mn/DOT.

In neighborhoods subject to redevelopment, removal of the previously defined barriers plus application of the Complete Streets guidelines defined later in this section is recommended to enhance the use of alternative forms of transportation at the neighborhood level.

With respect to safe routes to school, Bloomington has already been pursuing funding through a FHWA program, which is administered in Minnesota through Mn/DOT under the Safe Routes To School (SRTS) Program. The left column illustrates a recent application submitted by Bloomington in cooperation with the local school district for grant monies. Although ranked very high, the application was not funded due to lack of resources. Nonetheless, staying committed to seeking outside funding sources remains critical to making improvements over time.

In terms of implementation, FHWA recommends that SRTS efforts incorporate – directly or indirectly – five components, often referred to as the "5 E's". These include:

- **Engineering** – creating operational and physical improvements to the infrastructure surrounding schools that reduce speeds and potential conflicts with motor vehicle traffic, and establish safer and fully accessible crossings, walkways, trails and bikeways
- **Education** – teaching children about the broad range of transportation choices, instructing them in important lifelong bicycling and walking safety skills, and launching driver safety campaigns in the vicinity of schools
- **Enforcement** – partnering with local law enforcement to ensure traffic laws are obeyed in the vicinity of schools (this includes enforcement of speeds, yielding to pedestrians in crossings, and proper walking and bicycling behaviors), and initiating community enforcement such as crossing guard programs
- **Encouragement** – using events and activities to promote walking and bicycling
- **Evaluation** – monitoring and documenting outcomes and trends through the collection of data, including the collection of data before and after the intervention(s)

FHWA selection criteria requires applications to address both infrastructure and non-infrastructure activities, regardless of whether the grant is requesting one type of funding, or both. FHWA recommends that States establish and consider multiple eligibility criteria including, but not limited to:

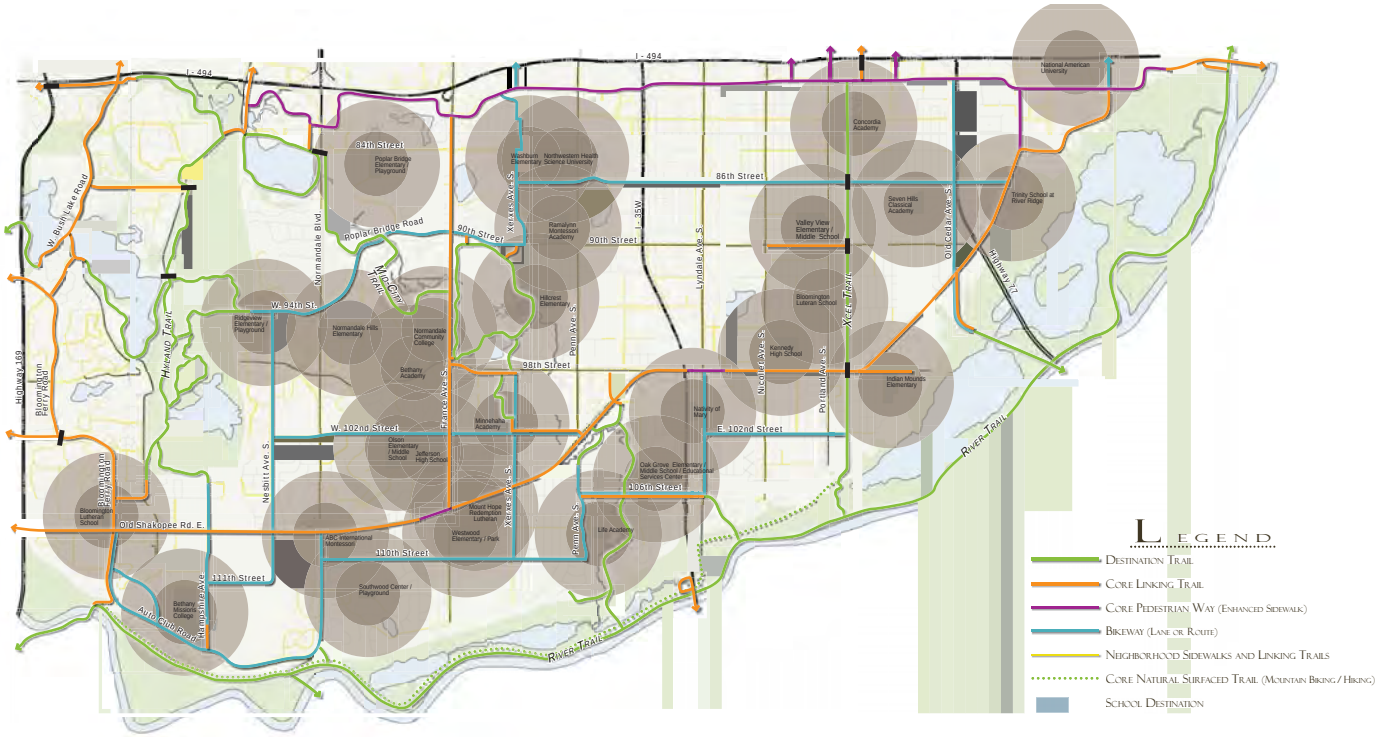
- Demonstrated needs
- Identification of safety hazards

- Potential to reduce child injuries and fatalities
- Potential to create a safer walking and bicycling built environment within approximately two miles of a school
- Potential to encourage walking and bicycling among students
- Identification of current and potential safe walking and bicycling routes to schools
- Number of child pedestrians or bicyclists currently using routes
- Number of child pedestrians or bicyclists anticipated to use routes
- Community support for application

The National Center for Safe Routes to School provides assistance to communities in developing successful Safe Routes programs and strategies. The Center offers a centralized resource of information on how to start and sustain a Safe Routes to School program, case studies of successful programs, as well as many other resources for training and technical assistance.

From a practical implementation standpoint, continuing to work with the local school district to identify and prioritize infrastructural improvements needed around schools is recommended. Making incremental improvements radial to a priority school site is a common approach, As a starting point, 1/4 mile to 1/2 mile radius is commonly considered an acceptable walking distance to schools from within a neighborhood or school service area. Beyond that, the willingness of students to walk to school drops off considerably. As Figure 3.19 illustrates, using these radii also effectively link safe route to school enhancement areas to many of the core alternative transportation plan features.

Figure 3.19 – Safe Routes to School Effective Service Areas



Circles illustrate 1/4 mile and 1/2 mile radii from the various local schools. Beyond these distances, it becomes less likely that a student will walk or ride a bike to school. Note that school attendance areas will affect actual safe routes to school route considerations. In other words, the service area for a given school may be more lopsided than the service radii suggest.

Practical Limitations of Neighborhood Pedestrian/Safe Routes to School Program

As defined, enhancing alternative transportation opportunities at the neighborhood and school level through facility enhancements is indeed valuable and important. This optimism, however, has to be balanced against the realities of the built form in Bloomington, in which the provision of sidewalk systems in any given area is not always consistent or robust. Whereas filling gaps and enhancing safety along primary routes is an achievable and worthy goal, expectations about retrofitting sidewalk systems uniformly in the community where none currently exist requires a degree of pragmatism. Costs, neighborhood desire, right-of-way limitations, etc. all factor into the practicalities of undertaking such improvements. Although such wholesale retrofitting has merit, it is likely to only occur as part of larger redevelopment initiatives in which the Complete Streets guidelines defined later in this section can be applied. In these instances, the City is encouraged to ensure that all transportation alternatives are integrated into area planning.

Aerial image of the eastern side of the city illustrates that sidewalks are primarily provided along major streets and not along local streets in the neighborhood. Through education and enforcement, drivers of motor vehicles need to be reminded that local streets are inherently multi-modal, with pedestrians, bicyclists, and motor vehicles all sharing the same space. Incidentally, in Bloomington, the accident rate between motorists and pedestrians in these neighborhoods is quite low.

Public Participation in Identifying Gaps

As is the case with the broader Complete Streets Program, the City should encourage residents to inform staff and elected officials of gaps in the system that create barriers to pedestrian and bicycle travel within neighborhoods and to school sites. Once documented, these occurrences can be factored into the City's overall PMP program as previously described in this section.

Signage and Wayfinding

A significant issue that routinely arose during the public process is the lack of a consistent signage program that is uniformly understood by motorists, bicyclists, and pedestrians alike. This is especially the case with bikeway signage, in which the current placement of bike route signs along 4-lane roads with no shoulders is confusing to both bicyclists and motorists. Development and implementation of a cohesive signage program is a key aspect of the alternative transportation plan.

In Bloomington, as elsewhere, bicyclists can legally ride on most non-freeway streets irrespective of whether or not they are signed for such use. As such, bikeway signage is not intended to be used as a means to designate whether or not bicycling is allowed on any given road. Irrespective of a street's configuration, motorists must, by law, safely accommodate any bicyclists conforming to the same laws who are comfortable riding in that environment.

A signage program is intended to *support* a legitimate bikeway by providing wayfinding information and reinforcing the relationship between motor vehicles and bicyclists. Signage, however, is ineffective at accomplishing either of these if the street is not configured to accommodate bicyclists in the first place. In other words, signing a street as a designated bikeway is of little value if the street lacks the physical space to separate the bicyclist from motor vehicles, whether that is accomplished by widening the shoulder (for a bike route) or providing a designated bike lane. In fact, an over-abundance of warning and regulatory signs may most often cause confusion and increase the likelihood of conflict.

For these reasons, signing and marking of bikeways, trails, and walkways must be uniform and consistent for them to command the respect of the public and provide safety to users. Signing and marking must be warranted by use and need and provide uniformity and continuity across the city. Well-designed street configurations, as defined earlier in this section, should themselves make it relatively clear to users how to proceed, and therefore require limited signing. The attention of drivers, bicyclists and pedestrians should be on the road and other users, not on signs on the side of the road. Over-signing degrades the usefulness of signs, causes distractions, creates a cluttered effect, is ineffective and wastes resources.

Existing Bikeway Signage

Given the notable public concern about this issue, the entire bikeway signage program warrants evaluation and refinement. As a general statement, bikeway signage should be provided only under the following circumstances:

- Along routes that are part of the core bikeway system as defined by this plan *after* the streets are reconfigured to safely accommodate bicyclists as proposed
- Along new routes that emerge out of the neighborhood pedestrian/ Safe Routes to School Program or Complete Streets Program where provisions for bicyclists are provided in the street design

Other than these circumstances, the existing bikeway signage along local streets should be removed to reduce confusion and provide the opportunity to reestablish the program. Once that occurs, a well-designed signage program can be implemented consistent with the forthcoming guidelines that will better serve bicyclists and motorists.

Bikeway Signage Program Guidelines

At the technical design level, the bikeway signage program should be consistent with the MN MUTCD traffic control standards available on-line the Mn/DOT's website. These along with the guidelines provided in Mn/DOT's Bikeway Facility Design Manual and Bloomington's own traffic standards should be used for establishing the technical signage package for use in the city.

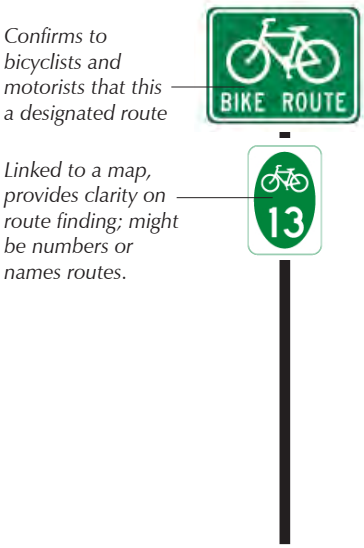
At the system planning level, which is the focus here, the following establishes guidelines for key elements of bikeway signage program to ensure clarity on the issue and establish certain baseline expectations about the program. It is not meant to be a complete illustration of all aspects of a comprehensive signage program.

Bike Routes (Wide Shoulder)

Signage for bike routes, which are most often associated with streets with a widened shoulder, focuses on three informational elements to direct bicyclists to destinations, guide them through the community, and alert motorists to their presence on the road. Informational elements include distance, direction, and destination.

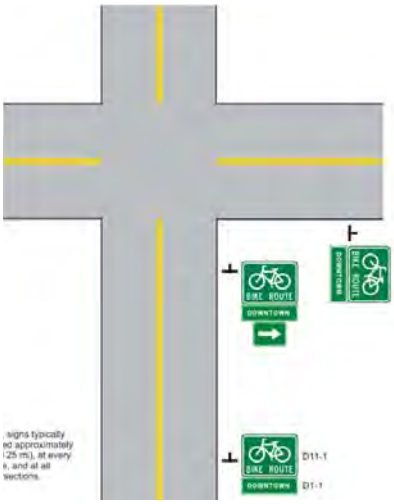
The distance component provides bicyclists with trip length information, which adds a measure of certainty and convenience to the planning of their trips. The direction component provides bicyclists with wayfinding information to destinations and around the system. Direction is most commonly an arrow on a sign. The destination component helps cyclists choose the most effective route to a given destination. Figure 3.20 provides example of common combinations of signage along a designated bike route.

Figure 3.20 – Common Approach to Bike Route Signage

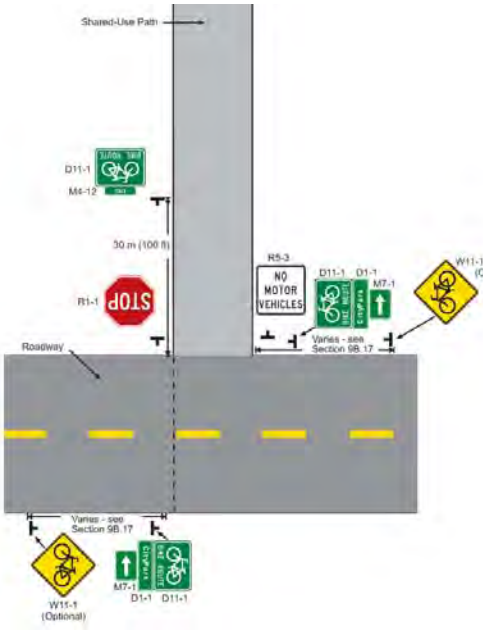


Providing simple, consistent, and understandable information to bicyclists and motorists is vital to a successful signage program.

Graphic qualifier: *These layouts/ signage locations are conceptual and subject to change.*



Along streets, signage properly placed at intersections can inform bicyclists and motorists and provide simply wayfinding information.



Maintaining consistent signage when bike routes interlink with trails is also important.

Bike Lanes (Designated Portion of Street)

Signage for bike lanes serves the same purpose as that for bike routes, only with more assertiveness at critical points of interface between motor vehicles and bicyclists. This is especially the case at intersections, where direct and clear direction about maneuvering space is of utmost value for both parities.

On-pavement stencils should be placed after most intersections, which alerts drivers and bicyclists entering the street of the exclusive nature of the bike lanes. Stencils should be placed after every intersection where a parking lane is placed between the bike lane and the curb.

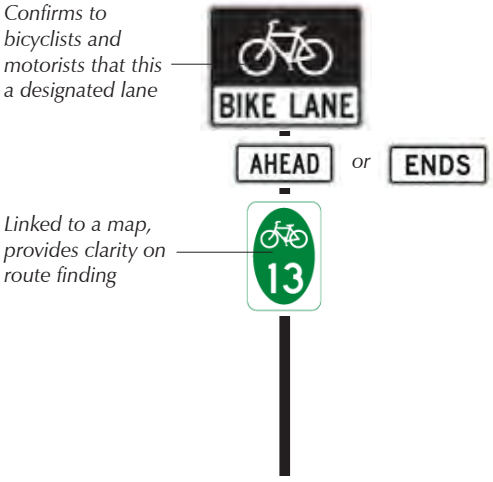
Supplementary stencils may also be placed at the end of a block, to warn cyclists not to enter a bike lane on the wrong side of the road. Additional stencils may be placed on long sections of street with no intersections. A rule of thumb for appropriate spacing is to multiply designated travel speed by 40. For example, in a 35 MPH speed zone, stencils may be placed approximately every 1400 feet.

Care must be taken to avoid placing stencils in an area where motor vehicles are expected to cross a bike lane - usually driveways and the area immediately after an intersection.

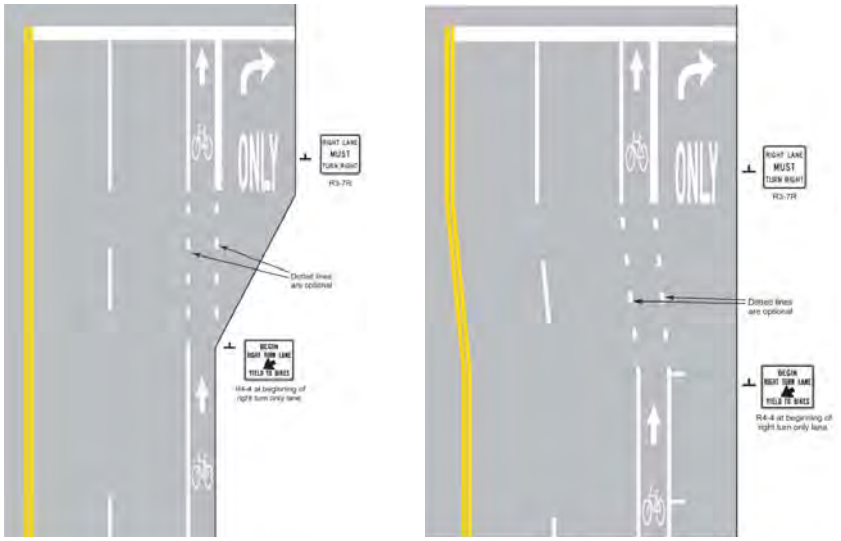
At intersections, bike lanes should be striped to a marked crosswalk or a point where turning vehicles would normally cross them. The lanes should resume at the other side of the intersection. Bike lanes are not normally striped through intersections.

At right turn lanes at intersections, bike striping is particularly important. Figure 3.21 provides example of common combinations of signage and stenciling at an intersection with turn lanes.

FIGURE 3.21 – COMMON APPROACH TO BIKE LANE SIGNAGE



Providing simple, consistent, and understandable information to bicyclists and motorists is vital to a successful signage program.



Signage and pavement markings are especially important at major intersections, where it is to everyone's benefit to have clarity on where bicyclists and motor vehicles should be to enhance safety.

Graphic qualifier: *These layouts/ signage locations are conceptual and subject to change.*

Signage Program for Trails

As with bikeways, an effective signage program for trails is of equal importance. To maintain consistency from system to system, the *Minnesota Trail Planning, Design, and Development Guidelines* (MN DNR 2007) should be used as the primary guidelines for signage along trails, As the following page images illustrate, trail signage falls into four categories, including:

- Regulatory, traffic control, and warning signs
- Trailhead and orientation signs
- Directional and routes guide signs
- Trail identification and warning signs for motorists

For more information!

Refer to Mn/DOT's website (www.dot.state.mn.us/trafficeng/otepubl/mutcd/index.html) for the complete MN MUTCD manual.

Shared-use Trail Signage and Striping

The MN MUTCD is the primary reference for general traffic control and safety sign standards along shared-use trails. Part 9 – Traffic Control Devices for Bicycle Facilities and Appendix C – Sign Listing are particularly useful in defining the standards for various types of signs found on trails, including stop, speed, hazard warning, grades, curves, directional, and authorized uses.

In addition to traffic control and safety, signs should provide useful trail and destination information in a consistent, uncluttered manner. This means only providing the signs really necessary in order to minimize visual distraction, maintenance, and ongoing costs. It is also important not to place signs that may inadvertently confuse motorists. (When signs are within a road right-of-way, it should be obvious to motorists that they are intended for trail users and signed in conformance with MN MUTCD standards.) The following provides examples of various types of signs most often associated with shared-use paved trails.

Regulatory/Traffic Control/Warning Signs

These signs are used to notify trail users of rules and laws associated with trails and alert users of potentially hazardous conditions on or adjacent to a trail, as the following photos illustrate.

Stop signs are classic warning signs and recommended at all roadway crossings. Note the difference in the size of the sign in these two photos. In general, smaller signs consistent with MN MUTCD standards are recommended for general application and to avoid visual clutter, with larger ones being used to get trail users' attention at more dangerous crossings.

Small, simple signs alerting trail users to which side of the path to use are appropriate at access points or wherever the trail configuration changes. The character of these signs should be consistent throughout the system to make reacting to them second nature to the trail user traveling at different speeds.

Warning signs alert trail users to a changed condition, such as a curve, narrowing of the trail, or steep grade. Such signs convey an important message and should be consistent with uniform standards. Consistent signing helps trail users' reaction to the signs become second nature and increase their reaction time, resulting in a safer trail experience.

Regulatory and rules signs alert trail users to limitations on trail use and their responsibilities in using the trail. As with all signs, these should be of a consistent style and character so trail users become familiar with the set of rules and regulations common to a system of trails.

Trailhead/Orientation Signs

These signs highlight trail features and interconnections with other trails, and provide general "You Are Here" information. Trailhead and orientation signs come in many forms depending on the setting and information needs. In an urban area, trail kiosks are often informational as well as an architectural element and common identifier of a particular system. In a rural setting, these types of signs are often simpler. The following photos highlight a few examples of these types of signs.

An ornate architectural style is appropriate for an informational kiosk in a historic district, as is this one along the Mississippi River in Minneapolis.

The distinctive style of the information kiosks of the Chain-of-Lakes Grand Rounds in Minneapolis provides users with consistent information at expected locations. The kiosk is also an important architectural statement.

The style of the information signs along the Gateway Trail is purposefully simpler and appropriate while still being consistent and successful at providing trail users with information at expected locations.

DIRECTIONAL SIGNS AND ROUTE GUIDES FOR TRAIL USERS

These signs provide useful information at key decision points along a trail. They are used to sign roadway crossings, identify where connecting trails lead, and highlight major destinations in the vicinity of the trail.

The style of directional signage and route guides for the Root River Trail (far left) is consistent with the setting, as is that found along the Cedar Lake Greenway (middle).

Although signage is important, excessive or cluttered signage loses its impact and detracts from the trail experience (right).

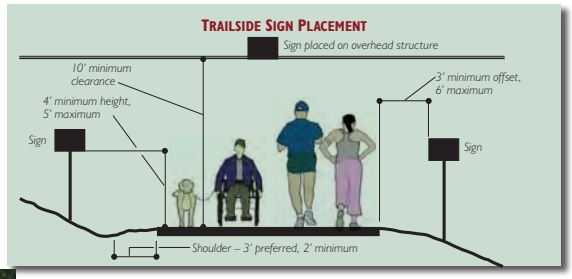
TRAIL IDENTIFICATION/WARNING SIGNS FOR MOTORISTS

These signs alert motorists about the existence of a trail crossing or related facility. Consistently signing can help motorists become more aware of the trail and thus more likely to proceed with caution.

Each of these signs gets across a simple message to motorists. It is especially important for roadway signs to be consistent with MUTCD standards, since those are the ones motorists are used to.

GENERAL SIGN PLACEMENT GUIDELINES

Part 9 – Traffic Control Devices for Bicycle Facilities of the MN MUTCD provides guidelines for signs along trails. The following graphic illustrates the most important aspects of these guidelines.



trails
'al and
sightlines adequate. Nonetheless, trail users are responsible to stay in their lane when approaching opposing traffic.

SHARED-USE TRAIL STRIPING GUIDELINES

Trail striping and markings are used to indicate the separation of trail lanes in congested areas and highlight potential hazards. Part 9 – Traffic Control Devices for Bicycle Facilities of the MN MUTCD provides general guidelines. In general, striping and pavement markings are used to address a specific safety concern, including:

- Trail hazards, which are defined as anything that would be unexpected or difficult to see and/or may require a trail user to make a maneuver or change speed
- Areas of heavier use where striping is used to remind trail users to stay in their lane, especially with oncoming traffic
- Any curve, hill, or roadway crossing where sightlines are compromised and/or where trail users should stay in their respective lanes

The following photos highlight the most common striping situations.

A solid white line may be used on a shared-use path to separate uses, with a broken yellow line used for separating opposing lanes. Pavement markings clarify proper uses and direction.

A broken solid yellow line is used on busier trails to remind trail users to stay in their lane. Consistency of use along a trail is important in order for trail users to understand the pattern.

A solid yellow line is used to identify a no-passing area when approaching a curve or hill with limited sightlines. This is often accommodated with a trailside warning sign.

MN MUTCD standards are recommended for all roadway crossings to ensure consistency across the state.

A solid white line can be used to highlight a particular trail hazard, alerting trail users to pay attention, maneuver around an obstruction, or change speed.

In some systems, a green center line is used in lieu of yellow as an identifier of a system of trails. If this approach is taken, maintain consistency to avoid confusion.

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