



# Bicycle and Pedestrian Facilities Design Guidelines

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East Central Wisconsin  
Regional Planning Commission

**ECWRPC**

## Marked Crosswalks

Well-designed crosswalks are an important component to increase the safety of pedestrians crossing streets and roads. A marked crosswalk signals to motorists that they must yield to pedestrians and encourages pedestrians to cross at designated locations. Installing crosswalks alone will not necessarily enhance the comfort level of crossings. Crosswalks should exist at all locations where sidewalks meet the roadway, regardless of whether pavement markings are present. Providing marked crosswalks communicates to drivers that pedestrians may be present, and helps guide pedestrians to locations where they should cross the street.



*Ladder style crosswalk with bump-out to reduce the distance pedestrians have to cross*

### Benefits

- Increases the visibility of pedestrians crossing at intersections and controlled mid-block crossings.
- Can have traffic-calming effects if raised or if curb extensions are provided.

### Challenges

- Road grades and crowns pose challenges for constructing crosswalks that meet accessibility requirements.
- Multi-lane streets and rural intersections require longer crosswalks and are less comfortable for pedestrians.
- Enforcing stop-bar compliance is important so that drivers do not stop in crosswalks.





*Continental striping pattern*



*Standard stripe*

**Cost Rating: Low**

**Effectiveness Rating : Moderate**

### **Design Criteria**

- Designs should balance the need to reflect the desired pedestrian walking path by orienting the crosswalk perpendicular to the curb; perpendicular crosswalks minimize crossing distances and therefore limit the time that pedestrians are exposed.
- Users should not have to leave the crosswalk or reorient themselves from the crosswalk when accessing the curb ramp onto the sidewalk
- There are many different styles of crosswalk striping and some are more effective than others. Ladder and continental striping patterns are more visible to drivers.
- Crosswalk markings should be used at crossings with high pedestrian use or where vulnerable pedestrians are expected, including: school crossings, across arterial streets for pedestrian-only signals, and at midblock crosswalks.

## Curb Ramps

Curb ramps are the design elements that allow all users to make the transition from the street to the sidewalk. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access. There are a number of factors to be considered in the design and placement of curb ramps.



*Curb ramps must include textured patterns for the visually impaired*

### Benefits

- Universally, widespread benefits apply to people using wheelchairs, strollers, walkers, crutches, handcarts, bicycles, or who have mobility restrictions that make it difficult to step up and down high curbs.
- Provide a safe connection from the sidewalk to the street

### Challenges

- Curb ramp designs can be challenging, especially at intersections with large corner radii or on streets within narrow right-of-ways.
- Need to be well maintained, especially during winter months when snow and ice are encountered.
- If not designed to ADA standards, curb ramps can be a problem for pedestrians with visual impairments because they minimize the tactility of the transition point between the sidewalk and the roadway.



*Separate curb ramps for each crosswalk*



*Safe connection from the sidewalk to the street*

**Cost Rating: Low**

**Effectiveness Rating : Moderate**

## **Design Criteria**

- Separate curb ramps should be provided for each crosswalk at an intersection rather than a single ramp at a corner for both crosswalks. The separate curb ramps improve orientation for visually impaired pedestrians by directing them toward the correct crosswalk.
- Curb ramps should direct pedestrians into the crosswalk. The bottom of the ramp should lie within the area of the crosswalk.
- Truncated domes must be installed on all new curb ramps to alert pedestrians to the sidewalk and street edge.
- All newly constructed and resurfacing roadway projects must include curb ramps. In addition, existing facilities must be upgraded to current standards when appropriate.



## Curb Extensions

Curb extensions—also known as bulb-outs or neckdowns—extend the sidewalk or curb line out into the parking lane. Curb extensions narrow the roadway, creating safer and shorter crossings for pedestrians while increasing the available space for street furniture, benches, plantings, and street trees. They may be implemented on downtown, neighborhood, and residential streets.



*Curb extensions encourage slower turning speeds*

### Benefits

- Reduce the crossing distance for pedestrians.
- Have traffic-calming effects, by serving as a visual cue to drivers that they are entering a neighborhood street or area.
- Increase the overall visibility of pedestrians.

### Challenges

- Can force bicyclists into vehicle travel lane which may be uncomfortable for novice riders.
- They can reduce future flexibility in making changes to the location of bus zones, roadway lane layout, or crosswalks
- Curb extensions can make winter maintenance more difficult.



*Align pedestrians with the parking lane*



*Shorten the crossing distance for pedestrians*

**Cost Rating: Moderate to High**

**Effectiveness Rating : High**

### **Design Criteria**

- Curb extensions are only appropriate where there is an on-street parking lane and where transit and bicyclists would be traveling outside the curb edge for the length of the street. They should not extend more than 6 –8 feet from the curb.
- The turning needs of larger vehicles, such as school buses and emergency vehicles, need to be considered in curb extension design.

## Pedestrian Signals

Pedestrian signals are devices used at signalized intersections to notify pedestrians when it is safe to cross the street. Pedestrian signals should allow sufficient time for pedestrians to cross the street, including seniors, children, and people with disabilities. Modern pedestrian signals incorporate countdown timers into their design that display the number of seconds remaining before the signal changes to “Don’t Walk.” Pedestrian countdown signals are designed to enhance the effectiveness of pedestrian signals at clearing the crosswalk before a signal changes direction.



*Pedestrian countdown signals have been shown to have a 25% reduction in pedestrian injury collisions*

### Benefits

- Informs pedestrians when they should begin crossing.
- Countdown timers inform pedestrians how much time they have to cross.
- Certain types of pedestrian signals also alert motorists that pedestrians are crossing, which increases the percentage of vehicles that yield to pedestrians.

### Challenges

- When push buttons are used, they should be located so that someone in a wheelchair can reach the button from a level area of the sidewalk without deviating significantly from the natural line of travel into the crosswalk.
- It is important to allow sufficient crossing time for vulnerable users.





*Rapid Flashing Beacon*



*Pedestrian Hybrid Beacon*

**Cost Rating: Moderate to High**

**Effectiveness Rating : High**

## **Design Criteria**

- When possible, provide a walk interval for every cycle.
- Special considerations should be included for pedestrians with visual and hearing impairments.
- The Rapid Flashing Beacon is a device used in combination with pedestrian warning signs to provide a high-visibility strobe-like warning to drivers when pedestrians use a crosswalk.
- The Pedestrian Hybrid Beacon, also known as HAWK signals provide safer crossing alternatives for people walking and biking than traditional crosswalks, especially in mid-block locations with heavy demand.

## Pedestrian Refuge Islands

A pedestrian refuge island is a median with a refuge area that is intended to help protect pedestrians who are crossing a multi-lane road. A pedestrian refuge island can improve safety and comfort by providing pedestrians with the option of waiting in the median area before beginning the next stage of crossing.



*Pedestrian refuge islands can reduce pedestrian crashes by 32%.*

### Benefits

- Provide pedestrians a place to stop when crossing wide, multi-lane streets.
- Allow the pedestrian to focus on one direction of traffic at a time.
- Enhances visibility of the crossing and reduces the speed of approaching vehicles.

### Challenges

- Refuge islands should provide sufficient space for pedestrians to stop and be protected from traffic.
- Must be accessible, preferably with a cut-through passage rather than ramps.
- May require frequent maintenance of road debris.



*Limit pedestrian exposure in the intersection*



*Cut-through refuge island*

**Cost Rating: Moderate to High**

**Effectiveness Rating : High**

## **Design Criteria**

- Refuge islands are commonly implemented for mid-block pedestrian crossings on multi-lane roadways with higher traffic speeds.
- Islands should be a minimum of six feet wide and at least 20 feet long.
- The cut-through or ramp width should equal the width of the crosswalk.
- Cut-throughs or curb ramp shall be marked with a tactile warning device to alert people with visual impairments to changes in the pedestrian environment.
- All refuge islands at intersections should have a “nose” that extends past the crosswalk to protect people waiting on the island.
- Illuminate or highlight islands with street lights, signs, or reflectors to enhance visibility for motorists.



## Sidewalks

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel separated from vehicle traffic. Providing adequate and accessible facilities can lead to increased numbers of people walking, improved accessibility, and the creation of social space.



*Roadways without sidewalks are more than twice as likely to have pedestrian crashes.*

### Benefits

- Provides a safe space for pedestrians, separated from vehicle traffic.
- Increases access to local businesses
- Increases mobility for non-drivers
- Creates healthier communities.
- Reduces “walking along roadway” crashes.

### Challenges

- Sidewalks should be provided on both sides of all streets.
- Often difficult to retrofit streets to add sidewalks in existing neighborhoods.
- Need to be maintained and often that responsibility is passed on to adjacent property owners.



*Wider sidewalks can be used in areas with high concentrations of pedestrians*



*Allow all users to safely travel*

**Cost Rating: Moderate to High**

**Effectiveness Rating : High**

## **Design Criteria**

- Minimum width: 5 feet around obstructions Preferred width: 5 feet in residential areas 6 feet or wider in commercial areas.
- Wider sidewalks should be installed near schools, at transit stops, in downtown/main street areas, or anywhere high concentrations of pedestrian traffic exists.
- Wisconsin Department of Transportation (WisDOT) recommends a typical width for the buffer, or terrace, of four to six feet.
- When retrofitting gaps in the sidewalk network, locations near transit stops, schools, parks, public buildings, and other areas with high concentrations of pedestrians should be the highest priority.

## Shared Use Path

A shared use path is a two-way facility physically separated from motor vehicle traffic and used by bicyclists, pedestrians, and other non-motorized users. Shared use paths can provide a low-stress experience for a variety of users using the network for transportation or recreation.



*Provides dedicated space for users of all ages and abilities*

### Benefits

- Separated from motor vehicle traffic.
- May be appropriate for less-confident adults, children, seniors, and persons with disabilities.
- Provides recreational opportunities in addition to transportation.

### Challenges

- High construction costs.
- Can present safety concerns when placed next to a roadway with frequent driveway or intersection crossings.





*Paths have a small footprint*



*Provide a short-cut between cities and neighborhoods*

**Cost Rating: High**

**Effectiveness Rating : High**

## **Design Criteria**

- Preferred Width: 10-12 feet
- Widths as narrow as 8 feet are acceptable for short distances under physical constraint. Warning signs should be considered at these locations.
- In locations with heavy volumes or a high proportion of pedestrians, widths exceeding 10 feet are recommended. A minimum of 11 feet is required for users to pass with a user traveling in the other direction. It may be beneficial to separate bicyclists from pedestrians by constructing parallel paths for each mode.
- Paths typically have a lower design speed for bicyclists than on-street facilities and may not provide appropriate accommodation for more confident bicyclists who desire to travel at greater speeds.
- Consider adding amenities such as benches, rest areas, and scenic overlooks along paths that provide attractive recreational opportunities.
- Shared use paths are required to be accessible by all users, including those with mobility devices and vision disabilities.

## Shared Lane Markings

Shared lane markings (or “sharrows”) are pavement markings that indicate shared bicycle and motor vehicle travel lanes. The markers are two chevrons, positioned above a bicycle symbol, alert motorists that bicycles may use that shared space. In general, this is a design solution that should only be used in locations with low traffic speeds and volumes as part of a signed route, bicycle boulevard, or as a temporary solution on constrained, higher-traffic streets until additional right of way can be acquired.



*Sharrows show preferred lane positioning for bicyclists while also reminding drivers to expect people on bikes.*

### Benefits

- Reinforces that bicyclists have the same rights as motorists.
- Advertises the presence of bicyclists to all users.
- Reduces the incidence of wrong-way bicycling.
- Low-cost treatment that can be implemented in a short time period.

### Challenges

- May not be suitable for all users as shared lane markings do not provide separate space for bicyclists.
- Pavement markings may have higher maintenance needs than other facility types due to the wear and tear presented by motor vehicles driving over the pavement markings.
- Does not qualify for federal funds.



*Sharrows strengthen connections in bicycle networks*



*Provides a wayfinding element along bike routes*

**Cost Rating: Low**

**Effectiveness Rating : Moderate**

## **Design Criteria**

- Preferred on low to moderate volume and low to moderate speed streets.
- Use of pavement markings to help increase motorists awareness of bicyclists.
- The marking's centerline must be minimum 4' from curb where parking is prohibited
- Sharrows should be placed far enough from the curb to direct bicyclists away from gutters, seams, and other obstacles.
- Color may be used to enhance the visibility of the shared lane marking.



## Bicycle Lane

On-street bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signs. The bike lane is located directly adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge, or parking lane.



*A wide solid line separates the bike lane from the roadway*

### Benefits

- Increases bicyclist comfort level and confidence on streets.
- Creates separation between bicyclists and vehicles
- Increases capacities of streets carrying mixed bicycle and vehicle traffic.

### Challenges

- Bike lanes need to be maintained to be free of snow, potholes, and debris
- Bike lane striping and markings will require higher maintenance where vehicles frequently travel over them.



*Establish an area for exclusive bicycle use*



*Designed to offer priority to bicyclists*

**Cost Rating: Low/Moderate**

**Effectiveness Rating : High**

## **Design Criteria**

- The preferred minimum width of a bike lane is 5 feet to allow bicyclists to ride side-by-side or pass each other without leaving the bike lane.
- Bike lanes may be used on any street with adequate space, but are most effective on streets with average daily traffic volume of 3,000 vehicles or more per day.

## Protected Bicycle Lane

Protected bicycle lanes, or cycle tracks, are on-street bikeway facilities that are separated from vehicle traffic. Physical separation is provided by a barrier between the bikeway and the vehicular travel lane. These barriers can include flexible posts, bollards, parking, planter strips, extruded curbs, or on-street parking. Separated bikeways using these barrier elements typically share the same elevation as adjacent travel lanes, but the bikeway could also be raised above street level, either below or equivalent to sidewalk level.



*Dedicated space for bicyclists to improve comfort and safety.*

### Benefits

- Increases bicyclist comfort level and confidence on streets.
- Creates separation between bicyclists and vehicles
- Eliminates risk and fear of collisions with over-taking vehicles

### Challenges

- Snow removal should be considered when choosing type of barrier to be used.
- Requires more space.
- Intersections and driveway access points will need to be considered.





*Two-way cycle track*

**Cost Rating: Moderate**



*Bollards may be removed in winter to provide access to snow plow trucks*

**Effectiveness Rating : High**

## Design Criteria

- Cycle tracks may be one-way or two-way.
- Streets with high traffic volumes and high traffic speeds are ideal candidates for protected bicycle lanes.
- The minimum width of a protected bicycle lane should be five feet. In areas with high volumes of bicyclists, the minimum desired width is seven feet to allow for passing.

## Lane Reconfiguration (Road Diet)

Streets with excess roadway capacity or wider lanes often make excellent candidates for road diets. The removal of a single travel lane will generally provide sufficient space for bike lanes on both sides of a street. Even if the width of the sidewalk does not increase, pedestrians benefit from the buffer that the new bike lanes create between the sidewalk and travel lanes. Although the actual roadway crossing distance has not been reduced, the addition of bike lanes reduces the number of vehicle travel lanes pedestrians must cross.



*Lanes were narrowed to make way for a bike lane.*

### Benefits

- Narrower lanes generally encourage slower vehicle speeds and higher comfort for people walking and biking.
- Allows for the addition of bike lanes without large infrastructure changes.
- Reduces rear-end collisions by allowing left lane turning vehicles to use the center lane.

### Challenges

- Multiple access points may cause conflicts between left-turning vehicles and should be taken into consideration.



*Improves the safety for all users*

**Cost Rating: Low/Moderate**



*Includes a bike lane and still retains space for parking*

**Effectiveness Rating :High**

## **Design Criteria**

- Ideally implemented in commercial/residential areas on four lane streets that have an average daily traffic volume of less than 20,000 vehicles and a need for bicycle and pedestrian accommodations.
- Lane reconfigurations should also consider school, public transit, emergency service access, and other truck volumes.
- Lane reconfigurations are often paired with the road repaving or resurfacing to reduce costs.



## Paved Shoulder

Paved shoulders on the edge of roadways can be enhanced to serve as a functional space for bicyclists and pedestrians to travel in the absence of other facilities with more separation. A rural paved shoulder or a paved shoulder is a way to accommodate bicyclists alongside travel lanes. Paved shoulder width varies according to the adjacent travel lane width, and whether or not a rumble strip is present. Unlike bike lanes, paved shoulders are not travel lanes, so they may be utilized to temporarily store disabled vehicles and parking, unless otherwise prohibited.



*When enough width is provided, shoulders can accommodate bicyclists along roads too busy for comfortable shared roadway travel.*

### Benefits

- Provide separated space for bicyclists and can be used by pedestrians.
- Reduce run-off-road motor vehicle crashes.
- Reduce pavement edge deterioration and accommodate maintenance and farm vehicles.

### Challenges

- May not provide a comfortable experience for all bicyclists when used on high-speed roads.
- The placement of rumble strips may significantly degrade the functionality of paved shoulders for bicyclists.



*Rumble strips on the left-most edge of the shoulder maximizes the ride-able space for bicyclists.*



*Wider paved shoulders increase comfort for bicyclists.*

**Cost Rating: Low**

**Effectiveness Rating : Moderate/High**

## **Design Criteria**

- The minimum width for a paved shoulder to accommodate bicycles is three feet.
- Contrasting or colored pavement materials may be used to differentiate the shoulder from the adjacent travel lanes.
- No signs are required on paved shoulders, but signs may be used to identify a road as a bicycle route.

## Bicycle Boulevard

Bicycle boulevard treatments applied on quiet streets, often through residential neighborhoods, are designed to prioritize bicycle through-travel while discouraging motor vehicle traffic and maintaining relatively low motor vehicle speeds. Many cities already have signed bike routes along neighborhood streets that provide an alternative to traveling on high-volume, high-speed arterials. Applying bicycle boulevard treatments to these routes makes them more appealing for bicyclists of all abilities and can reduce crashes.



*Treatments used on a bicycle boulevard vary depending on traffic volumes, speed, and street width*

### Benefits

- Increases comfort for people bicycling by reducing the vehicle speeds and volumes.
- Can provide connections to schools and other community spaces.
- Reduces the incidence of biking on sidewalks.
- Can be a relatively low cost treatment.

### Challenges

- May impact traffic patterns.
- Pavement markings may have higher maintenance needs than other facility types due to the wear and tear presented by motor vehicles driving over the pavement markings.





*Traffic diverter used to reduce traffic*



*Designed to offer priority to bicyclists*

**Cost Rating: Low/Moderate**

**Effectiveness Rating : High**

## **Design Criteria**

- Stop signs or traffic signals should be placed along the bicycle boulevard in a way that prioritizes the bicycle movement, minimizing stops for bicyclists whenever possible.
- Sidewalk space for pedestrians should still be available.
- Additional treatments for major street crossings, such as refuge islands, or rapid beacons, may be needed.

## Bike Box

A bike box is a designated area located at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible space to get in front of queuing traffic during the red signal phase. Motor vehicles must queue behind the white stop line at the rear of the bike box. On a green signal, all bicyclists can quickly clear the intersection.



*A bike box allows cyclists to wait in front of traffic, providing high visibility and ahead start over vehicle*

### Benefits

- Increases visibility of bicyclists.
- Gives bicyclists priority at an intersection and allows them a head start when the signal turns green.
- Makes bicyclists movements more predictable.

### Challenges

- Bicyclists only get priority at the intersection when the signal is red and vehicles are behind the stop bar
- Painting the colored bike lane straight through the intersection may be necessary to reduce the risk of “right hook” collisions with vehicles.
- Colored pavement surface can be costly to maintain.



*Groups bicyclists together to clear an intersection quickly*



*Designed to offer priority to bicyclists*

**Cost Rating: Low/Moderate**

**Effectiveness Rating : Moderate**

## **Design Criteria**

- Best implemented at intersections with high volumes of bicyclists
- Most often used in conjunction with bike lanes
- Placement of markings between tire tracks will reduce wear of markings.



## Wayfinding

Wayfinding is a highly visible way to improve bicycling in an area because it helps identify the best routes to destinations, helps people overcome a barrier of not knowing where to ride, and reminds motorists to anticipate the presence of bicyclists. A wayfinding system is typically composed of signs and pavement markings that guide bicyclists along preferred routes to destinations across the community, county, or region. Signs may also state distances or time to destinations.



*Supports bicycle encouragement efforts by reducing concerns about misdirection and getting lost.*

### Benefits

- Directs bicyclists on the best routes.
- Provides connections to destinations.
- Provides a widespread indicator for motorists that bicyclists should be expected on streets, especially those that are popular bike routes.

### Challenges

- Excessive number of signs can contribute to sign clutter
- Should involve the public to determine destinations in order to develop a successful network.



*Signs are typically placed at decision making points along the route.*



*Sign design can be customized for community branding*

**Cost Rating: Low**

**Effectiveness Rating : Moderate**

## Design Criteria

- Careful consideration, analysis, and public input should go into selecting routes and developing a wayfinding system.
- Confirmation signs, turn signs, and decision signs should all be a part of a wayfinding system to insure bicyclists can easily navigate the route.
- Colors, logos, or symbols can be used by a local municipality to brand their bicycle network.
- Regional wayfinding should involve collaboration among entities.



## Bicycle Parking

People need a safe, convenient place to secure their bicycle when they reach their destination. There are short term bike parking options like bike racks and bike corrals. Long-term bicycle parking options include lockers and bicycle parking stations. Secure bicycle parking is a key factor that influences people's decision to cycle.



*Bicycle racks should support the bicycle at both the tire and the frame.*

### Benefits

- Can increase bicycle use by providing secure and convenient parking.
- Keeps pedestrian zones clear by designating areas for bicycle parking
- Eliminates risk and fear of collisions with over-taking vehicles

### Challenges

- Not all bike racks provide two points of contact with the bicycle.
- Should provide a clear zone around bicycle parking to avoid impeding traffic, including near transit vehicle doors and pedestrians on sidewalks.





*Bicycle corrals are located on the street*



*Bicycle locker*

**Cost Rating: Low**

**Effectiveness Rating : Moderate/High**

## **Design Criteria**

- Bicycle parking should be provided in convenient locations for bicyclists.
- If multiple bicycle racks are installed, place them at least four feet apart to provide maneuvering room.
- Long-term vs. short-term parking will have different requirements for design and security.