APPENDIX A

Design Guidelines

DESIGN GUIDELINES

These design guidelines provide examples of typical physical treatments for enhancing walking and bicycling trips. Sources include the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, the Manual on Uniform Traffic Control Devices (MUTCD), the NJDOT Pedestrian and Bicycle Compatible Design Guidelines, the Institute of Transportation Engineers (ITE), State of the Practice Traffic Calming Guide, and the Federal Highway Administration (FHWA) Designing Sidewalks and Trails for Access, Best Practices Design Guide.

1. Pedestrian Accommodations and Streetscape Enhancements

Sidewalks. Sidewalks are the portion of the public right-of-way between the curb lines, or the lateral lines of a roadway and the adjacent property lines that has an improved surface and is intended primarily for use by pedestrians. Sidewalks should have a paved surface, be at least five feet wide, and provide some separation from adjacent motor vehicle traffic.

Example of sidewalk

Along roadways with low traffic volume and low travel speeds, pedestrians can comfortably share the roadway space with motor vehicle traffic. Sidewalks are appropriate for roadways with higher traffic volumes and/or speeds. Roadways without sidewalks can be evaluated to determine if sidewalk construction would benefit the traveling public.

Crosswalks at Intersections and Mid-block. Crosswalks are a portion of a roadway designated for pedestrian crossing. At intersections, they can be either marked or unmarked. At mid-block locations, they must be marked. Crosswalks help to direct pedestrians to the appropriate crossing location, and let motorists and bicyclists know where to expect pedestrians will be crossing. Crosswalks that include high visibility ladder striping patterns in combination with other treatments such as curb extensions, should be considered along school routes and other key pedestrian and bicyclist locations.

In-Roadway Warning Lights at Crosswalk

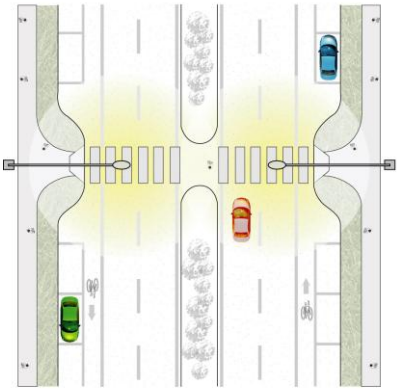
In roadway warning lights are a series of amber lights embedded in the pavement on both sides of a crosswalk to face oncoming traffic. They are intended to provide a heightened warning to motorists that they are approaching a condition on or near a roadway that may require them to slow down or come to a complete stop. Primarily they are intended to alert motorists to the presence of a pedestrian in the crosswalk or about to cross. These devices are included in the MUTCD which provides standards and guidance for their use.

Example of crosswalk with in-roadway warning lights

Where used, these devices must:

- Be installed only at marked crosswalks with applicable warning signs. They shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic control signals.
- Be installed on both sides of the crosswalk and shall span its entire length.
- Begin operation based on pedestrian actuation and shall cease operation at a predetermined time after the pedestrian actuation or, with passive detection, after the pedestrian clear the crosswalk.
- Displays a flashing yellow signal indication when actuated. The flash rate for in-roadway warning lights at crosswalks shall be at least 50, but not more than 60, flash periods per minute. The flash rate shall not be between 5 and 30 flashes per second to avoid frequencies that might cause seizures.

Example of Enhanced Visibility Crosswalks



Example of Mid-block Crosswalk

Pedestrian Signs. Pedestrian warning signs, school crossing signs and restriction signs all help provide both motorists and pedestrians with information about where to expect and how to manage conflicts at crossing locations. School and pedestrian warning signs inform motorists where they are likely to encounter pedestrians waiting to cross a roadway. The striped crosswalks delineate exactly where pedestrians are intended to cross. The signs are an efficient means of informing motorists well in advance of this crossing location.

Yield-to-Pedestrian Crossing signs may be used to remind road users of laws regarding right of way at unsignalized pedestrian crossings. According to the Manual on Uniform Traffic Control Devices (MUTCD), In-Street Pedestrian Crossing (R1-6) signs are not permitted at signalized locations.

According to the MUTCD: "Pedestrian, Bicycle, and School signs and their related supplemental plaques may have a fluorescent yellow-green background with a black legend and border. When a fluorescent yellow-green background is used, a systematic approach featuring one background color within a zone or area should be used. The mixing of standard yellow and fluorescent yellow-green backgrounds within a selected site area should be avoided."

Example of Pedestrian Signs

Traffic Signal Enhancements for Pedestrians. Traffic signal enhancements are designed to increase the safety of pedestrians and improve their awareness of alertness when crossing the roadway. Here are examples of traffic signal enhancments that can be made for pedestrians:

Pedestrian Signal Head

A pedestrian signal head is a signal control that is installed to direct pedestrian traffic at a traffic control signal, through the display of symbols (upraised hand and walking man).

Example of a Countdown Signal

Countdown Pedestrian Signals

A "Countdown Signal" is a pedestrian signal head with numerical display, which informs pedestrians of the number of seconds remaining in the pedestrian clearance interval.

Pedestrian Signal Timing

Pedestrian signal timing is designed to give pedestrians sufficient time to cross the roadway based on the width of the roadway and a selected (assumed) pedestrian walking speed.

Leading Pedestrian Interval (LPI)

An LPI gives pedestrians an advanced walk signal before motorists get a green light, giving pedestrians several seconds to start in the crosswalk where there is a concurrent signal. This enables the pedestrians to enter the crosswalk before motor vehicles start their advance. Using this method, pedestrians are made more visible to motorists so they are more likely to yield to them in the crosswalk.

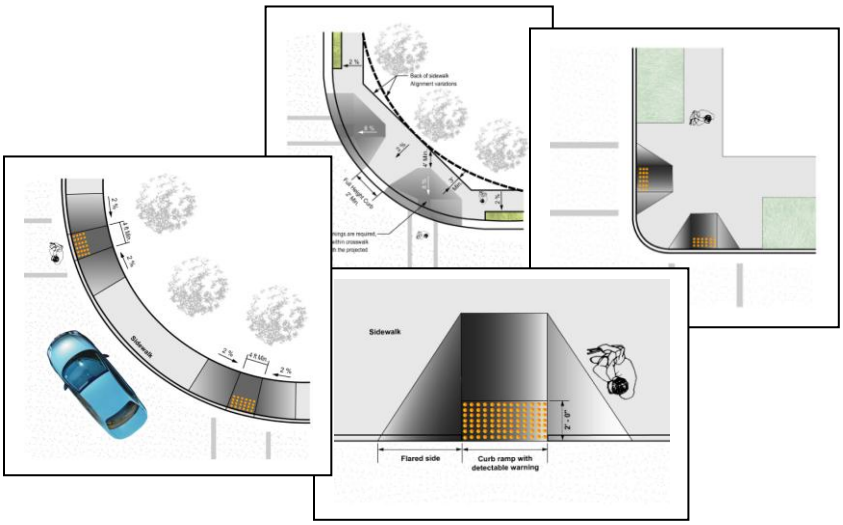
Example of pushbutton

Pushbutton

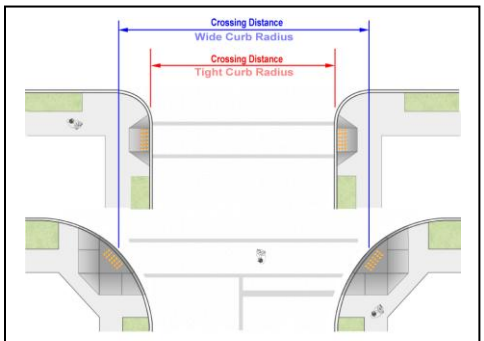
A pushbutton is a button connected to a traffic signal that is used to activate pedestrian crossing phase**.** Pushbuttons are not required on signals that operate on a fixed time basis.

Curb Ramps. Curb ramps are a facility used to enable or facilitate access (a change in elevation) between street and sidewalk by pedestrians, including people using wheelchairs and scooters, as well as other users such as people pushing strollers. The five basic components of curb ramp design are approach, ramps, gutters, landings, and flares. In most cases, two ramps should be provided on each corner.

Additional curb ramps should be installed at any location where they would provide a more direct travel path for pedestrians, especially those with vision impairments who benefit greatly from direct travel paths and consistent intersection treatments. An inventory of the existence and condition of curb ramps at all intersections should be included when conducting a sidewalk inventory.

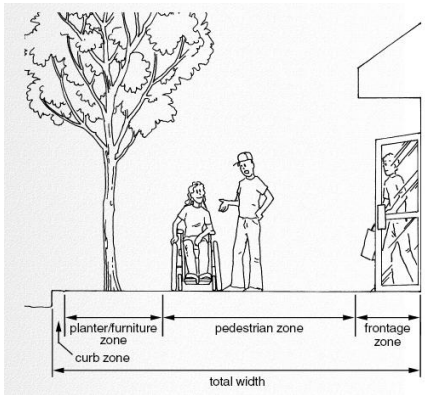


Typical Curb Ramp Design Treatments



Crossing Distance Comparison

Reduced Corner Curb Radii. Curb radii should be designed to be as small as possible considering all intersection users, rather than designing for the largest possible vehicle. Large turning radii allow vehicles to turn at high speeds and increase pedestrian crossing distance. Both factors reduce pedestrian safety and comfort. They also take up space that can be used by waiting pedestrians, make pedestrians less visible to drivers, and make vehicles more difficult for pedestrians to see. Reducing curb radii slows down turning traffic and shortens pedestrian crossing distances.



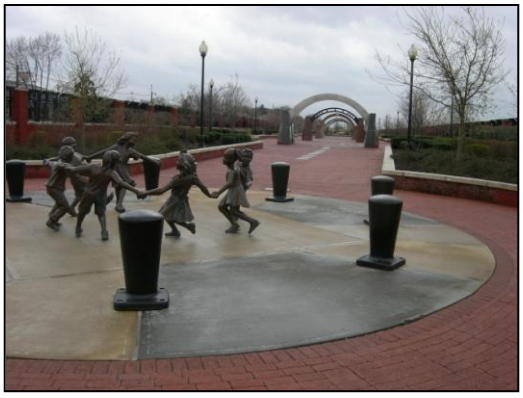
Streetscape Zones

Streetscapes and Public Spaces.
Public spaces, streets in particular, must be designed with all users and the many roles it plays in mind. In addition to conveying traffic of all kinds (both motorized and non-motorized), streets also accommodate underground utilities, above ground fixtures and dynamic interim uses such as street fairs and parades. Successful streetscape design requires coordination of street furniture elements, landscaping utilities (especially lighting) in a design approach that acknowledges the surrounding context. Good design is inspired by the age, density and historic nature of the neighborhood. A vibrant and successful streetscape is an engaging, people-friendly place that makes the most of what the community has to offer.

Wayfinding and interpretive signs can also provide information about public places including parks, historic and cultural sites. Providing good information about location and available facilities can significantly enhance the public experience.

In addition, in designing streetscapes and public spaces, consideration should be given to incorporating public art elements into the design to highlight the cultural and historic significance of the community. Some of the benefits of incorporating public art into the design are that it can offer a sense of ownership to the community as it signifies local character and individuality.

Good Streetscape Design Example



Public Art

Interpretive Sign

2. Bicycle Accommodations

Where roadways have not been specifically designed with bicycles in mind, bicycle travel can be accommodated on any type of street given the proper conditions. Along low volume, low speed roadways bicycle travel can be accommodated in a shared use condition. This is an appropriate and preferred design treatment for bicycle travel along a roadway that currently meets the needs of those who wish to bicycle on it.

To encourage additional bicycle use, rather than auto travel for short local trips, enhanced bicycle accommodations can be provided. Treatments such as bicycle routes, bicycle lanes, and shared lane pavement markings can improve accommodation of bicycle traffic and help to encourage people to travel by bicycle.

Some bicycle accommodations include the following:

Shared Road. A shared road is a roadway which is open to both bicycle and motor vehicle travel. This may be an existing roadway or street with wide curb lanes, a road with paved shoulders, or a roadway or street usually with low traffic volumes and low traffic speeds with no additional outside lane width.

A bicycle compatible roadway is a shared road, not designated as a bicycle facility (bikeway), that has design features such as wide outside lanes and bicycle "safe" drainage grates that enable it to provide basic accommodations for bicyclists.

Example of Shared Road without Delineated Shoulder

A shared road should preferably have paved shoulders that are delineated with striping and be at least four feet in width. However, when four feet is not available, the shoulder should still be delineated. For bicyclists, any additional shoulder width (beyond a minimal travel lane) is helpful. In some cases, low volume roadways with low traffic speeds can function as a shared road even without a delineated shoulder.

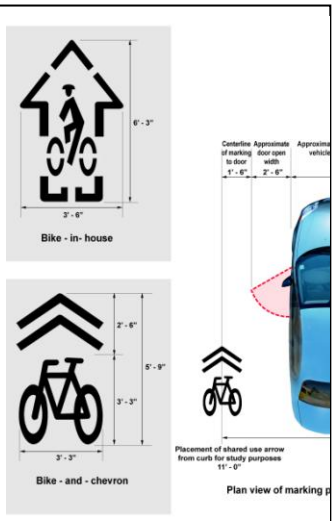
Example of Shared Road with Delineated Shoulder

Shared Lane Markings and Bicycle Routes. Shared lane markings designate the location on a shared road where bicycle traffic should operate. The markings by themselves do not connote a designated bikeway. Research in San Francisco and Florida has shown that shared lane pavement markings have a positive impact on motorist and bicyclist behavior, positions and safety.

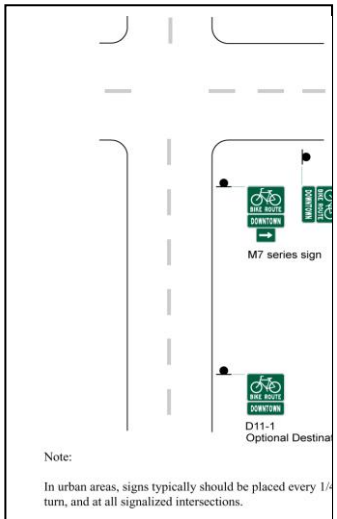
Signed Shared Road, also known as Bicycle Routes, are shared roadways that have been identified by signing as preferred routes for bicycle travel. Bike routes may be signed for various reasons:

- To provide continuity to other bicycle facilities.
- To provide a preferred or more direct route to priority destinations.
- To indicate or provide connectivity to a preferred touring route.

When used alone, bike route signs convey little meaning. They should be accompanied by supplemental plaques giving destinations and distances. A Bike Way map can also provide the supplemental information that supports the use of Signed Shared Routes.



Shared Lane Markings example



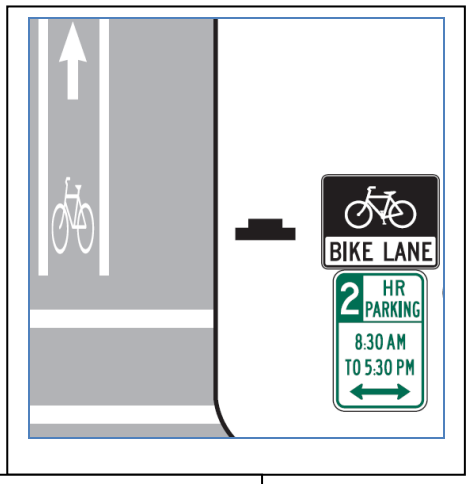
Bicycle Route Signs example

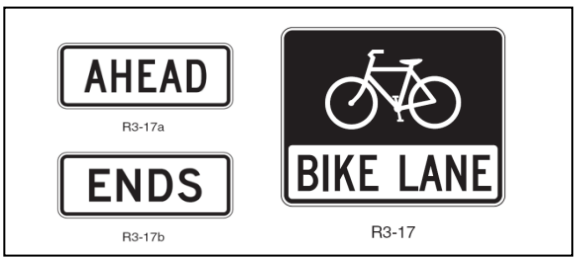
Share the Road Warning Signs (MUTCD)

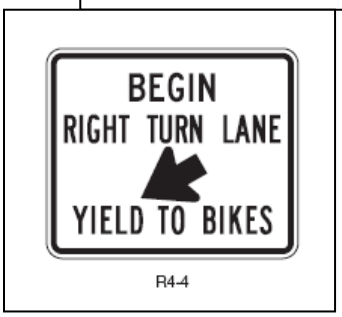
Bicycle (Bike) Lane. Bike lanes delineate available road space for preferential use by bicyclists and motorists, and provide for more predictable movements by each. Ordinarily bike lanes are one-way facilities and carry bike traffic in the same direction as adjacent motor vehicle traffic. However, there are situations in which a "contra flow" bike lane can be installed along a one-way street.

Bicycle lanes promote a smooth, efficient and safe sharing of the highway by:

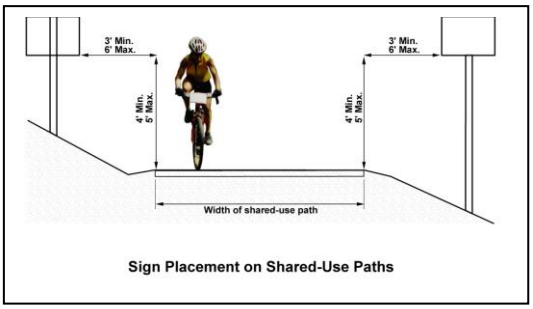
- Establishing the correct riding position for bicyclists.
- Sending a message to motorists that bicyclists have a right to the roadway.
- Reducing the incidence of sudden swerves by motorist and bicyclist (lane changing).
- Guiding bicyclists through intersections on the safest, most predictable course.
- Permitting bicyclists to pass stopped motorists and queue properly at traffic signals.
- Permitting motorists to pass bicyclists on 2-lane roadways.







Shared Use Path. Shared use path is the generic term adopted by AASHTO to encompass trail and path facilities that accommodate a variety of non-motorized uses, most often bicycle and pedestrian traffic. Shared use paths work best when they occupy a linear right of way that is distinctly separated from and has limited interaction with road right-of-way. Common examples include rail rights-of-way (usually, though not necessarily abandoned or inactive), canal tow-paths, greenways along stream corridors and utility rights of way. When two-way shared use paths are located adjacent to a roadway, wide separation between the two facilities is desirable to demonstrate to both the bicyclist and the motorist that the path functions as an independent facility. [AASHTO]



Sign Placement on Shared-Use Paths

A distance of 5 feet from the edge of the shoulder to the shared use path should be maintained wherever possible. A greater distance is recommended in rural areas and next to high-speed roadways, if possible. If a 5-foot separation is not possible, a suitable physical barrier is recommended. The barrier should be a minimum of 42 inches high, to prevent bicyclists from toppling over it, should not impair sight distance at intersections and should reinforce the concept of the path as an independent facility. [NJDOT Bicycle Compatible Roadways and Bikeways, Planning and Design Guidelines]

Path/Trail Surfaces. Path and trail surface types can range in cost, durability, aesthetics, and eco-friendliness and depending on factors such as context and use, each type has varying advantages and disadvantages.

Surface Material (cost per mile) (longevity)	Advantages	Disadvantages
Soil cement, $60,000-$100,000, medium	Uses natural materials, more durable than native soils, smoother surface, low cost, accommodates multiple use.	Surface wears unevenly, not a stable all-weather surface, erodes, difficult to achieve correct mix.
Granular stone, $80,000-$120,000, medium-long (7-10 yrs.)	Soft but firm surface, natural material, moderate cost, accommodates multiple use.	Surface can rut or erode with heavy rainfall, regular maintenance needed to keep consistent surface, replenishing stones may be a long-term expense, not for areas prone to flooding or steep slopes.
Asphalt, $200,000-$300,000, medium-long (7-15 yrs.)	Hard surface, supports most types of use, all-weather, accommodates most users simultaneously, smooth surface to comply with ADA guidelines, low maintenance.	High installation cost, costly to repair, not a natural surface, freeze/thaw can crack surface, heavy construction vehicles need access.

Surface Material (cost per mile) (longevity)	Advantages	Disadvantages
Concrete, $300,000-$500,000, long-term (20 yrs. Plus)	Hardest surface, easy to form to site conditions, supports multiple use, lowest maintenance, resists freeze/thaw, best cold weather surface, most resistant to flooding.	High installation cost, costly to repair, not a natural-looking surface, construction vehicles will need access to the trail corridor.
Boardwalk, $1.5-$2 million, medium-long	Necessary in wet or ecologically sensitive areas, natural-looking surface, low maintenance supports multiple use.	High installation cost, costly to repair, can be slippery when wet.
Resin-stabilized, cost varies depending on type of application, medium-long depending on type of application	Aesthetics, and less environmental impact, possible cost savings if soil used, can be applied by volunteers.	Need to determine site suitability and durability, may be more costly in some cases.
Native soil, $50,000-$70,000, short to long depending on local use and conditions.	Natural material, lowest cost, low maintenance, can be altered for future improvements, easiest for volunteers to build and maintain.	Dusty, ruts when wet, not an all-weather surface, can be uneven and bumpy, limited use, possibly not accessible.
Wood chips, $65,000-$85,000, short-term (1-3 yrs.)	Soft, spongy surface good for walking, moderate cost, natural material.	Decomposes under high temperature and moisture, requires constant replenishment, not typically accessible, limited availability, not appropriate for flood prone areas.
Recycled materials, cost and life vary	Good use of recyclable materials, surface can vary depending on materials.	Design appropriateness and availability vary.

(*Source: Trails for the Twenty-First Century, second edition*)

Asphalt Example

Concrete Example

Crushed Stone Example

Note: *Recycled materials can be used in pathway construction and can include shredded car tires, recycled asphalt, recycled concrete and recycled stone. New recycled and reusable products and manufacturers are emerging with many options for safe and practical construction materials.*

Bicycle Boulevards. A bicycle boulevard is a type of shared roadway that provides a degree of bicycle primacy on selected roadways. Bicycle boulevards are usually collector or minor arterial streets. Recommended guidance on the design elements of a bicycle boulevard include the following:

Example of Bicycle Boulevard

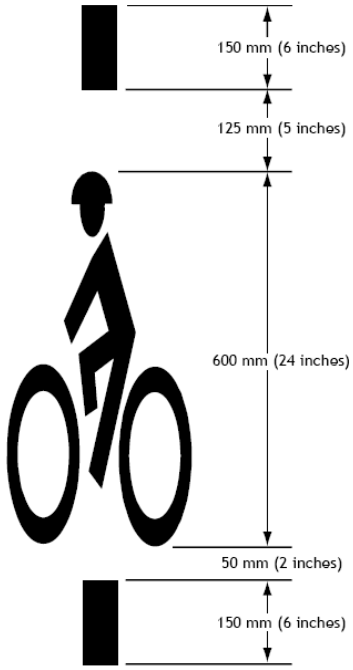
- Select a street that provides a direct and continuous connection for bicyclists. Bicycle boulevards work best on a street grid system.
- Turn stop signs towards intersecting traffic.
- Place motor vehicle traffic diverters at key intersections. The diverters must be designed to allow through bicycle movement. Include a cut-through wide enough to accommodate a bicycle with a trailer (4 feet wide).
- Alternatively, place traffic calming devices on the street. Include traffic circles, speed humps, curb extensions, neck down, chicanes, etc.
- Place directional signs to route bicyclists to key destinations, to guide bicyclists through difficult situations, and to alert motorists to the presence of bicyclists.
- Provide protection where the boulevard crosses higher volume arterial streets by:
  - Providing a signal where a traffic study has shown that a signal will be safe and effective.
  - Or providing a median refuge with a minimum protective width of 8 feet (10 feet preferred).

Advanced Queuing at Signalized Intersections ("Bike Box"). At intersections, bicyclists may find it difficult going straight ahead when many vehicles are turning right. In addition, turning left at traffic signals where many motor vehicles are turning right or going straight ahead can be difficult. Experienced bicyclists will position themselves at the front of the stopped traffic line. However, this may involve positioning the bicycle too far forward to see the signals at some locations.


Example of Advanced Bike Box

Advance stop lines or "bicycle box" for bicyclists accommodate this practice by providing a waiting area (reservoir) for bicyclists between two stop lines – one for cyclists and an advance stop line for motorists. A bike lane on the right allows bicyclists to bypass the traffic lane and reach the waiting area during the red phase of the signal. When the light changes, the bicyclists are then able to proceed in advance of motor vehicles. The advance stop line also allows bicyclists to position themselves away from direct vehicle fumes.

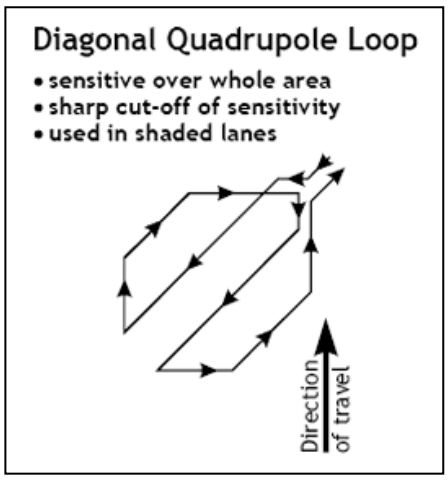
Moving the vehicle stop line back at signalized intersections with bike lanes can improve the visibility of bicyclists, especially to vehicles turning right and opposing traffic. Advanced stop lines also benefit pedestrians as they and drivers of vehicles have a clearer view of one another and more time to assess each other's intentions.

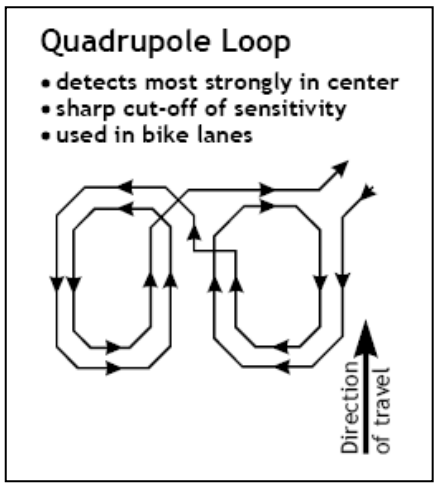


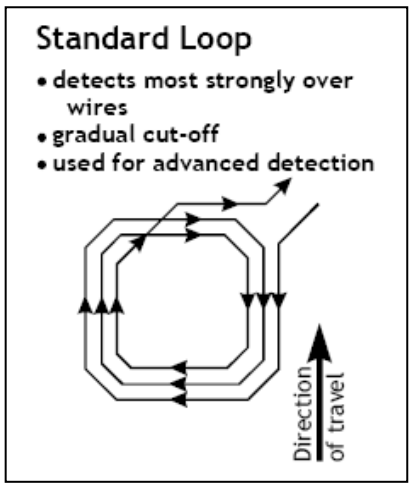
Bicycle Detector Pavement Marking

Bicycle Actuated Traffic Signals. The FHWA recommends that new on-road bicycle facilities include traffic signals that detect bicycles for all actuated signal systems. Several bicycle-sensitive loop configurations (loops are wires installed beneath the pavement surface that detect the presence of vehicles) are available that can effectively detect bicycles. The quadrupole loop is the preferred solution for bike lanes, and the diagonal quadrupole loop is preferred for use in shared lanes.

A potential solution for existing intersection signals that do not respond well to bicycles is to install a special pavement marking over the exact spot that a bicycle must stop in order to activate the signal.







3. Traffic Calming

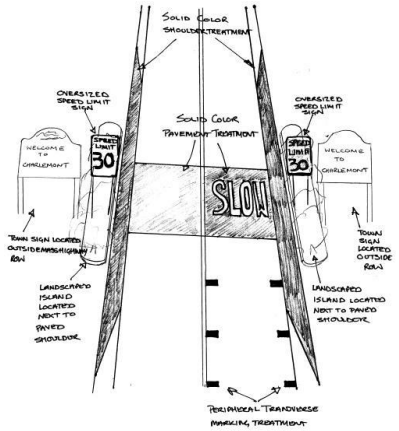
According to the Institute for Transportation Engineers, "traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users". Traffic calming techniques target specific issues and are applicable to certain roadway conditions. Some treatments are appropriate only on local roads, while others are designated for higher classification roadways.

Traffic calming measures that impact driver behavior can be categorized into volume control or speed control. Some measures that target cut through traffic or minimizing volume, include restricted turns, roadway closures or median barriers. Speed control measures include passive concepts such as gateways or streetscape that changes a driver's perspective of a corridor, and active concepts that force a driver to physically alter their travel path. This can be accomplished with speed humps, curb extensions, mini traffic circles, rumble strips or stripes or any of numerous tested and proven techniques to help encourage motorists to drive at an intended speed.

Example of Speed Hump

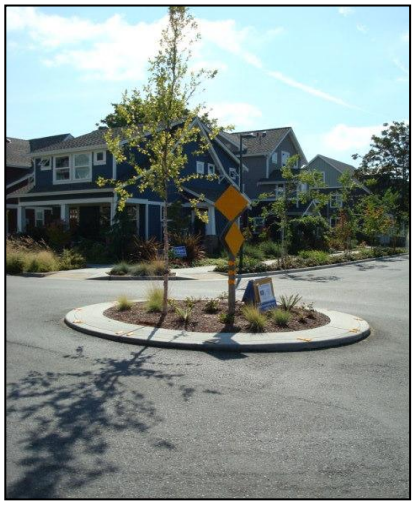
Example of Traffic Calming Sign

Example of Raised Intersection



Example of Traffic Calming Design

Mini Traffic Circles or Roundabouts. A mini traffic circle or roundabout is a small traffic circle placed at the intersection of two or more streets. It operates on the "yield-on-entry" principle (giving vehicles within the roundabout the right-of-way), as opposed to "yield-to-entry" (giving entering vehicles the right-of-way) larger sized traffic circles historically found in New Jersey. Mini traffic circles or roundabouts limit speeds by horizontally deflecting vehicles as they pass through an intersection. They reduce crashes by separating movements and ensuring that all vehicles traverse the intersection at the design speed.

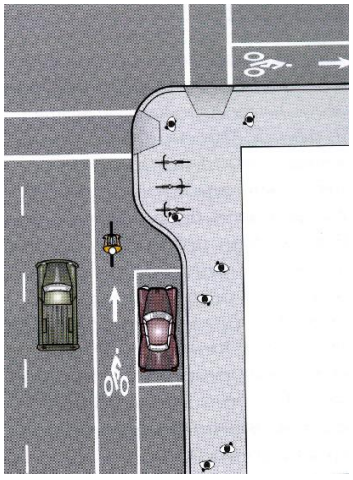


Examples of Mini Traffic Circles

Curb Extensions. Curb extensions refer to any horizontal extension of the sidewalk into the street. They are also commonly known as neck downs, curb bulbs, sidewalk flares, bulge, traffic throttles, and bulb-outs. Curb extensions may be used at an intersection or mid-block wherever there is a parking lane. The benefits of curb extensions include:

- Enhanced visibility between pedestrians and drivers
- Less exposure for pedestrians due to shorter crossing distances
- Greater space for pedestrian waiting to cross the street
- More space for sidewalk furniture
- Fewer vehicles blocking the crosswalk area

Example of Curb Extension



Example of Curb Extension Design

Gateways. Gateway treatments identify a transition from one area to another. They are often used at municipal boundaries to inform travelers that they have entered a new city or town, or at the boundary of a business district to signify that land use and intended operating speeds along a roadway may be different than in the previous area.

Example of Gateway

Forced Turn Islands Closures. Managing what turns and what through movements are permitted at intersections and along roadways can physically control traffic volumes. This can be an extremely effective way to eliminate unwanted cut through traffic. The effect of the traffic management devices must be carefully considered, as they will affect local traffic as well as would be through traffic.

Example of Forced Turn Island

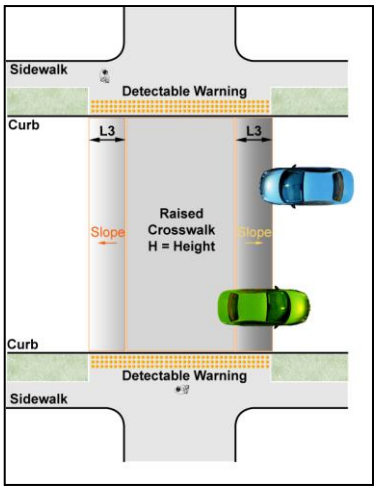
A forced turn island or diagonal diverter is a barrier placed diagonally across an intersection, that forces traffic to turn in one direction and prevents other movements. Design options range from a line of bollards placed diagonal across the intersection, to a full street reconstruction complete with curb extensions.

A full street closure closes a street to through traffic at an intersection or mid-block. Design options range from bollards, gates, or planters placed across the street, to a full street reconstruction complete with trees, landscaping and vehicle turnarounds. Similarly, a half street closure closes a street to through traffic in one direction. It may be installed at an intersection or mid-block where a street transitions from one land use to another.

Example of closure to motor vehicles

These measures can often work most effectively in conjunction with other traffic calming treatments such as curb extensions, aesthetic pavement treatments and streetscaping.

Speed Humps, Raised Crosswalks and Raised Intersections. Vertical speed control devices or "raised" roadway treatments are extremely effective at eliminating excessive speeding along a roadway. They can be designed for intended travel speed between 25 and 35 miles per hour, are most effective when used in a series of at least three elements along a corridor, and typically have an effective range of approximately 300 feet. There are temporary treatments available that can be used to help test what locations can work best along a given roadway, and can be easily moved before a final design decision is constructed permanently.



Example of Raised Crosswalk

Rumble Strips and Rumble Stripes. Audible and visual striping treatments can also be an effective means of managing travel speeds along a roadway. Rumble strips give drivers feedback that increases with travel speed. Rumble stripes are more of a visual perceptive device that are less intrusive to the surrounding neighborhood, since they are designed to be seen and not heard.

Colorized Pavement. Pavement can be augmented with several types of treatments to achieve an aesthetic and durable colorized treatment for many applications. This can be used to delineate a parking area, a loading zone, to highlight bicycle lanes or other streetscape features that are intended to standout from the typical roadway cross section.

Example of Colorized Pavement

Traffic Safety/Innovative Traffic Calming signs. Municipalities across New Jersey have used innovative traffic signs to call drivers attention to their travel speeds, and to reinforce a priority on pedestrian safety. Some innovative traffic safety signs have sent the following messages:

- *"We have plenty of children but none to spare"*
- *"Exceed 25mph – meet our judge"*
- *"25, yes your car can go that slow"*
- *"If Daisies Are Your Favorite Flower; Keep Pushin' Up those Mile-Per-Hour" (Burma-Shave)*
- *"Thirty Days Hath September April, June; and The Speed offender" (Burma-Shave)*

Example of Innovative Traffic Calming

4. Amenities

Bicycle Parking. Safe and secure bicycle parking can help encourage more travelers to bike to their destination in place of driving. With up to 10 bicycles being able to be parked in the space of one motor vehicle, this can be extremely attractive to both planners and travelers who wish to park close to where they are going. Bicycle racks provide easy access and are typically easy to locate. Bicycle lockers and parking shelters offer protection from the elements and are appropriate for longer-term bicycle parking. Bicycle lockers can also be a deterrent from vandalism and theft. With growing concern for public safety, many communities are looking for options to make security more effective. Clear bicycle lockers provide one option.

Example of Bicycle Rack

Example of Bicycle Parking Shelter

Example of Bicycle Locker

Rest Areas/Benches. Providing a place for people to gather, rest and generally take in their surroundings can greatly enhance a visitor's experience of any place they travel. Incorporating a place to sit, wait for friends, or tie your shoe is an excellent amenity for a trail, sidewalk, path, commercial area or any place that will likely attract pedestrian travel. Providing rest areas and/or benches can also passively encourage people to stay in an area longer and possibly visit more than one destination in what would otherwise be a single stop auto trip.

Example of a bench along a trail

Rest areas/benches should be placed in areas of heavy pedestrian traffic and/or areas of special interest. Rest areas/benches should be visible and convenient to encourage pedestrian use but should not impede the flow of pedestrian travel. The design and materials used should be dependent on the surrounding land use and intended users. Rest areas/benches should suit the community character and/or be incorporated into public art projects. Common construction materials include wood, concrete, fiberglass, steel and recycled and repurposed materials such as "lumber" from recycled plastic.

Example of Rest Area

Example of xylophone bench made with repurposed materials

Example of a bench as a Community Public Art Project

In areas that cater to furnishing the visitor with a welcome stop in their journey, additional amenities should be considered for nearby placement. Such amenities include public restrooms, trash receptacles, and water fountains. Rest area facilities can be constructed in an eco-friendly manner by incorporating sustainable, energy and maintenance-efficient options into the design. The design standard for public restrooms has been to build restrooms with conventional, low-flow toilets or renting portable toilets. Communities can employ "green" building standards to build restroom facilities that are created with sustainable materials that take advantage of natural light and heat, and powered by energy efficient sources like solar panels.

Example of a "living roof" sustainable bathroom

Maintenance costs can be reduced by utilizing facilities such as self-compacting/self-composting toilets and/or self-compacting/self-composting trash receptacles. Because the waste is completely self-contained, these facilities are able to handle more waste than those that are traditionally used thereby reducing the collection rate. Compartmentalized recycling receptacles encourage a healthy sustainable environment by having users separate the trash from the recyclable material - eliminating additional steps for maintenance crews.

Pedestrian-Scale Lighting. Providing lighting focused on sidewalks and paths can greatly enhance the perception of the pedestrian travel corridors. Many roadways have lighting that focuses on major intersections or the center of the roadway. While there may be some surplus lighting that covers portions of a sidewalk area, the spotlight is on the motorist's line of sight. Pedestrian-scale lighting would focus on a more uniform and lower-scale lighting pattern that is more consistent along the sidewalk or path.

Example of solar powered pedestrian-scale lighting along path

Pedestrian-scale lighting should be positioned between 12-15 feet above a sidewalk, crosswalk or path. Light-emitting diode (LED) bulbs or solar powered lighting can be utilized in communities looking to achieve energy and maintenance efficiency. In residential areas, light fixtures that are equipped with glare shields should be considered to protect adjacent residences from light pollution from surplus lighting.

Kiosks/Interpretive Signs. Local residents and visitors to an area benefit from access to information when they are at a site so they can easily interpret both where they are and what is immediately around them. Kiosks (weatherproof bulletin boards with a roof) provide a means to display information about the surrounding area, trails, amenities in the area and upcoming events. Interpretive signs allow visitors to take a self-guided tour and can be combined with maps for self-orientation. Providing a series of interpretive signs along a longer facility can encourage visitors to travel along a path or corridor and truly experience the area.

Example of Interpretive Sign

Example of Kiosk

Trailheads. Travelers looking to access a path or trail benefit from clear and precise information about where the trail intersects adjacent roadways. Trailheads can provide this information by identifying major access points to the trail and other recreational facilities. Trailheads can vary in scale from small-scale with a simple sign marking the intersection location to large-scale with a parking lot, restrooms and a welcome center. Trailheads can be sized to fit the context of any trail intersection and the design should be in keeping with the character of the trail and its amenities.

Example of Trailhead

Outdoor Fitness Systems. Outdoor fitness systems, especially exercise stations configured along a walking path, can enhance the experience of users by combining the benefits of walking with other fitness activities. Outdoor fitness systems are often incorporated into community parks and trails to specifically meet the needs of active older adults.

Example of Outdoor Fitness Svstem